PHASE 2 ENVIRONMENTAL INVESTIGATION
of a site at
REAR OF 39 SECOND CROSS ROAD, TWICKENHAM
for
ANTHONY C BIANCHI

Contaminated Land Solutions

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Project No 1985
Report ref: 1985-P2E-1
Issued: 24 April 2024
Revision:

Document Control		
Revision	**Issue date**	**Reason for Revision**
Draft	19/04/2024	
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Revision	**Issue date**	**Reason for Revision**
Original	24/04/2024	
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Revision	**Issue date**	**Reason for Revision**
A		
Prepared by		
Reviewed by		
Approved for issue by		
Revision	**Issue date**	**Reason for Revision**
B		
Prepared by		
Reviewed by		
Approved for issue by		
Revision	**Issue date**	**Reason for Revision**
C		
Prepared by		
Reviewed by		
Approved for issue by		

CONTENTS

14 REFERENCES

Appendix A – Site Location Plan

Appendix B – Site Works Plan

Appendix C – Proposed Site Plan

Appendix D –Borehole Logs

Appendix E – Borehole Photographs

Appendix F – Contamination Test Results

Appendix G – Geotechnical Test Results

1 EXECUTIVE SUMMARY

The phase 1 report identified the following potentially significant sources and receptors:

On-Site contamination sources	None identified
Off-Site contamination sources	former War Surplus Yard and a historical smithy.
Potential Contaminants	Metals, Hydrocarbons & PAHs Asbestos (War Surplus Yard only)
Receptors	Site Users, Ground workers, Maintenance operatives, Principal Aquifer

The proposed site usage is residential with private gardens.

The made ground on site was found to include pieces of ash and clinker. Therefore made ground impacted by past use has been included as an onsite source of contamination.

Elevated levels of lead have been recorded within samples taken from boreholes positioned across the site. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

Areas where the development is proposed to comprise of buildings and impermeable hardstanding do not pose a significant risk to on-site and off-site receptors therefore made ground can remain in these areas. The made ground beneath proposed soft landscaped and permeable areas should be removed to a depth of natural ground and replaced with clean soil.

It is recommended that a remediation strategy and verification plan is prepared.

Risk Summary

Very Low	Low	Moderate / Low	Moderate	High

		Receptors				
		Site Users	Ground Workers	Neighbours	Proposed Building	Aquifer
Sources	Made Ground (On site) (Lead)					
	Former War Surplus Yard and Smithy (Off-Site) (Lead)					

2 BRIEF

Mr Antony Bianchi instructed GO Contaminated Land Solutions to undertake a phase 2 geo-environmental investigation of the site.

This report should be read in conjunction with the phase 1 environmental report dated November 2020, ref 1985-P1E-1 by GO contaminated Land Solutions.

3 INVESTIGATION STRATEGY

The phase 1 environmental report shows that there sis potential for contamination to be present on site from a former army surplus yard and a historical smithy.

The principles of the strategy are to:

- Identify the nature and extent of any contamination in the made ground across the site.

Non-targeted sampling has been used where contamination location is unknown.

Location Reference	Rationale for Location	Depth (mbgl)	Sampling, Testing & Monitoring
BH3, BH4, BH5 and BH6	Boreholes were located to give coverage of the site	0.20 - 0.60	Tested for asbestos, metals, hydrocarbons & PAHs Leachate testing for lead
BH13, BH14, BH14 and BH16	Located adjacent to BH3, BH4, BH5 and BH6 respectively to test made ground below 600mm	0.60 – 0.80/1.10	Tested for lead and lead leachate

4 SITE DESCRIPTION

3 November 2020

The site is rectangular shaped in plan and occupies 0.05 ha.

The site comprises of a gravel drive area, soft landscaping (lawn & plantings), green house, wooden storage sheds and a patio area. Access to the site is gained via a wooden gate from Chestnut Road. The site can also be accessed from the associated property at 39 Second Cross Road.

Photograph 1: View of the site looking NE from the SW border

Towards the southern end of the lawn, where it meets the driveway there is a mound of excavated soil placed against the fence. A wooden shed sits adjacent to the fence on north west side of the driveway.

Beyond the driveway is a lawn which accounts for half of the site area and extends to the patio, greenhouse and second shed at the northeast end of site.

Some gardening equipment and a store of firewood was found behind the shed to the north east.

The site is bound on all borders by a wooden fencing. A large growth of ivy was noted at the southern end of the south west boundary fence.

The site is situated in a residential zone. The surrounding area is mostly residential with some commercial activity (shops and restaurants) south & south west of the site.

According to client, 41/43 Second Cross Road was occupied by a War Surplus Yard until approximately 2000 when the area was developed into houses.

An active tyre dealer was noted at the southern end of Second Cross Road (120m).

No visual or olfactory evidence of contamination was noted during the visit.

12 March 2024

The site was found to be unchanged from the above description.

5 SITE WORKS

5.1 Programme

The initial sampling site works were undertaken on 12 March 2024.

Further sampling works were undertaken on 4 April 2024.

5.2 Boreholes

Initially four boreholes were hand augered to depths of between 1.0 and 1.2mbgl for soil sampling purposes.

Four further boreholes were undertaken adjacent to the previous locations to depths of 1.0 and 1.25mbgl to sample the deeper made ground.

6 GROUND CONDITIONS

6.1 Geological Survey

Reference to the geological survey of Great Britain indicates that beneath made ground, the area generally is underlain by superficial deposits comprising sand and gravel which is described as Kempton Park Gravel Member.

The superficial deposits are underlain by bedrock comprising clay and silt described as London Clay Formation.

6.2 Hydrogeology

The Environment Agency maps show the site to be located over a Principal Aquifer in the superficial or drift deposits, in the bedrock they show the site to be over Unproductive Strata.

Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Principal Aquifers comprise layers of rock or drift deposits that have either high intergranular or fracture permeability, meaning they usually provide a high level of water storage. They may support either water supply or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

The soils overlying the aquifers are assumed to have a high leaching potential (U) and a worst case vulnerability classification (H) is assumed due to a lack of data available for restored workings and urban areas.

The Environment Agency maps show the site is not located within a source protection zone of a borehole abstraction point.

The Environment Agency define a zone according to how the groundwater behaves in that area. From this a model of the groundwater environment is developed on which to define the zones.

Groundwater source catchments are divided into three zones:

SPZ1 – Inner protection zone

Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

SPZ2 – Outer protection zone

Defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3 – Source catchment protection zone

Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75.

6.3 Hydrology

The main water course of significance to the site would appear to be the River Crane which is approximately 436 metres to the north at the nearest point. This is considered to be too distant to be significantly impacted by the site

The Environment Agency maps show the site is not located within a flood zone.

The British Geological Society data shows the site lies in an area with potential for groundwater flooding to occur at surface.

6.4 Field Summary

The ground conditions encountered are summarised in the following table. Full records are contained in appendix D.

Depth from (mbgl)	Depth to (mbgl)	Description
0.00/0.10	1.10	MADE GROUND
0.80	1.25 +	Silty or Silty Clayey SAND

7 PROPOSED DEVELOPMENT

Plans for the proposed development are included in appendix C.

The proposed development comprises a two-storey detached residential property and a private garden.

8 CONTAMINATION SAMPLING and TESTING

8.1 Laboratory Testing

The chemical testing was carried out in accordance with standard industry methods in a UKAS approved laboratory which is also currently accredited in accordance with MCERTS for the majority of its testing. Further information regarding this accreditation is available on request together with a full list of test methods if required.

All samples were tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA). These include, heavy metals, aromatic and aliphatic hydrocarbons, in accordance with Environment Agency guidelines, and speciated PolyAromatic Hydrocarbon (PAH) only.

All samples were analysed for the presence of asbestos.

