



Phase 2 Intrusive Site Investigation Report

LOCATION	Moorbridge Farm, Moorbridge Lane, Harleston IP14 3JH
ISSUE DATE	December 2023
FOR	Edward Heldneich
CLIENT REF.	
OUR REF.	G23417

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1. Introduction

In accordance with your instruction, Geoinvestigate Limited has carried out an intrusive site investigation at Moorbridge Farm, Moorbridge Lane, Harleston IP14 3JH.

A Phase 1 Desk Study has been completed by Geoinvestigate Limited (G23307, August 2023). The most pertinent findings of the desk study comprised the following:

- Agricultural buildings may have Asbestos Containing Materials within structures.
- Storage tanks and equipment around site may be sources of contamination.
- There is an apparent lack of hazardous gas sources.
- The site is not within a coal mining affected area.

The nature of the development is unknown at this time. The boundary of the current study area and the proposed developmental layout are presented on the site plan included within Appendix 1 of this report.

The purpose of this Phase 2 investigation has been to establish the true nature of the ground conditions at the site with regard to the potential contamination risks that have been identified during preliminary research.

Investigation of ground gas and geotechnical risks were not within the scope of these investigation works, nor was consideration of soil permeability, slope stability or, sinkhole risk.

2. Scope of Phase 2 Investigation

2.1 Scope of Works

Given the above, the following investigation was carried out to assess the potential risks to the proposed development:

- Five (5) boreholes (ref. BH1 to BH5) were undertaken at the site to depths of between 2.00m and 3.00m below ground level (bgl) with associated soil sampling, logging, and supervision of the works by a suitably qualified geo-environmental engineer. The boreholes were commenced using windowless sampling techniques with a Dando Terrier 2002 mini drilling rig.
- Five (5) hand excavated trial pits (re. TPA to TPE) to provide additional information on near-surface ground conditions and to collect additional samples for contamination analysis, including from proposed soft landscaping and/or garden areas.
- Contamination analyses of seven (7) samples of topsoil, made ground and natural subsoil recovered at depths of between 0.10m and 0.50m. Analysis was variably undertaken for a general suite of potential metal/metalloid contaminants, polycyclic aromatic hydrocarbons (PAHs), asbestos, and petroleum hydrocarbons (including BTEX*). Chemical analyses were based on the attending engineer's assessment of soils and ground conditions at the site together with desk study findings. Leachate from two (2) of these samples was tested to check the mobility of potential contaminants.

*Benzene, toluene, ethyl benzene and xylenes

- Provision of a factual and interpretative report including site plan, borehole logs, trial pit logs, contamination soil analysis results, advice on the contamination, situation at the site, and advice regarding any remediation and validation works that may be necessary.

The trial pit and borehole positions are shown on the plan provided in Appendix 1.

The excavations were sampled and logged at site by a geoenvironmental engineer and the ground conditions encountered are described on the trial pit and borehole logs also provided in Appendix 1.

The results of the contamination testing are included in Appendix 3 (Chemtech Environmental Ltd. report no. 128842).

2.2 Sampling Rationale

The borehole positions were chosen to give an indication of the ground conditions generally throughout the site, both in terms of soil contamination. The soils encountered in the boreholes are considered to be broadly representative of soils throughout the site. The hand excavated trial pit positions were specifically chosen to target proposed areas of soft landscaping or areas near to potential contamination sources (i.e. tanks).

3. Phase 2 Investigation Findings

3.1 Encountered Ground Conditions

3.1.1 Windowless Sample Boreholes

The ground conditions were relatively uniform across the site and comprised topsoil or made ground underlain by natural strata predominantly comprising sandy gravelly clay.

The surface strata encountered in BH1, BH2 and BH3 were made ground comprising 150mm concrete in BH1 very clayey sand gravel / gravelly sandy clay fill with gravel constituents of concrete, tarmac, brick, and flint to between 0.10m and 0.20m. BH4 and BH5 encountered turf and topsoil comprising soft sandy gravelly clay with gravel constituents of brick, concrete, and flint.

Below this surface strata in BH1, BH2, BH3 and BH5 natural ground was encountered of firm to stiff sandy gravelly clay with gravel of chalk and flint to termination at between 2.00m and 3.00m.

In BH4, below the surface topsoil was deeper made ground comprising firm very sandy very gravelly clay with gravel of concrete and sandstone to 0.90m. This was then underlain by natural strata of firm to stiff sandy gravelly clay with gravel of chalk and flint to termination at 2.00m

Hand shear vane tests within the natural clay returned values between 50kN/m² and 110kN/m² indicating generally firm to very stiff conditions.

Groundwater was encountered at 1.00m and 1.55m bgl within the made ground in BH1 and BH4 respectively and closed below 1.50m and 1.60m respectively.

3.1.2 Hand Excavated Trial Pits

TPA and TPE encountered turf and topsoil of soft sandy gravelly clay with gravel of sandstone, brick, and concrete to between 0.10m and 0.20m followed by made ground of sandy gravelly clay with gravel of sandstone, chalk, flint, brick, and occasional glass, pot and fabric to termination at 0.50m

TPB encountered made ground soft sandy gravelly clay with gravel of sandstone, flint, glass, and pot to 0.30m followed by very soft natural sandy clay with gravel chalk to termination at 0.50m.