8.2 Test Results

All the results have been compared to the Atkins 2017 ATRISKsoil SSVs for residential use with plant uptake, for 1% or 6% as appropriate, where available. These guideline values have been derived using the updated CLEA v1.071 model, previously published Category 4 Screening Levels (C4SLs) by DEFRA and information in the Environment Agency guidance SR2. Where ATRISKsoil SSVs have not been derived, the Category 4 Screening Levels have been used, and for determinands which do not have either of the above, the LQM/CIEH Suitable 4 Use Levels (S4ULs) assessment criteria have been used.

12 March 2024

TEST RESULTS ABOVE SCREENING VALUES				
Determinand	**Reference**	**Depth**	**Value (mg/kg)**	**Screening value (mg/kg)**
Lead	BH3	0.20 – 0.60	791	200
	BH4		672	
	BH5		760	
	BH6		1420	

LEACHATE TEST RESULTS COMPARED TO WATER GUIDELINE VALUES				
Determinand	**Reference**	**Depth**	**Value (ug/l)**	**WGV (ug/l)**
Lead	BH3	0.20 – 0.60	43	10
	BH4		37	
	BH5		140	
	BH6		58	

All three samples were screened in the laboratory for the presence of asbestos fibres. No asbestos was identified in any of the samples.

4 April 2024

Four additional samples were taken in adjacent locations at depths below 600mm to determine whether the underlying made ground below 600mm could remain on site.

These samples were tested for lead only.

TEST RESULTS ABOVE SCREENING VALUES				
Determinand	**Reference**	**Depth**	**Value (mg/kg)**	**Screening value (mg/kg)**
Lead	BH13	0.60 – 1.10	388	200
	BH14	0.60 – 0.80	381	
	BH15	0.60 – 1.00	282	
	BH16	0.60 – 1.10	836	

All the additional samples of made ground were found to exceed the screening value for lead. Therefore leachate tests were undertake on all four samples. See table below

LEACHATE TEST RESULTS COMPARED TO WATER GUIDELINE VALUES				
Determinand	**Reference**	**Depth**	**Value (ug/l)**	**WGV (ug/l)**
Lead	BH13	0.60 – 1.10	128	10
	BH14	0.60 – 0.80	61	
	BH15	0.60 – 1.00	107	
	BH16	0.60 – 1.10	61	

The initial and further leachate tests are all significantly above the WGV for lead. Therefore there is a risk to the underlying aquifer as well as a risk to on site and off site receptors. Appropriate remediation is required.

9 CONTAMINATION DISCUSSION

In this investigation samples were tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA).

Only elevated levels of lead were recorded, with all other contaminants below the screening criteria for residential with plant uptake.

The site is located above a principal aquifer, therefore lead leachate testing was undertaken to determine the risk to the aquifer and to assess whether made ground underlying soft landscaping and permeable areas could remain on the site.

The leachate testing found that the leachate significantly exceeded water guideline values. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

No olfactory evidence of contamination (such as vapours) was identified during sampling. No visual evidence of contaminants, such as oils, were noted.

Four samples were screened in the laboratory for the presence of asbestos fibres. No asbestos was identified in any of the samples.

Areas where the development is proposed to comprise of buildings and impermeable hardstanding do not pose a significant risk to on-site and off-site receptors therefore made ground can remain in these areas. The made ground beneath proposed soft landscaped and permeable areas should be removed to a depth of natural ground and replaced with clean soil.

No significant organic containing material was identified within the ground and it is therefore not considered necessary to undertake any monitoring of potential ground gases.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported. It is critical that the WAC results are representative of the material to be disposed of and therefore care must be taken to ensure that different materials are not mixed. Guidance can be obtained from Environment Agency document Waste Sampling and Testing for Disposal to Landfill.

10 REVISED CONCEPTUAL MODEL

The legislative framework for the regulation of contaminated land is embodied in Part IIA of the Environmental Protection Act 1990, implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by UK contaminated land policy is that of "suitability for use" which implies that the land should be suitable for its current use and made suitable for any proposed future use.

In this revised contamination assessment the site has been modelled using the Source-Pathway-Receptor approach to produce a site specific conceptual model.

Source - substances or potential contaminants which may cause harm

Pathway - a linkage or route between a source and receptor

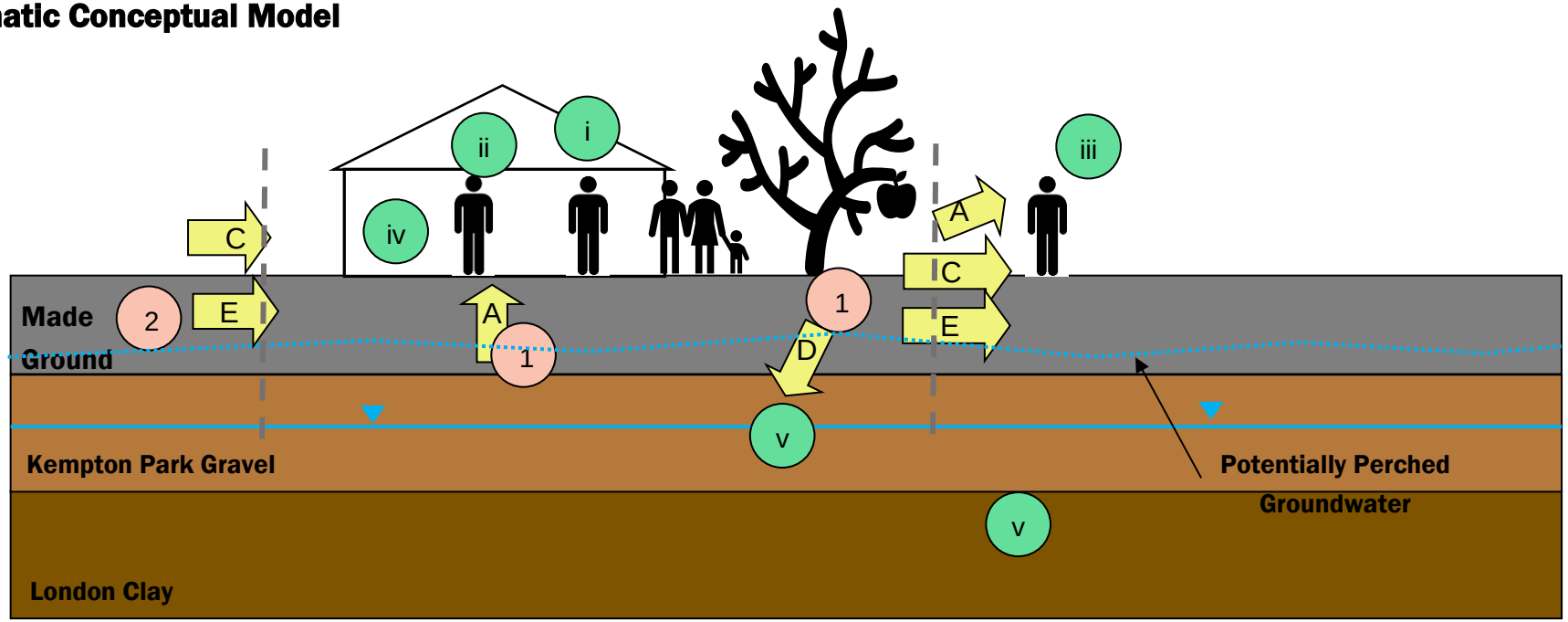
Receptor - humans, plant life, groundwater etc., which could be harmed by a contaminant

Geological records indicate that the site is underlain by an aquifer in the superficial stratum and therefore there is a potential for contaminants to be transported both to and from site in the groundwater.

From the information available at present a revised conceptual model has been considered.

		Potential pathways												
		Inhalation of contaminated vapour	Inhalation of contaminated dust	Direct Soil Ingestion	Direct dermal contact	Inhalation of asbestos	Drinking contaminated water supply	Direct contact of soil with building materials	Surface water run-off	Surface water percolation to groundwater	Migration via groundwater	Build-up of ground gas	Comments on discounted pathways	
Receptors	Site Users	N	Y	Y	Y	N	Y					N	Only lead identified as exceedance, therefore vapour pathway not considered significant	No potentially significant sources of land gas identified.
	Ground Workers	N	Y	Y	Y	N						N		
	Neighbours	N	Y			N			Y		Y	N	No asbestos identified	
	Proposed Building							N				N	Geotechnical investigation completed	
	Watercourse								N		N		No major watercourse identified nearby.	
	Aquifer									Y				

Schematic Conceptual Model



Sources	Pathways	Receptors
1 Made Ground (Lead) (On Site) 2 Army surplus yard and smithy (Lead) (Off Site)	A Inhalation, ingestion, dermal contact B Drinking contaminated water supply C Surface water run-off D Surface water percolation to groundwater E Migration via groundwater	i Site Users ii Ground Workers iii Neighbours iv Proposed Building v Groundwater (Principal Aquifer)

11 REVISED RISK ASSESSMENT

The level of information provided by the Landmark report and historic Ordnance Survey maps, together with the other information within the report is considered suitable to provide the data for a satisfactory risk assessment for the site. While there will always be uncertainties due to known or unknown gaps in information it is considered that sufficient information is available to reduce those uncertainties to within acceptable limits for the nature of the site under review.

Only contaminants identified to exceed the environmental screening level have been included in the Risk Assessment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground impacted by past use (On Site)	Lead	Site Users	Dermal contact	Medium	Likely	Moderate risk	Remediation required
			Soil Ingestion and Home Produce Consumption	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Low likelihood	Moderate/Low risk	
			Drinking of water from supply impacted by contaminated soil	Mild	Unlikely	Very low risk	It is not considered that barrier supply pipe is required. This report should be provided to the water supplier for confirmation
		Ground Workers	Dermal contact	Medium	Likely	Moderate risk	Information to be contained in site Health & Safety Plan and File. Use of appropriate PPE and normal good hygiene measures. Appropriate dust control measures during construction.
			Soil Ingestion	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Likely	Moderate risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground impacted by past use (On Site)	Lead	Neighbours	Inhalation of contaminated dust (during construction)	Medium	Low likelihood	Moderate/Low risk	Appropriate dust control measures during construction.
			Inhalation of contaminated dust (after construction)	Medium	Unlikely	Low risk	No action required.
			Surface water run-off	Medium	Low likelihood	Moderate/Low risk	Remediation required
			Lateral migration of groundwater transporting contaminants	Medium	Low likelihood	Moderate/Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground impacted by past use (On Site)	Lead	Aquifer	Vertical percolation to groundwater via Foundations	Medium	Likely	Moderate risk	Remediation required
			Vertical percolation to groundwater via soft landscaped and permeable areas	Medium	Likely	Moderate risk	
			Percolation to groundwater via SuDS	Medium	Likely	Moderate risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Former War Surplus Yard and Smithy (Off Site)	Metals Hydrocarbons PAHs	Site Users	Dermal contact	Medium	Likely	Moderate risk	Remediation required
			Soil Ingestion and Home Produce Consumption	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Low likelihood	Moderate/Low risk	
			Drinking of water from supply impacted by contaminated soil	Mild	Unlikely	Very low risk	It is not considered that barrier supply pipe is required. This report should be provided to the water supplier for confirmation

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Former War Surplus Yard and Smithy (Off Site)	Metals Hydrocarbons PAHs	Ground Workers	Dermal contact	Medium	Likely	Moderate risk	Information to be contained in site Health & Safety Plan and File. Use of appropriate PPE and normal good hygiene measures. Appropriate dust control measures during construction.
			Soil Ingestion	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Likely	Moderate risk	

Any visual or olfactory evidence of contamination noted during works should be investigated by a suitably qualified person and their recommendations implemented.

12 SITE WORKS and UNEXPECTED CONDITIONS

The sample locations were positioned to cover the site. However, there are areas where investigations were not carried out, and although unlikely given the size of the site, it should be considered possible that other areas may potentially be contaminated. Construction operatives should remain vigilant for any unexpected contamination encountered during development (eg discoloured soil or odours or buried waste). Any unexpected conditions should be investigated by a suitably qualified person and their recommendations implemented.

It is recommended that construction operatives use appropriate ppe, normal good hygiene measures, and appropriate dust control measures if necessary. The risks to construction operatives identified, should be addressed under a Construction (Design and Management) (CDM) Plan. The CDM Regulations place legal duties on those involved in construction work. All construction projects require a plan to ensure that health and safety issues are properly considered during a project's development so that the risk of harm to workers is reduced.

13 CONCLUSIONS

In this investigation, elevated levels of lead were recorded in all samples throughout the depth of made ground on site Leachate testing found that the lead leachate significantly exceeded water guideline values. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

It is recommended that a remediation strategy and verification plan is prepared.

It is unlikely but possible that asbestos may be present in other areas of the site and therefore construction operatives should also ensure that appropriate ppe and good hygiene measures are used, and dust control measures during construction where necessary. Any debris from earlier demolition found during site strip is to be inspected for asbestos by a suitably experienced contractor.

Areas where the development is proposed to comprise of buildings and hardstanding do not pose a significant risk to on-site and off-site receptors therefore made ground can remain in these areas. In areas of soft landscaping and permeable hardstanding made ground should be removed down to a depth of natural ground and replaced by clean soil.

It is recommended that a remediation strategy and verification plan is prepared.

It is recommended that this report is referenced in the site Health and Safety Plan and that normal good hygiene practice is observed during the works and subsequent building and grounds maintenance.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

14 REFERENCES

Atkins. (2006, July 13). Retrieved from ATRISKsoil: http://www.atrisksoil.co.uk/

BS 5930, British Standard. Code of practice for ground investigations. *British Standards Institution*.

BS10175, British Standard. (2001). Investigation of potentially contaminated sites - Code of Practice. *London: British Standards Institution*.

Building Research Establishment. (2004). *Cover Systems for Land Regeneration: Thickness of Cover Systems for Contaminated Land (BR 465)*. IHS BRE Press.

Card, G. B., Wilson, S., & Mortimer, S. (2012). *A Pragmatic Approach to Ground Gas Risk Assessment*. London, UK: Contaminated Land: Applications in Real Environments.

Contaminated Land: Applications in Real Environment (CL:AIRE). (2009). *Soil Generic Assessment Criteria for Human Health Risk Assessment*. London: CL:AIRE.

Contaminated Land: Applications in Real Environment (CL:AIRE). (2014). *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*.

D Environment Agency. Land Contamination Risk Management (LCRM).

Environment Agency. (2013). *Groundwater protection: principles and practice (GP3)*. Bristol: Environment Agency.

Environment Agency. (2013). *Waste Sampling and Testing for Disposal to Landfill*. Bristol, UK: EA.

Health and Safety Executive. (2012). *The Control of Asbestos Regulations 2012*.

Health and Safety Executive. (2015). *Construction (Design and Management) Regulations 2015*.

Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C., & Nathanial, J. F. (2015). *The LQM/CIEH S4ULs for Human Health Risk Assessment*. Nottingham: Land Quality Press.

UK Water Industry Research Ltd. (2010). *Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites*. UKWIR.

Wilson, S., Oliver, S., Mallet, H., Hutchings, H., & Card, G. (2007). *CIRIA Report C665. Assessing risks posed by hazardous gases to buildings*. London, UK: Construction Industry Research and Information Association.

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The recommendations made and the opinions expressed in this report are based on the borehole records, examination of samples and the results of site and laboratory tests.

The report is issued on the condition that GO Contaminated Land Solutions Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the boreholes or trial pits which have not been shown by the boreholes, trial pits or other tests carried out during the investigation.