TPC and TPD encountered turf and topsoil of soft sandy gravelly clay with gravel of brick, flint, and sandstone to between 0.10m and 0.20m, followed by natural strata of medium dense very clayey gravel of flint to 0.30m in TPC then soft sandy gravelly clay to termination at 0.50m in each trial pit.

The trial pits all remained stable and dry on completion.

4. Contamination Testing

As mentioned in Section 1, the agricultural use of the study site itself and storage tanks might comprise the most viable potential sources of contamination at the site.

The soils most likely to contain contamination were expected to be the made ground deposits, but contamination could feasibly also occur throughout the full thickness of the topsoil and made ground strata which were encountered in the boreholes and trial pits to a maximum depth of 0.90m in BH4. Soils close to surface would be the most relevant regarding human health risk assessment though analysis of leachate was also considered appropriate to ensure no risk to local ground and surface waters exists through potential contaminant leaching and mobilisation.

Other than the presence of occasional brick and pot fragments, the topsoil and made ground showed no obvious visual or olfactory evidence of potential contamination or contaminative materials. However, given the site's history and tanks on site, the potential for contamination to have affected the site could not be ruled out without soil analyses.

Based on the findings of the site works, seven (7) samples of topsoil, made ground and natural subsoil from depths of between 0.20m and 0.50m recovered from across the site were tested for a range of substances. These samples were tested for a range of substances, depending on their origin, the requirements of the investigation, and the assessment of the attending engineer. Test suites variably included metals/metalloids, PAHs, asbestos, and petroleum hydrocarbons (including BTEX in some cases). Leachate from two (2) of the samples was analysed also to determine if there might be any risk of mobile contamination, with testing including TPH where appropriate.

The results of the contamination testing are included in Appendix 3 of this report (Chemtech Environmental Ltd. Report 128842 and have been used in the following contamination risk assessment.

5. Risk Assessment

5.1 Method

Geoinvestigate Ltd. uses a combination of assessment criterion provided by the Environment Agency, DEFRA and by the Chartered Institute of Environmental Health in order to assess the presence of potentially harmful chemicals within soils and water. These include; Environment Agency Environmental Quality Standards (EQSs), Site Specific Assessment Criteria (SSAC) generated using CLEA software version 1.06 site specific risk assessment modelling, DEFRA Category 4 Screening Levels (C4SLs), and Land Quality Management / Chartered Institute of Environmental Health (LQM/CIEH) Safe for Use Levels (S4ULs).

It is assumed the site is to be developed as a residential dwelling and therefore falls within the residential end-use category. As it is possible that persons living on the site may cultivate vegetables / fruit for consumption, consideration to this end is also necessary.

No site-specific assessment criteria (SSAC) have been created for the site as no unusual circumstances (i.e., occupation periods etc.) are considered to be present/likely at the site that would render the generic residential assessment criteria unsuitable.

The results of the contamination testing that has been carried out have been compared to the soil quality values from the above sources. Where they fall below these limit values, they have been deemed safe for a residential end use.

Where results have been found to be above the intervention values, an assessment of the available pathways and receptors has been carried out to determine whether further investigation or remediation may be necessary.

An appraisal of the chemical results and relevant limits is set out in the Contamination Risk Assessment that follows.

5.2 Contamination Risk to Identified Receptors

5.2.1 Contamination Risk to Human Health

Made ground was encountered to a maximum depth of 0.90m in BH4 and much shallower elsewhere, this was underlain by cohesive natural mostly clay subsoils.

No visual and/or olfactory evidence of contamination was found in any of the encountered soils, including no visible evidence of asbestos contamination such as roofing board.

As discussed earlier in the report, levels of determinands have been compared to the soil assessment criteria for residential end-use, as published by DEFRA and LQM/CIEH, with DEFRA C4SLs taking priority where more than one target value exists due to their “more pragmatic whist still strongly precautionary” nature (quote from SP1010 C4SL Policy companion Document).

The results of the analyses of seven (7) soil samples recovered at depths of between 0.20m and 0.50m are summarised and presented with the adopted assessment criteria in Table 1 on the following page.

The majority of analyses have returned low/negligible contaminant concentrations with some minor exceptions discussed later in this report.

A mean Total Organic Carbon Content (TOC) of 5.83% and mean Soil Organic Matter Content (SOM) of 1.86% (estimated from the TOC) were returned from the soil analyses. Therefore, the LQM/CIEH GAC for PAHs and other hydrocarbons were chosen using the Soil Organic Matter (SOM) option of 3.20%, which is considered the most representative (and a conservative) value for the samples returned.