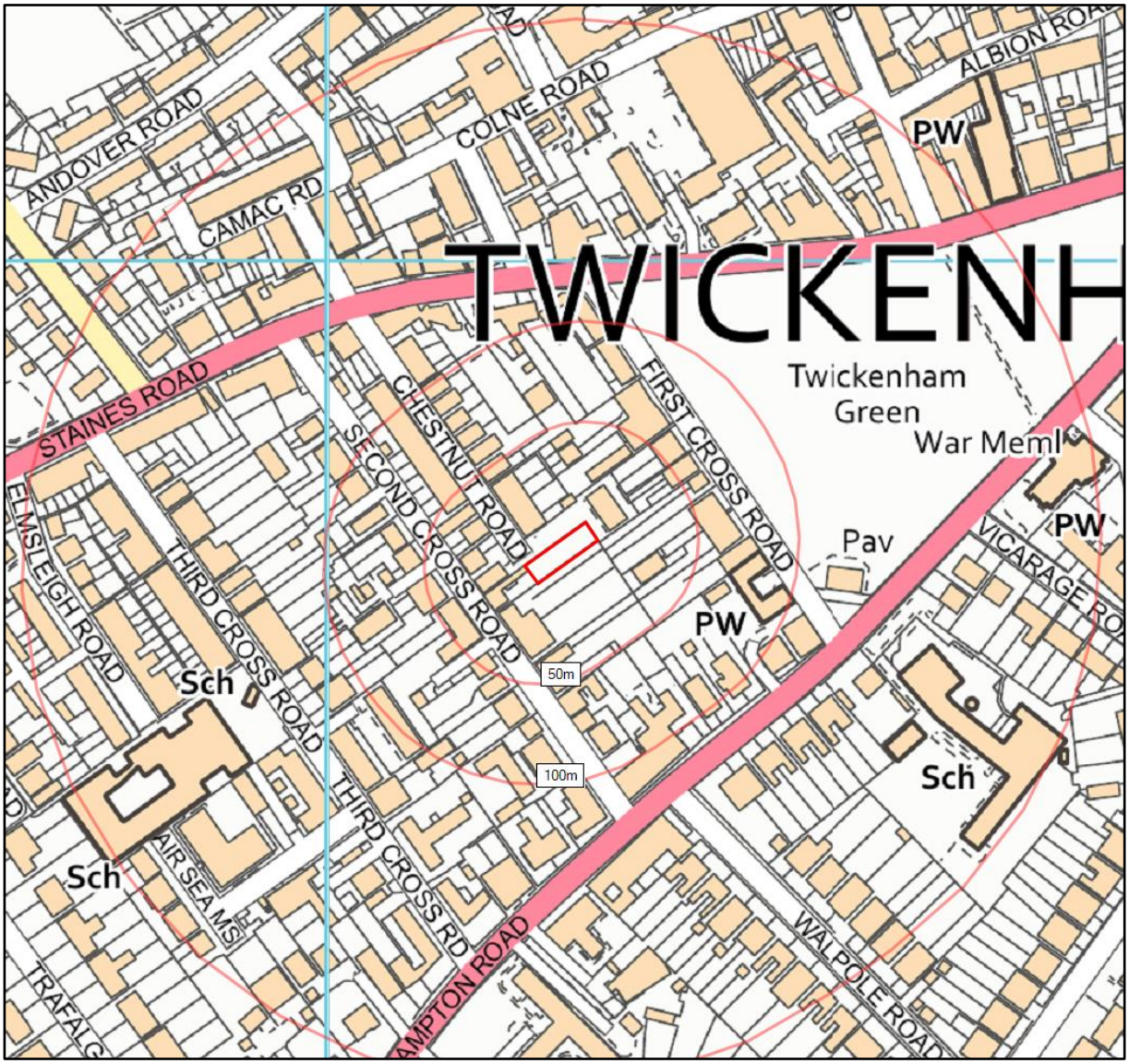
In addition, GO Contaminated Land Solutions Ltd will not be liable for any loss whatsoever arising directly or indirectly from any opinion given on the possible configuration of strata either between the borehole positions or below the maximum depth of the investigation. Such opinions, where given, are for guidance only.

Groundwater levels may also vary with time from those reported during our site investigation due to factors such as tidal conditions, heavy pumping from nearby wells or seasonal changes.

All soil samples will be kept for a period of 28 days after the date of the invoice for this project unless otherwise notified to GO Contaminated Land Solutions Ltd in writing. Should samples be required to be stored for longer than 28 days then a storage charge will be levied.

Contaminated Land Solutions

Appendix A – Site Location Plan



1985-P2GE-1-Draft: Second Cross Road, Twickenham
Anthony C Bianchi

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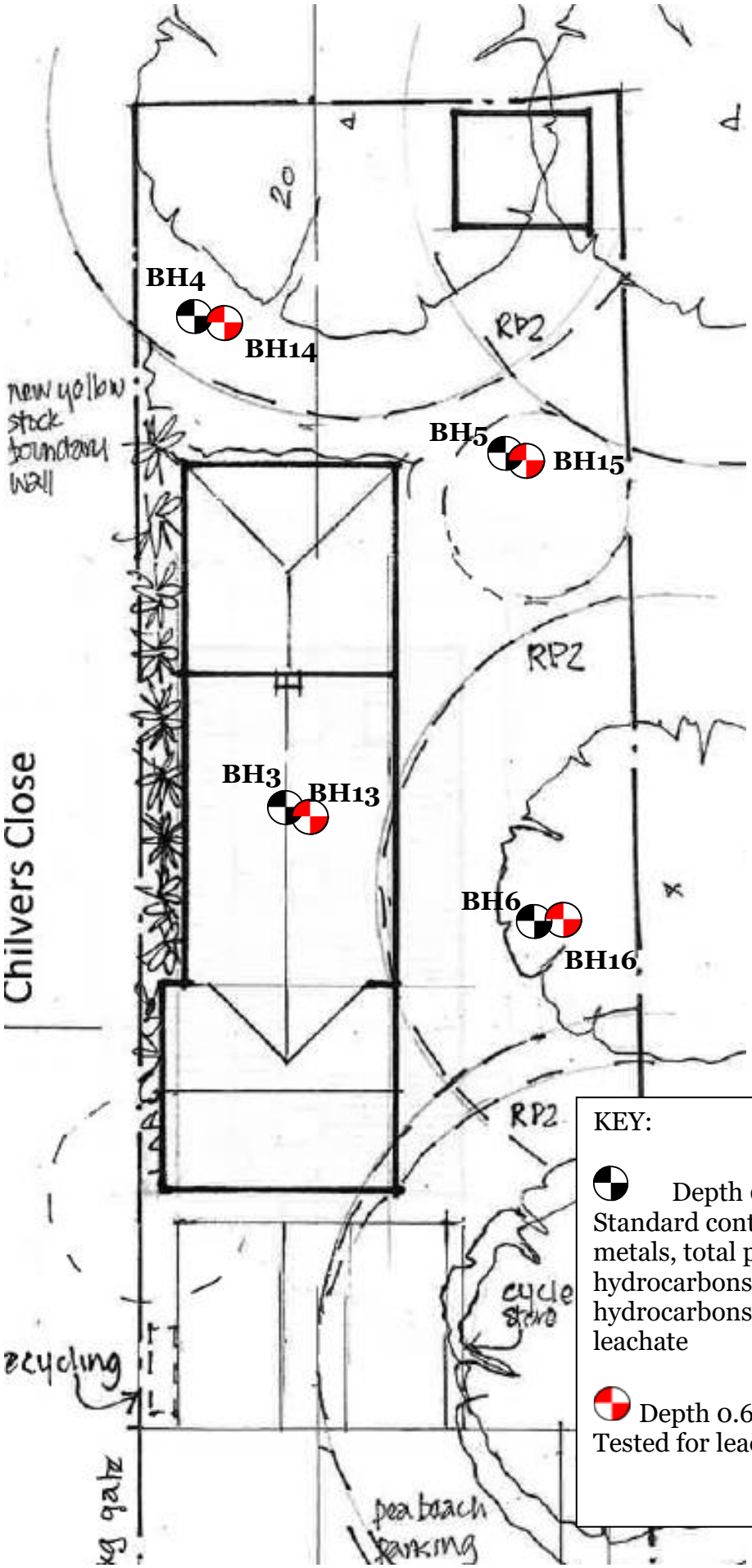
Solutions

Appendix B – Site Works Plan



KEY:

Depth 0.20 - .60m
Standard contamination suite: metals, total petroleum hydrocarbons, polyaromatic hydrocarbons, asbestos and lead leachate

Depth 0.60 – 0.80/1.0m
Tested for lead and lead leachate

1985-P2GE-1-Draft: Second Cross Road, Twickenham
Anthony C Bianchi

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Appendix C – Proposed Site Pla

Chestnut Road

Chilvers Close

exg gate

pea beach paving

Existing

Chestnut Road

Chilvers Close

exg gate

recycling

new yellow stock boundary wall

20

pea beach paving

cycle store

RP2

RP2

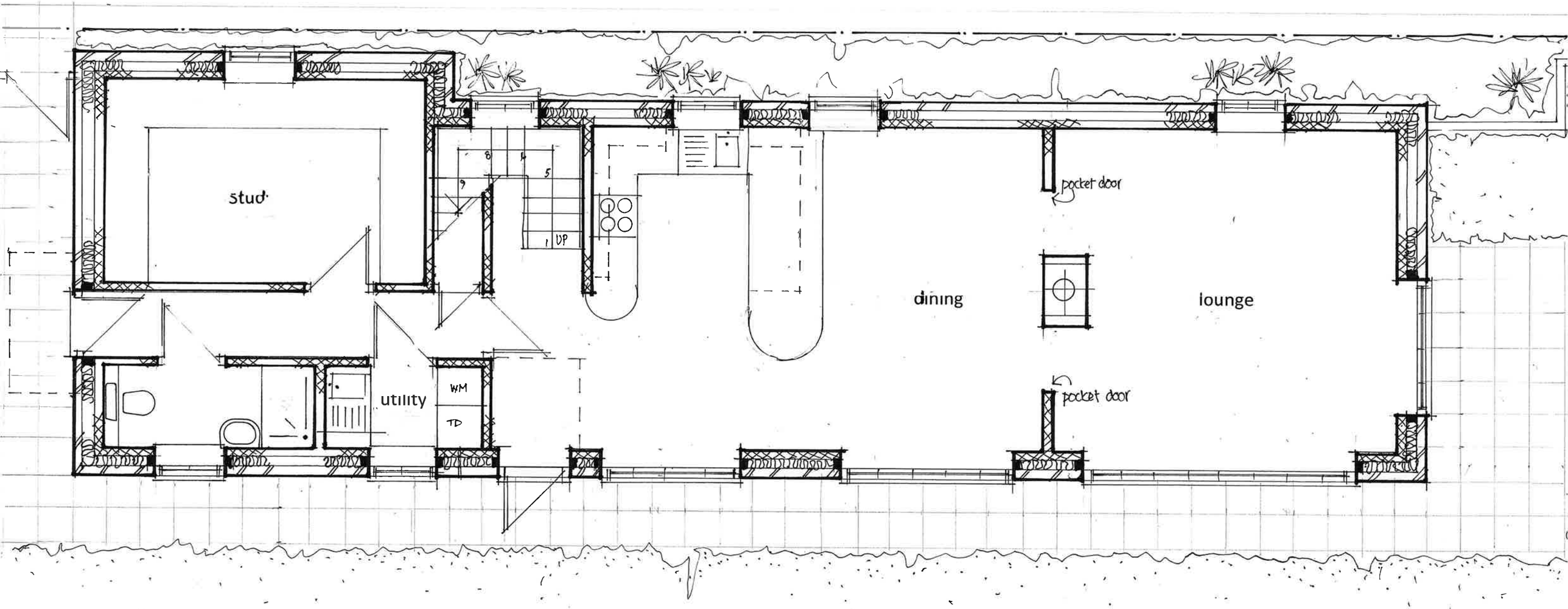
RP2

20

4

Proposed

ANDREW FRYATT ASSOCIATES CHARTERED ARCHITECTS	Client: Mr and Mrs A. V. Bianchi	The Bothy, Old Parsonage House, High Street, Farningham, Kent, DA4 0DG 01322 867403 andrewfryatt@oldparsonagehouse.com
	Project: 39 Second Cross Road, Twickenham, TW2 5QY	
	Drawing: Proposed site plan	
	Drawing number: SCR20-05	Scale: 1:200



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ANDREW FRYATT ASSOCIATES
CHARTERED ARCHITECTS

Client	
Mr + Mrs A. V. Bianchi	
Project	
39 Second Cross Road, Twickenham, TW2 5QY	
Drawing	
Proposed ground floor	
Drawing number	**Scale**
SCR-20-06	1:50@A3

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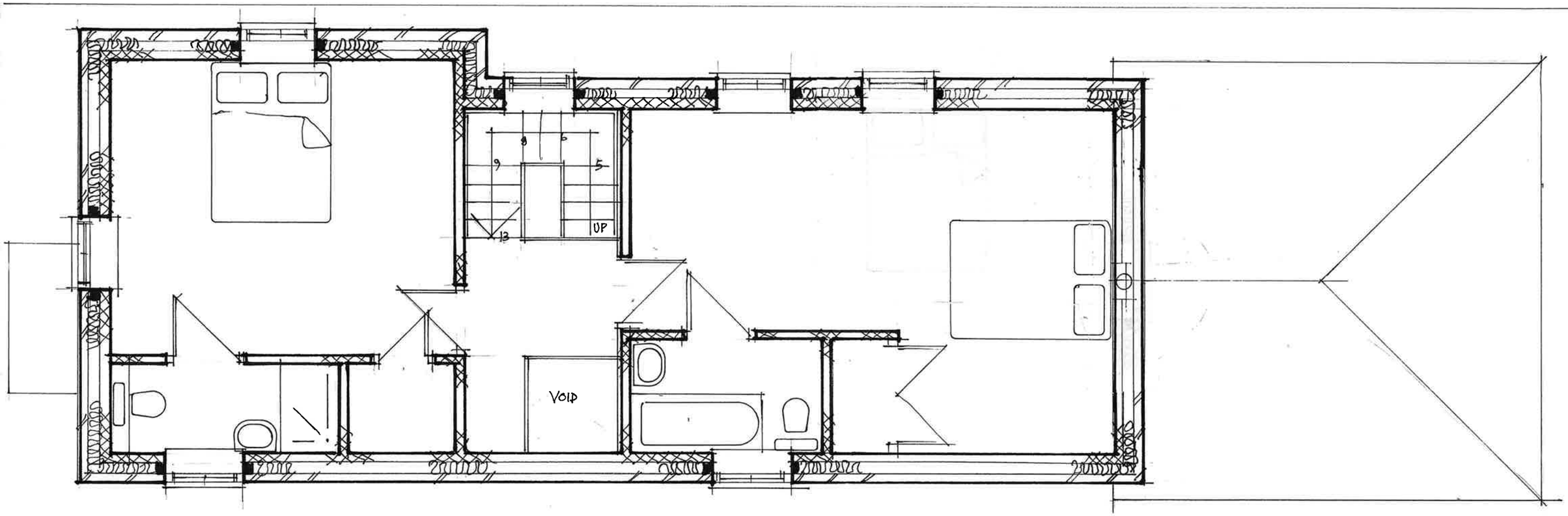

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ANDREW FRYATT ASSOCIATES
CHARTERED ARCHITECTS

Client	
Mr + Mrs A. V. Bianchi	
Project	
39 Second Cross Road, Twickenham, TW2 5QY	
Drawing	
Proposed first floor	
Drawing number	**Scale**
SCR-20-07	1:50@A3