Table 1: Chemical Determinands in Soils

Determinand	Range of Returned concentrations (mg/kg)	S4UL (LQM/CIEH)* (mg/kg)	C4SL (DEFRA)* (mg/kg)
Asbestos	None detected (all 3 samples)	Any presence unacceptable	
Arsenic	5.1 – 12.9	37	37
Boron	<0.5 – 1.2	290	
Cadmium	<2	11	26
Chromium VI	<0.04	6	21
Chromium III	25.4 – 35.1	910	
Copper	7.6 – 17.6	2,400	
Lead	11.7 – 54.2		200
Mercury (elemental)	<2	1.2	
Nickel	8.9 – 18.7	130	
Selenium	<3	250	
Zinc	51.4 – 147.2	3,700	
pH	7.6 – 8.7	See Report Section 7.3 “Concrete Design”	
Water Soluble SO ₄	13.0 – 111.6		
Phenol	<0.5	200	
Total PAH	<0.34 – 374.34		
PAH Naphthalene	<0.02 – 0.53	5.6	
PAH Acenaphthylene	<0.02 – 0.93	420	
PAH Acenaphthene	<0.02 – 3.52	510	
PAH Fluorene	<0.02 – 2.99	400	
PAH Phenanthrene	<0.02 – 32.56	220	
PAH Anthracene	<0.02 – 11.58	5400	
PAH Fluoranthene	<0.02 – 71.59	560	
PAH Pyrene	<0.02 – 65.34	1200	
PAH Benzo[a]anthracene	<0.02 – 30.87	11	
PAH Chrysene	<0.03 – 29.27	22	
PAH Benzo(b)fluoranthene	<0.02 – 32.51	3.3	
PAH Benzo(k)fluoranthene	<0.03 – 14.48	93	
PAH Benzo(a)pyrene	<0.02 – 34.36	2.7	5
PAH Indeno(123-cd)pyrene	<0.02 – 21.45	36	
PAH Dibenz(a,h)anthracene	<0.02 – 4.08	0.28	
PAH Benzo(ghi)perylene	<0.02 – 18.29	340	
TPH Aromatic C5-C7	<0.05	140	0.87 (benzene)
TPH Aromatic C7-C8	<0.05	290	
TPH Aromatic C8-C10	<0.05	83	
TPH Aromatic C10-C12	<0.5 - 1.46	180	
TPH Aromatic C12-C16	<1	330	
TPH Aromatic C16-C21	<2	540	
TPH Aromatic C21-C35	<5 – 44	1500	
TPH Aromatic C35-C44	<1.5 – 33	1500	
TPH Aliphatic C5-C6	<0.05	78	
TPH Aliphatic C6-C8	<0.1	230	
TPH Aliphatic C8-C10	<0.05	65	
TPH Aliphatic C10-C12	<0.5 – 0.68	330 (118**)	
TPH Aliphatic C12-C16	<0.5 – 0.93	2400 (59**)	
TPH Aliphatic C16-C35	<4.5	92000 (21**)	
TPH Aliphatic C35-C44	<1	92000 (21**)	

*For residential use with allowance for plant uptake / consumption of homegrown produce and SOM of 2.5% where relevant.

Concentrations of potential contaminants returned from the analysis of seven (7) soil samples generally fell below the adopted target values. However, some exceptions are noted.

Levels of five (5) PAH species have been detected above their corresponding target values in one (1) sample recovered from a depth of 0.50m in TPA. These are; benzo[a]anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene.

Generally, petroleum hydrocarbons have been returned at levels below detectable levels and/or the adopted target values.

Further discussion is included in section 5.3 later.

No asbestos was detected in any of the five samples inspected.

5.2.2 Contamination Risk to the Controlled Waters

Given the possible historical contamination sources leachate was analysed from two (2) samples to investigate possible contaminant mobility. These samples were obtained from TPB at 0.50m and TPE at 0.20m

Levels for domestic water supply or the protection of aquatic life levels as published by the Environment Agency are presented as the assessment criteria, but these are not strictly target values. They are not directly applicable to leachates because these standards would represent the total concentration in the receiving water bodies following mixing of leached contaminants. As such, the standards are included as an example of good water quality for consideration of how leachable contamination might affect such waters. The results of the testing and the assessment criteria are shown Table 2 below.

Table 2: Chemical Determinands in Leachate

	Returned Concentrations (µg/l)	UK Standard for Surface Waters intended for Drinking Water Abstraction* (DW) and/or protection of Aquatic Life in surface waters* (Aq) (µg/l)
<i>Inorganic Chemicals</i>		
Arsenic	6.77 – 7.21	50 (DW, range: 50-100) (No Aq standard)
Boron	15 – 18	1000 (DW & Aq)
Cadmium	<0.1	5 (DW & Aq)
Chromium	1.2 – 1.4	50 (DW) / 5-250 (Aq, range: 5-250)
Copper	3.7 – 6.1	50 (DW) / 5-112 (Aq, range: 5-112)
Lead	1.6 – 5.0	50 (DW) / 4-250 (Aq, range: 4-250)
Mercury (elemental Hg)	<0.05	1 (DW & Aq)
Nickel	1.8 – 2.3	20** (DW) / 50-200 (Aq, range: 50-200)
Selenium	<1.1 – 1.29	10 (DW) (No Aq standard)
Zinc	4 – 23	3000 (DW, range: 3000-5000) / 30-2000 (Aq, range: 30-2000)
pH	7.8 – 8.0	Range 5.5 to 10 (UK drinking water standards)
<i>Organic Chemicals</i>		
Cyanide	<5	50 (DW) / 5 (Aq)
Phenols	<20	50**(DW) / 300 (Aq)
PAHs (total)	<1.6***	0.2 (DW, range: 0.2-1.0) (No Aq standard)

*sourced from Environment Agency database at <http://evidence.environment-agency.gov.uk/ChemicalStandards/home.aspx>.