The Bothy,
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Solutions

Appendix D –Borehole Logs

GO Contaminated Land Solutions
4 De Frene Rd
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Tel.: 020 8291 1354
Email: askgo@gosolve.co.uk
Web: www.gosolve.co.uk

BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**12 March 2024**

Log ID BH3 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
						Silty TOPSOIL	
				0.10			-0.10
							-0.20
							-0.30
	C	0.20 - 0.60					-0.40
							-0.50
						MADE GROUND - Clayey Sandy SILT containing clinker, charcoal pieces and brick fragments	-0.60
							-0.70
							-0.80
							-0.90
				1.00			-1.00
						BH terminated	-1.10
							-1.20
							-1.30
							-1.40
							-1.50
							-1.60
							-1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

GO Contaminated Land Solutions
4 De Frene Rd
London, SE26 4AB
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Email: askgo@gosolve.co.uk
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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**12 March 2024**

Log ID BH4 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
	C	0.20 - 0.60				MADE GROUND - Silty CLAY containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50 -0.60 -0.70
				0.80		Orange Silty Clayey SAND	-0.80 -0.90
				1.00		BH terminated	-1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**12 March 2024**

Log ID BH5 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
	C	0.20 - 0.60				MADE GROUND - Sandy Clayey SILT containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50 -0.60
				0.60		MADE GROUND - Silty CLAY containing brick fragments and occasional gravel	-0.70 -0.80 -0.90 -1.00
				1.00		Orange Silty SAND	-1.10
				1.20		BH terminated	-1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**12 March 2024**

Log ID BH6 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
	C	0.20 - 0.60				MADE GROUND - Sandy Silty CLAY containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50 -0.60
				0.60		Silty CLAY containing charcoal pieces and brick fragments	-0.70 -0.80 -0.90 -1.00
				1.00		BH terminated	-1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**04 April 2024**

Log ID BH13 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
						MADE GROUND - Clayey Sandy SILT containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50 -0.60
	C	0.60 - 1.10		0.60		Silty CLAY containing brick fragments	-0.70 -0.80 -0.90 -1.00 -1.10
				1.10		Orange Silty very Clayey SAND	-1.20
				1.25		BH terminated	-1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**04 April 2024**

Log ID BH14 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
						MADE GROUND - Silty CLAY containing charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50 -0.60 -0.70 -0.80
	C	0.60 - 0.80		0.60			
				0.80		Orange Silty Clayey SAND	-0.90 -1.00
				1.00		BH terminated	-1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**04 April 2024**

Log ID BH15 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
						MADE GROUND - Sandy Clayey SILT containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50
				0.60			-0.60
	C	0.60 - 1.00				Silty CLAY containing brick fragments and gravel	-0.70 -0.80 -0.90
				1.00			-1.00
						Orange Silty SAND	
				1.10			-1.10
						Bh terminated	-1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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BOREHOLE LOG

Project	**Rear of 39 Second Cross Road**	**Project No.**	**1985**
Client	**Anthony Bianchi**	**Survey date:**	**04 April 2024**

Log ID BH16 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
				0.10		Silty TOPSOIL	-0.10
						MADE GROUND - Sandy Silty CLAY containing clinker, charcoal pieces and brick fragments	-0.20 -0.30 -0.40 -0.50
				0.60			-0.60
	C	0.60 - 1.10				Silty CLAY containing brick fragments	-0.70 -0.80 -0.90 -1.00
				1.10			-1.10
						Orange silty Gravelly SAND	
				1.20		BH terminated	-1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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Appendix E – Borehole Photographs

BH3

BH4

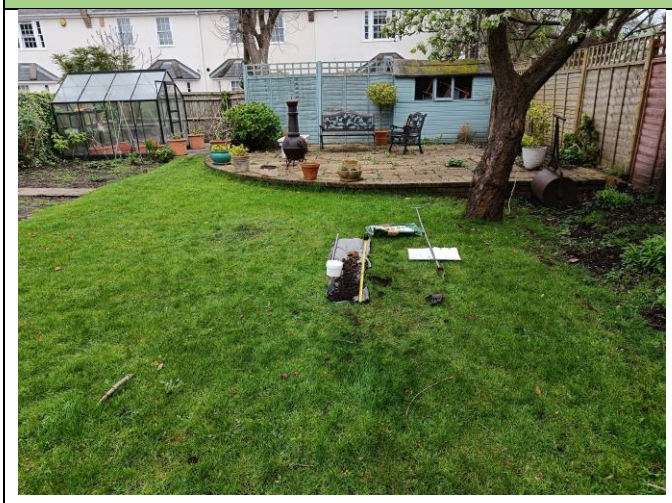
BH5

BH6

BH13

BH14

BH15



BH16

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Appendix F – Contamination Test Results

RESIDENTIAL WITH HOMEGROWN PRODUCE (RwHP) - SOM 1% - 12 March 2024									
Determinand	Unit	GAC	Source	Concentration				Number of Tests	Number of Exceedences
				BH3	BH4	BH5	BH6		
Metals									
Arsenic	mg/kg	37.0	DEFRA C4SL	25.5	22.6	26.0	41.3	4	0
Cadmium	mg/kg	22.1	DEFRA C4SL	0.7	0.9	0.6	0.7	4	0
Chromium (III)	mg/kg	14300.0	ATRISK SSV	22.9	25.9	27.5	31.5	4	0
Copper	mg/kg	4730.0	ATRISK SSV	110	101	112	152	4	0
Lead	mg/kg	200.0	DEFRA C4SL	791	672	760	1420	4	4
Mercury (Inorganic)	mg/kg	180.0	ATRISK SSV	1.9	1.6	2.1	5.4	4	0
Nickel	mg/kg	136.0	ATRISK SSV	24.9	22.0	25.6	37.4	4	0
Selenium	mg/kg	375.0	ATRISK SSV	< 1.0	< 1.0	< 1.0	< 1.0	4	0
Zinc	mg/kg	20000.0	ATRISK SSV	393	431	330	618	4	0
Inorganics									
Free Cyanide	mg/kg	34.0	ATRISK SSV	< 1.0	< 1.0	< 1.0	< 1.0	4	0
Hexavalent Chromium	mg/kg	20.5	DEFRA C4SL	< 0.8	< 0.8	< 0.8	< 0.8	4	0
Miscellaneous									
Moisture Content	%	-	-	22.2	19.9	21.9	20.4	4	-
pH	pH units	-	-	7.8	7.5	7.5	7.7	4	-
Soil Organic Matter	%	-	-	3.5	3.1	3.3	3.9	4	-
Stones Content	%	-	-	12.0	< 0.1	< 0.1	17.8	4	-
Phenols									
Total Monohydric Phenols	mg/kg	280.0	LQM/CIEH	< 5	< 5	< 5	< 5	4	0
Polyaromatic hydrocarbons									
Naphthalene	mg/kg	0.83	ATRISK SSV	0.05	0.05	0.02	0.13	4	0
Acenaphthylene	mg/kg	170.0	LQM/CIEH	0.03	0.04	< 0.02	0.10	4	0
Acenaphthene	mg/kg	608.0	ATRISK SSV	< 0.02	0.03	< 0.02	< 0.02	4	0
Fluorene	mg/kg	735.0	ATRISK SSV	< 0.02	0.03	< 0.02	0.04	4	0
Phenanthrene	mg/kg	95.0	LQM/CIEH	0.34	0.56	0.21	0.82	4	0
Anthracene	mg/kg	10200.0	ATRISK SSV	0.06	0.12	0.05	0.13	4	0
Fluoranthene	mg/kg	983.0	ATRISK SSV	0.78	1.20	0.55	1.90	4	0
Pyrene	mg/kg	668.0	ATRISK SSV	0.65	1.00	0.47	1.61	4	0
Benzo(a)anthracene	mg/kg	7.2	LQM/CIEH	0.35	0.51	0.27	0.89	4	0
Chrysene	mg/kg	15	LQM/CIEH	0.37	0.63	0.32	0.92	4	0
Benzo(b)fluoranthene	mg/kg	2.6	LQM/CIEH	0.44	0.62	0.31	1.19	4	0
Benzo(k)fluoranthene	mg/kg	77	LQM/CIEH	0.18	0.24	0.13	0.49	4	0
Benzo(a)pyrene	mg/kg	4.95	DEFRA C4SL	0.34	0.49	0.25	0.96	4	0
Indeno (1,2,3-cd) pyrene	mg/kg	27	LQM/CIEH	0.24	0.31	0.17	0.66	4	0
Dibenzo(a,h)anthracene	mg/kg	0.24	LQM/CIEH	0.05	0.07	0.04	0.14	4	0
Benzo(g,h,i)perylene	mg/kg	320	LQM/CIEH	0.26	0.37	0.18	0.72	4	0
TPH CWG									
>C_5-C_6 Aliphatic	mg/kg	42.7	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	4	0
>C_6-C_8 Aliphatic	mg/kg	99.3	ATRISK SSV	<0.05	<0.05	<0.05	<0.05	4	0
>C_8-C_{10} Aliphatic	mg/kg	13.9	ATRISK SSV	<2.0	<2.0	<2.0	<2.0	4	0
>C_{10}-C_{12} Aliphatic	mg/kg	81.7	ATRISK SSV	<2.0	<2.0	<2.0	<2.0	4	0
>C_{12}-C_{16} Aliphatic	mg/kg	385.0	ATRISK SSV	<3.0	<3.0	<3.0	<3.0	4	0
>C_{16}-C_{35} Aliphatic	mg/kg	210000.0	ATRISK SSV	<10.0	<10.0	<10.0	<10.0	4	0
>C_5-C_7 Aromatic (benzene)	mg/kg	0.14	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	4	0
>C_7-C_8 Aromatic (toluene)	mg/kg	113.0	ATRISK SSV	<0.05	<0.05	<0.05	<0.05	4	0
>C_8-C_{10} Aromatic	mg/kg	20.5	ATRISK SSV	<2.0	<2.0	<2.0	5.0	4	0
>C_{10}-C_{12} Aromatic	mg/kg	70.0	ATRISK SSV	<2.0	<2.0	<2.0	4.0	4	0
>C_{12}-C_{16} Aromatic	mg/kg	165.0	ATRISK SSV	<2.0	<2.0	<2.0	4.0	4	0
>C_{16}-C_{21} Aromatic	mg/kg	319.0	ATRISK SSV	<3.0	<3.0	<3.0	8.0	4	0
>C_{21}-C_{35} Aromatic	mg/kg	1120.0	ATRISK SSV	<21.0	<21.0	<21.0	17.0	4	0