If more than one option is available (dependant on other water properties or environmental setting) applicability is discussed later.

**Standard for water supply as no standard available for surface water abstraction for drinking water.

***Sum of USEPA 16, each at Lower Limit of Detection of <0.1

As can be seen from Table 4 and the detailed results presented in Chemtech Environmental Ltd. report 128842 (Appendix 3), soils at the site have generally been shown to not be leaching any potential contaminants at levels that would be expected to have any significant impact on local ground and surface water bodies.

5.3 Review of Results

One (1) of the seven (7) analysed samples have returned levels of PAHs in excess of the adopted target values.

These exceedances appear to be restricted to the area around TPA. The tested material was noted as predominantly clayey made ground, similar material was testing in nearby TPE which found no such elevated levels of contamination. As such, a localised remediation exercise will be required to address this issue before the site can be deemed suitable for residential use.

6 Hazardous Gas

6.1 Gas Regime

Made ground deposits have been found to be consistently shallow ($\leq 1.0\text{m}$) across the site. In addition, no records of other potential sources of hazardous gas have been identified (such as landfills, shallow coal mining or organic natural deposits).

Given the absence of any plausible source of hazardous gas, no ground gas monitoring has been considered necessary at the site, and there is not considered to be any noteworthy gas risk to the proposed development. In line with CLAIRE Research Bulletin 17 "A Pragmatic Approach to Ground Gas Risk Assessment", no ground gas monitoring or protection measures will be required for the proposed development.

6.2 Radon Gas

As confirmed by the phase 1 desk study report for the site the site is in an area where just <1% of properties are above the radon action level. Therefore, no radon protection measures will be required in the new structure(s).

7. Conclusions

7.1 Contamination

Soil analysis results have confirmed that remedial works will be required at the site before it can be deemed fit for purpose in a residential context.

No contamination risk to ground/surface waters has been identified.

Given the limited quantity and depth of affected soils it is likely that simple excavation, removal and replacement of the implicated soils with proven uncontaminated materials will comprise the most cost-effective and appropriate method of remediation.

The local planning authority (LPA) will most likely require a "remediation and validation strategy" document for approval prior to commencement of the remedial works, and a "validation report" on completion of the works confirming their success.

7.2 Hazardous Gas

The findings of the phase 1 desk study and the absence of any significant made ground or natural organic soils at the site confirm that there is no noteworthy potential ground gas risk (including consideration of radon).

No ground gas monitoring was considered necessary, and no ground gas protection will be required in the proposed new structure(s).

The complete absence of any visual or olfactory evidence of hydrocarbon contamination, coupled with the very favourable soil analysis results in that regard, also confirm that no hydrocarbon vapour risk exists at the site.

7.3 Concrete Design

The results of chemical analyses of the fill returned Water Soluble Sulphate levels of between 13mg/l¹ and 112mg/l¹ and pH levels of between 7.6 and 8.5. Additionally, the site is inferred to classify as natural soils with static9 water.

On this basis concrete in contact with the ground may be designed to ACEC Class DS-1 AC-1s of “BRE Special Digest 1 – Concrete in aggressive ground”.

Table 6: Aggressive chemical environment for concrete (ACEC) site classification⁽¹⁾ and applies to concrete exposed to ground with a pH value greater than 2.5

Sulfate and magnesium				Natural soil		Brownfield ⁽³⁾				ACEC class for site
Design sulfate class for site	2:1 water/soil extract	Ground water	Total potential sulfate ⁽²⁾	Static water	Mobile water	Static water		Mobile water		
1	2	3	4	5	6	7	8	9	10	11
	SO ₄	Mg	SO ₄	Mg	SO ₄	pH	pH	pH ⁽⁵⁾	pH ⁽⁵⁾	
	mg/l	mg/l	mg/l	mg/l	%					
DS-1	<500	All Mg values	<400	All Mg values	<0.24	>2.5		>2.5		AC-1s
							>5.5 ⁽⁶⁾		>6.5	AC-1
							2.5 -5.5		5.5-6.5	AC-2z
									4.5-5.5	AC-3z
									2.5-4.5	AC-4z
DS-2	500-1500	All Mg values	400-1400	All Mg values	0.24-0.6	>3.5		>5.5		AC-1s
							>5.5		>6.5	AC-2
						2.5-3.5		2.5-5.5		AC-2s
							2.5-5.5		5.5-6.5	AC-3z
									4.5-5.5	AC-4z
									<4.5	AC-5z

END OF REPORT

The findings and contents of this (intrusive) Site Investigation Report pertain solely to the study area(s) outlined herein and are based solely on the findings of the excavations undertaken as part of the current exercise unless otherwise stated. The findings and/or recommendations of this report do not take into account any ground conditions that may be present but have hitherto not been encountered and as such further investigation and/or a reconsideration of the findings of this report should be undertaken if such conditions are subsequently encountered or an alternative development plan or land use is subsequently proposed.

This report considers various environmental and/or geological risks posed to the site and/or proposed development and offers advice accordingly as guidance only. The findings of this report will remain valid provided no change of ground or groundwater conditions, either natural or anthropogenic, take place and no warrantee is offered or implied.

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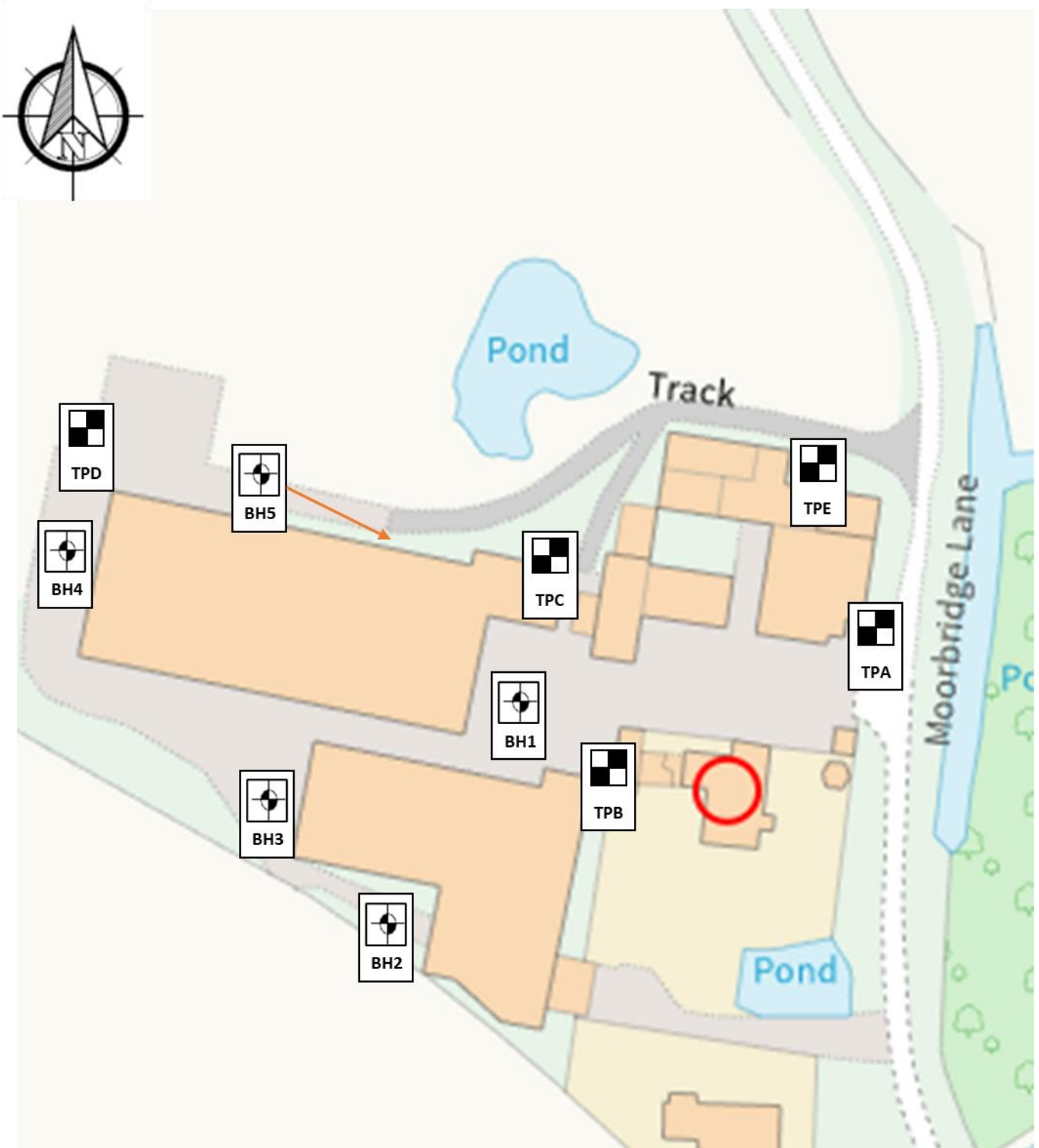
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APPENDIX 1
Site Plan
And
Borehole & Trial pit Logs

GEOINVESTIGATE Ltd.

OUR REF: G23417	YOUR REF:	SITE PLAN (NOT TO SCALE)
DATE: 24/11/23	LOCATION: Moorbridge Farm, Harleston, Stowmarket IP14 3JH	



Key



Windowless sample borehole locations



Trial Pit Locations

GEOINVESTIGATE Ltd.