RESIDENTIAL WITH HOMEGROWN PRODUCE (RwHP) - SOM 1% - 4 April 2024									
Determinand	Unit	GAC	Source	Concentration				Number of Tests	Number of Exceedences
				BH13	BH14	BH15	BH16		
Metals									
Lead	mg/kg	200.0	DEFRA C4SL	388.0	381.0	282.0	836.0	4	4

WATER GUIDELINE VALUES (WGV) - 12 March 2024									
Determinand	Unit	WGV	Source	Concentration				Number of Tests	Number of Exceedances
				BH3	BH4	BH5	BH6		
Metals									
Lead	µg/l	10	UK DWS	43	37	140	58	4	4

WATER GUIDELINE VALUES (WGV) - 4 April 2024									
Determinand	Unit	WGV	Source	Concentration				Number of Tests	Number of Exceedances
				BH13	BH14	BH15	BH16		
Metals									
Lead	µg/l	10	UK DWS	128	61	107	61	4	4

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Normec DETS Limited
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ME17 2JN
t: 01622 850410

DETS Report No: 24-02807

Site Reference:	24-52810
Project / Job Ref:	TPHCWG Analysis
Order No:	PO-12367
Sample Receipt Date:	18/03/2024
Sample Scheduled Date:	18/03/2024
Report Issue Number:	1
Reporting Date:	25/03/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Lenham Heath
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Tel : 01622 850410

4480

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-02807	**~Date Sampled**	12/03/24	12/03/24	12/03/24	12/03/24	
The Environmental Laboratory Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: 24-52810	**~TP / BH No**	355443	355444	355445	355446	
~Project / Job Ref: TPHCWG Analysis	**~Additional Refs**	BH3	BH4	BH5	BH6	
~Order No: PO-12367	**~Depth (m)**	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	
Reporting Date: 25/03/2024	**DETS Sample No**	704869	704870	704871	704872	

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	5	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	4	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	4	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	8	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	17	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	38	
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	

~ Sample details provided by the customer

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-02807	**~Date Sampled**	12/03/24	12/03/24	12/03/24	12/03/24	
The Environmental Laboratory Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: 24-52810	**~TP / BH No**	355443	355444	355445	355446	
~Project / Job Ref: TPHCWG Analysis	**~Additional Refs**	BH3	BH4	BH5	BH6	
~Order No: PO-12367	**~Depth (m)**	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	
Reporting Date: 25/03/2024	**DETS Sample No**	704869	704870	704871	704872	

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	

~ Sample details provided by the customer

Normec DETS Limited
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Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-02807	
The Environmental Laboratory Ltd	
~Site Reference: 24-52810	
~Project / Job Ref: TPHCWG Analysis	
~Order No: PO-12367	
Reporting Date: 25/03/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
704869	355443	BH3	0.20 - 0.60	19	Black sandy loam with vegetation
704870	355444	BH4	0.20 - 0.60	18.7	Brown sandy loam with vegetation
704871	355445	BH5	0.20 - 0.60	23.9	Brown sandy loam with stones and vegetation
704872	355446	BH6	0.20 - 0.60	17.5	Brown sandy loam with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~ Sample details provided by the customer

Normec DETS Limited
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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-02807
The Environmental Laboratory Ltd
~Site Reference: 24-52810
~Project / Job Ref: TPHCWG Analysis
~Order No: PO-12367
Reporting Date: 25/03/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received
~ Sample details provided by the customer

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

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info@elab-uk.co.uk

Certificate of Analysis

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	24-52810
Issue:	1
Date of Issue:	28/03/2024
Contact:	Peter George
Customer Details:	GO Contaminated Land Solutions Ltd 4 De Frene Road Sydenham London SE26 4AB
Quotation No:	Q24-04324
Order No:	Not Supplied
Customer Reference:	1985
Date Received:	14/03/2024
Date Approved:	28/03/2024
Details:	39 Second Cross Road, Twickenham
Approved by:	

Ben Rees, Customer Services Assistant

Sample Summary

Report No.: 24-52810, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
355443	BH3 0.20 - 0.60	12/03/2024	14/03/2024	Silty loam	
355444	BH4 0.20 - 0.60	12/03/2024	14/03/2024	Silty clayey loam	
355445	BH5 0.20 - 0.60	12/03/2024	14/03/2024	Silty clayey loam	
355446	BH6 0.20 - 0.60	12/03/2024	14/03/2024	Sandy silty loam	