Your Ref.
Our Ref.

G23417

BH No.1 Sheet No. 1 of 1
Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.15	CONCRETE. No dpm or rebar.	150			O	Cv kN/m ²			0.25
	Firm to stiff, becoming stiff, light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk and flint.				O	96			0.50
					O	90			0.75
					O	90		1.00m	1.00
	Very sandy between 1.40m and 1.80m				O	50			1.25
		2850			O	50			1.50
					O	90			1.75
					O	90			2.00
					O	110			2.25
					O	110			2.50
					O	110			2.75
3.00					O	110			3.00
	Borehole terminated at 3.00m								

Remarks:

Casing to 1.00m
 Dynamic windowless sampling by Terrier Rig to 3.00m
 Borehole closed to 1.50m upon completion
 Standing water level recorded at 1.00m

Key:

	Slotted Pipe		Disturbed sample
	Plain Pipe		Cv Shear vane
	Bentonite		W Water sample
	Gravel Filter		S Standard Penetration Test
			C Cone Penetration Test

BH1

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Your Ref.
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BH No.2 Sheet No. 1 of 1
Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.10	MADE GROUND. Firm dark brown very sandy gravelly clay. Gravel is fine to coarse of concrete, tarmac and flint.	100				Cv kN/m ²			0.25
	Firm to stiff light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk and flint.	1900			O	60			0.50
					O	60			0.75
					O	60			1.00
					O	80			1.25
					O	80			1.50
2.00					O	110			1.75
					O	110			2.00
	Borehole terminated at 2.00m								

Remarks:

Casing to 1.00m
 Dynamic windowless sampling by Terrier Rig to 2.00m
 Borehole remained open and dry on completion

Key:

	Slotted Pipe		Disturbed sample
	Plain Pipe		Cv Shear vane
	Bentonite		W Water sample
	Gravel Filter		S Standard Penetration Test
			C Cone Penetration Test

BH2

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BH No.3 Sheet No. 1 of 1

Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.20	MADE GROUND. Dense dark grey clayey sandy gravel. Gravel is fine to coarse of brick, tarmac and flint.	200							0.25
1.00	Loose to medium dense brown and orange gravelly SAND. Gravel is fine to coarse of flint and chalk.	800			O				0.50
					O	110			0.75
					O	110			1.00
	Stiff light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk and flint.				O	100			1.25
					O	110			1.50
					O	110			1.75
					O	110			2.00
					O	110			2.25
					O	110			2.50
					O	110			2.75
3.00	Borehole terminated at 3.00m				O	110			3.00

Remarks:

Casing to 1.00m
 Dynamic windowless sampling by Terrier Rig to 3.00m
 Borehole remained open and dry on completion

Key:

- | | | | |
|--|---------------|--|---------------------------|
| | Slotted Pipe | | Disturbed sample |
| | Plain Pipe | | Shear vane |
| | Bentonite | | Water sample |
| | Gravel Filter | | Standard Penetration Test |
| | | | Cone Penetration Test |

BH3

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BH No.4 Sheet No. 1 of 1
Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.20	TURF AND TOPSOIL. Soft brown very sandy very gravelly clay. Gravel is fine to coarse of sandstone, concrete and flint.	200				O	Cv kN/m ²		0.25
0.90	MADE GROUND. Firm light brown very sandy very gravelly clay. Gravel is fine to coarse of sandstone and concrete.	700				O	50		0.50
								0.75	
2.00	Firm to stiff light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk and flint.	1100				O	70		1.00
						O	80		1.25
						O	60	1.55m	1.50
	Borehole terminated at 2.00m								1.75
									2.00

Remarks:

Casing to 1.00m
 Dynamic windowless sampling by Terrier Rig to 2.00m
 Borehole closed to 1.60m upon completion
 Standing water level recorded at 1.55m

Key:

	Slotted Pipe	O	Disturbed sample
	Plain Pipe	Cv	Shear vane
	Bentonite	W	Water sample
	Gravel Filter	S	Standard Penetration Test
		C	Cone Penetration Test

BH4

GEOINVESTIGATE Ltd.

Your Ref.
Our Ref.

G23417

BH No.5 Sheet No. 1 of 1
Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

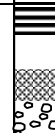
Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.20	TURF AND TOPSOIL. Soft brown sandy gravelly clay. Gravel is fine to coarse of brick, concrete and flint.	200			O	Cv kN/m ²			0.25
1.10	Soft brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse of chalk.	900			O	20			0.50
					O	20			0.75
					O	115			1.00
									1.25
					O	95			1.50
									1.75
					O	105			2.00
									2.25
					O	85			2.50
									2.75
3.00		2900							3.00
	Borehole terminated at 3.00m								

Remarks:

Casing to 1.00m

Dynamic windowless sampling by Terrier Rig to 3.00m

Borehole remained open and dry on completion

Key:


Slotted Pipe

Plain Pipe

Bentonite

Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

BH5

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref.