Results Summary

Report No.: 24-52810, issue number 1

				ELAB Reference	355443	355444	355445	355446
				Customer Reference				
				Sample ID				
				Sample Type	SOIL	SOIL	SOIL	SOIL
				Sample Location	BH3	BH4	BH5	BH6
				Sample Depth (m)	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60
				Sampling Date	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Determinand	**Codes**	**Units**	**LOD**					
Soil sample preparation parameters								
Moisture Content	N	%	0.1		22.2	19.9	21.9	20.4
Stones Content	N	%	0.1		12.0	< 0.1	< 0.1	17.8
Material removed	N	%	0.1		12.0	< 0.1	< 0.1	17.8
Description of Inert material removed	N		0		Stones	None	None	Stones
Metals								
Arsenic	M	mg/kg	1		25.5	22.6	26.0	41.3
Cadmium	M	mg/kg	0.5		0.7	0.9	0.6	0.7
Chromium	M	mg/kg	5		22.9	25.9	27.5	31.5
Copper	M	mg/kg	5		110	101	112	152
Lead	M	mg/kg	5		791	672	760	1420
Mercury	M	mg/kg	0.5		1.9	1.6	2.1	5.4
Nickel	M	mg/kg	5		24.9	22.0	25.6	37.4
Selenium	M	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5		393	431	330	618
Inorganics								
Free Cyanide	N	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8		< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous								
pH	M	pH units	0.1		7.8	7.5	7.5	7.7
Soil Organic Matter	U	%	0.1		3.5	3.1	3.3	3.9
Phenols								
Total Monohydric Phenols	N	mg/kg	5		< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons								
Naphthalene	SM	mg/kg	0.02		0.05	0.05	0.02	0.13
Acenaphthylene	SM	mg/kg	0.02		0.03	0.04	< 0.02	0.10
Acenaphthene	SM	mg/kg	0.02		< 0.02	0.03	< 0.02	< 0.02
Fluorene	S	mg/kg	0.02		< 0.02	0.03	< 0.02	0.04
Phenanthrene	SM	mg/kg	0.02		0.34	0.56	0.21	0.82
Anthracene	S	mg/kg	0.02		0.06	0.12	0.05	0.13
Fluoranthene	SM	mg/kg	0.02		0.78	1.20	0.55	1.90
Pyrene	SM	mg/kg	0.02		0.65	1.00	0.47	1.61
Benzo(a)anthracene	S	mg/kg	0.02		0.35	0.51	0.27	0.89
Chrysene	SM	mg/kg	0.02		0.37	0.63	0.32	0.92
Benzo(b)fluoranthene	SM	mg/kg	0.02		0.44	0.62	0.31	1.19
Benzo(k)fluoranthene	SM	mg/kg	0.03		0.18	0.24	0.13	0.49
Benzo(a)pyrene	S	mg/kg	0.02		0.34	0.49	0.25	0.96
Indeno(1,2,3-cd)pyrene	SM	mg/kg	0.02		0.24	0.31	0.17	0.66
Dibenzo(a,h)anthracene	SM	mg/kg	0.02		0.05	0.07	0.04	0.14
Benzo[g,h,i]perylene	SM	mg/kg	0.02		0.26	0.37	0.18	0.72
Total PAH(16)	NS	mg/kg	0.34		4.16	6.27	2.97	10.7

Results Summary

Report No.: 24-52810, issue number 1

			ELAB Reference	355443	355444	355445	355446
			Customer Reference				
			Sample ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH3	BH4	BH5	BH6
			Sample Depth (m)	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60	0.20 - 0.60
			Sampling Date	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Determinand	**Codes**	**Units**	**LOD**				
Metals							
Lead 10:1 extract	N	ug/l	5	43	37	140	58

Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 24-52810, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

In accordance with procedures, a 1kg soil sample should be analysed. For amounts less than this caution should be used when analysing the data as
sample size is smaller than the recommended amount, therefore samples could be deemed as not being representative of the materials present on site.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)	F/mm2 (I)
355443	0.20 - 0.60	BH3	Brown Sandy Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t	n/t
355444	0.20 - 0.60	BH4	Brown Sandy Soil, Glass, Stones	No asbestos detected	n/t	n/t	n/t	n/t	n/t
355445	0.20 - 0.60	BH5	Brown Sandy Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t	n/t
355446	0.20 - 0.60	BH6	Brown Sandy Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t	n/t

Method Summary

Report No.: 24-52810, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Leachate metals 10:1 extract	N		27/03/2024	301	ICPMS
Free cyanide	N	As submitted sample	18/03/2024	107	Colorimetry
Hexavalent chromium	N	As submitted sample	15/03/2024	110	Colorimetry
pH	M	Air dried sample	18/03/2024	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	15/03/2024	118	ICPMS
Phenols in solids	N	As submitted sample	15/03/2024	121	HPLC
Asbestos identification	U	Air dried sample	18/03/2024	281	Microscopy
Soil organic matter	U	Air dried sample	15/03/2024	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 24-52810, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
	Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
	ELAB are unable to provide an interpretation or opinion on the content of this report.
	The results relate only to the sample received.
	PCB congener results may include any coeluting PCBs
	Uncertainty of measurement for the determinands tested are available upon request
	Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

End of Report

Unit A2
Windmill Road
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TN38 9BY
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2683

Certificate of Analysis

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	24-53137
Issue:	2. Replaces Analytical Report number 24-53137; issue no.1
Date of Issue:	17/04/2024
Contact:	Peter George
Customer Details:	GO Contaminated Land Solutions Ltd 4 De Frene Road Sydenham London SE26 4AB
Quotation No:	Q24-04324
Order No:	Not Supplied
Customer Reference:	1985
Date Received:	08/04/2024
Date Approved:	17/04/2024
Details:	39 Second Cross Road, Twickenham
Approved by:	

Ben Rees, Customer Services Assistant

Re-Issue Summary

Client: GO Contaminated Land Solutions Ltd
Address: 4 De Frene Road, Sydenham, London, SE26 4AB

Date: **17-Apr-24**

Report No.: **24-53137**

Issue: **2**

This report replaces 24-53137, issue: 1, issued: 11 April 2024

Reason for Change

1 - Client request – additional analysis

Details of Changes to Work / Results

Sample Refs:

Tests* / Dets*:
Leachate metals 10:1
NRA Leachate extraction

Key
A - Additional Work added
D - Work Deleted
E - Result Edited*
R - Work Repeated*

*If a result changed, please refer to the previous report for the old result. The new result will be shown in this report.

Re-issued by: Ben Rees, Customer Services Assistal **Approved by:** Ben Rees, Customer Services Assistal

Sample Summary

Report No.: 24-53137, issue number 2

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
357269	BH13 0.60 - 1.10	04/04/2024	08/04/2024	Silty loam	
357270	BH14 0.60 - 0.40	04/04/2024	08/04/2024	Sandy loam	
357271	BH15 0.60 - 1.00	04/04/2024	08/04/2024	Sandy loam	
357272	BH16 0.60 - 1.10	04/04/2024	08/04/2024	Silty loam	

Results Summary

Report No.: 24-53137, issue number 2

ELAB Reference	357269	357270	357271	357272
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	BH13	BH14	BH15	BH16
Sample Depth (m)	0.60 - 1.10	0.60 - 0.40	0.60 - 1.00	0.60 - 1.10
Sampling Date	04/04/2024	04/04/2024	04/04/2024	04/04/2024

Determinand	Codes	Units	LOD				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	17.0	14.8	15.2	15.4
Material removed	N	%	0.1	10.5	9.1	8.5	13.1
Description of Inert material removed	N		0	Stones	Stones	Stones	Stones
Metals							
Lead	M	mg/kg	5	388	381	282	836

Results Summary

Report No.: 24-53137, issue number 2

ELAB Reference				357269	357270	357271	357272
Customer Reference							
Sample ID							
Sample Type				SOIL	SOIL	SOIL	SOIL
Sample Location				BH13	BH14	BH15	BH16
Sample Depth (m)				0.60 - 1.10	0.60 - 0.40	0.60 - 1.00	0.60 - 1.10
Sampling Date				04/04/2024	04/04/2024	04/04/2024	04/04/2024
Determinand	**Codes**	**Units**	**LOD**				
Metals							
Lead 10:1 extract	N	ug/l	5	128	61	107	61

Method Summary

Report No.: 24-53137, issue number 2

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Leachate metals 10:1 extract	N		16/04/2024	301	ICPMS
Aqua regia extractable metals	M	Air dried sample	09/04/2024	300	ICPMS

Tests marked N are not UKAS accredited

Report Information

Report No.: 24-53137, issue number 2

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HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
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2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

End of Report