G23417

TPA

Sheet No. 1 of 1

Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.20	TURF AND TOPSOIL. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, brick and concrete.	200			O	Cv kN/m ²			0.25
0.50	MADE GROUND. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, brick, pot, glass and fabric. Trial pit terminated at 0.50m.	300			O				0.50

Remarks:

Hand dug trial pit to a depth of 0.50m
Trial pit remained stable and dry upon completion

Key:

- | | | | |
|--|---------------|----|---------------------------|
| | Slotted Pipe | O | Disturbed sample |
| | Plain Pipe | Cv | Shear vane |
| | Bentonite | W | Water sample |
| | Gravel Filter | S | Standard Penetration Test |
| | | C | Cone Penetration Test |

TPA

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref. G23417

TPB

Sheet No. 1 of 1

Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.30	MADE GROUND. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, shale, glass and pot.	300			O	Cv kN/m ²			0.25
0.50	Very soft light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk.	200			O				0.50
Trial pit terminated at 0.50m.									

Remarks:

Hand dug trial pit to a depth of 0.50m
 Trial pit remained stable and dry upon completion

Key:

- | | | | |
|--|---------------|----|---------------------------|
| | Slotted Pipe | O | Disturbed sample |
| | Plain Pipe | Cv | Shear vane |
| | Bentonite | W | Water sample |
| | Gravel Filter | S | Standard Penetration Test |
| | | C | Cone Penetration Test |

TPB

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref.

G23417

TPC

Sheet No. 1 of 1

Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.10	TURF AND TOPSOIL. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, brick and flint. Medium dense dark brown very clayey GRAVEL of flint.	100				Cv kN/m ²			
0.30		200			O				0.25
0.50		200					O		
	Soft light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk. Trial pit terminated at 0.50m.								

Remarks:
 Hand dug trial pit to a depth of 0.50m
 Trial pit remained stable and dry upon completion

- Key:**
- Slotted Pipe
 - Plain Pipe
 - Bentonite
 - Gravel Filter
 - Disturbed sample
 - Cv Shear vane
 - Water sample
 - Standard Penetration Test
 - Cone Penetration Test

TPC

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref. G23417

TPD

Sheet No. 1 of 1

Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.20	TURF AND TOPSOIL. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone and brick.	200			O	Cv kN/m ²			0.25
0.50	Soft light brown sandy gravelly CLAY. Gravel is fine to coarse of chalk.	300			O				0.50
	Trial pit terminated at 0.50m.								

Remarks:

Hand dug trial pit to a depth of 0.50m
 Trial pit remained stable and dry upon completion

Key:

- Slotted Pipe
- Plain Pipe
- Bentonite
- Gravel Filter
- Disturbed sample
- Cv Shear vane
- Water sample
- Standard Penetration Test
- Cone Penetration Test

TPD

GEOINVESTIGATE Ltd.

Your Ref.
Our Ref. G23417

TPE
Sheet No. 1 of 1
Location: Moorbridge Farm, Harleston Stowmarket, IP14 3JH

DATE: 23-24/11/23

Depth (m)	Description of Strata	Thick-ness	Legend	Gas Well	Sample	Test Type Result	SPT N Value (Depth)	Depth to Water	Depth (m)
0.10	TURF AND TOPSOIL. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, brick and concrete. MADE GROUND. Soft dark brown sandy gravelly clay. Gravel is fine to coarse of sandstone, brick, pot, glass and fabric. Trial pit terminated at 0.50m.	100				Cv kN/m ²			
		400			O				0.25
0.50						O			0.50

Remarks:

 Hand dug trial pit to a depth of 0.50m
 Trial pit remained stable and dry upon completion

Key:

- | | |
|--|--|
| <ul style="list-style-type: none"> Slotted Pipe Plain Pipe Bentonite Gravel Filter | <ul style="list-style-type: none"> Disturbed sample Cv Shear vane W Water sample S Standard Penetration Test C Cone Penetration Test |
|--|--|

TPE

APPENDIX 2 Site Pictures



APPENDIX 3
Chemtech Analytical Test Report



ANALYTICAL TEST REPORT

Contract no: 128842

Contract name: Moorbridge Farm, Harleston, Stowmarket, IP13 3JH

Client reference: G23417

Clients name: Geo Investigate

Clients address: Units 3a & 4 Terry Dicken Industrial Estate
Ellerbeck Way, Stokesley
North Yorkshire
TS9 7AE

Samples received: 04 December 2023

Analysis started: 04 December 2023

Analysis completed: 14 December 2023

Report issued: 14 December 2023

Key

- U UKAS accredited test
- M MCERTS & UKAS accredited test
- \$ Test carried out by an approved subcontractor
- I/S Insufficient sample to carry out test
- N/S Sample not suitable for testing
- NAD No Asbestos Detected

Approved by:

E. McCulloch

Ellis McCulloch
Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
128842-1	TPA	0.50	Clayey Loam with Gravel & Roots	-	-	15.3
128842-2	TPB	0.50	Sandy Loamy Clay with Gravel	-	-	16.7
128842-3	TPC	0.20	Clayey Loam with Gravel	-	-	14.1
128842-4	TPD	0.20	Clayey Loam with Gravel & Roots	-	-	22.1
128842-5	TPE	0.20	Sandy Loam with Gravel	-	-	18.2
128842-6	BH2	0.50	Sandy Clay with Gravel	-	-	11.0
128842-7	BH5	0.50	Sandy Clay with Gravel & Roots	-	-	16.9

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SOILS

Lab number			128842-1	128842-2	128842-3	128842-4	128842-5	128842-6
Sample id			TPA	TPB	TPC	TPD	TPE	BH2
Depth (m)			0.50	0.50	0.20	0.20	0.20	0.50
Date sampled			23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Test	Method	Units						
Arsenic (total)	CE264 ^M	mg/kg As	7.9	12.9	5.1	7.0	6.3	8.3
Boron (water soluble)	CE063 ^U	mg/kg B	1.2	1.0	0.8	1.2	1.0	<0.5
Cadmium (total)	CE264 ^M	mg/kg Cd	<2	<2	<2	<2	<2	<2
Chromium (total)	CE264 ^U	mg/kg Cr	33.2	35.1	30.7	33.2	25.4	25.9
Chromium (III)	CE208	mg/kg CrIII	33.2	35.1	30.7	33.2	25.4	25.9
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	17.6	13.2	7.6	12.3	14.3	11.4
Lead (total)	CE264 ^U	mg/kg Pb	54.2	38.1	16.3	19.8	41.8	15.0
Mercury (total)	CE264 ^U	mg/kg Hg	<2	<2	<2	<2	<2	<2
Nickel (total)	CE264 ^M	mg/kg Ni	16.4	18.7	8.9	14.0	11.8	17.9
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3
Zinc (total)	CE264 ^M	mg/kg Zn	127.9	107.7	51.4	73.0	147.2	66.1
pH	CE004 ^M	units	8.7	7.6	7.9	8.1	8.0	8.5
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	31	112	19	23	20	26
Sulphide	CE016	mg/kg S ²⁻	12	<10	<10	<10	40	20
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Thiocyanate	CE145 ^M	mg/kg SCN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	2.5	0.9	1.8	2.8	3.7	0.7
Estimate of OMC (calculated from TOC)	CE197	% w/w	4.3	1.6	3.1	4.9	6.4	1.1
PAH								
Acenaphthene	CE087 ^M	mg/kg	3.52	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	CE087 ^M	mg/kg	0.93	<0.02	<0.02	<0.02	0.02	<0.02
Anthracene	CE087 ^U	mg/kg	11.58	<0.02	<0.02	0.04	0.11	<0.02
Benzo(a)anthracene	CE087 ^U	mg/kg	30.87	0.04	0.07	0.23	0.52	<0.02
Benzo(a)pyrene	CE087 ^U	mg/kg	34.36	0.03	0.06	0.21	0.52	<0.02
Benzo(b)fluoranthene	CE087 ^M	mg/kg	32.51	0.05	0.08	0.24	0.66	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	18.29	<0.02	<0.02	0.08	0.40	<0.02
Benzo(k)fluoranthene	CE087 ^M	mg/kg	14.48	<0.03	0.03	0.10	0.27	<0.03
Chrysene	CE087 ^M	mg/kg	29.27	0.03	0.05	0.27	0.58	<0.03
Dibenz(ah)anthracene	CE087 ^M	mg/kg	4.08	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	CE087 ^M	mg/kg	71.59	0.06	0.09	0.43	0.87	<0.02
Fluorene	CE087 ^U	mg/kg	2.99	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(123cd)pyrene	CE087 ^M	mg/kg	21.45	<0.02	0.02	0.09	0.40	<0.02
Naphthalene	CE087 ^M	mg/kg	0.53	<0.02	<0.02	<0.02	0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	32.56	0.03	<0.02	0.19	0.21	<0.02
Pyrene	CE087 ^M	mg/kg	65.34	0.06	0.10	0.42	0.92	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	374	<0.34	0.50	2.29	5.52	<0.34
TPH								
VPH Aromatic (>EC5-EC7)	\$	mg/kg	-	<0.05	-	-	<0.05	<0.05

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SOILS

Lab number			128842-1	128842-2	128842-3	128842-4	128842-5	128842-6
Sample id			TPA	TPB	TPC	TPD	TPE	BH2
Depth (m)			0.50	0.50	0.20	0.20	0.20	0.50
Date sampled			23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Test	Method	Units						
VPH Aromatic (>EC7-EC8)	\$	mg/kg	-	<0.05	-	-	<0.05	<0.05
VPH Aromatic (>EC8-EC10)	\$	mg/kg	-	<0.05	-	-	<0.05	<0.05
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	1.46	-	-	<0.5	<0.5
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	<1	-	-	<1	<1
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	<2	-	-	<2	<2
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	<5	-	-	44	<5
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	<1.5	-	-	33	3
VPH Aliphatic (>C5-C6)	\$	mg/kg	-	<0.05	-	-	<0.05	<0.05
VPH Aliphatic (>C6-C8)	\$	mg/kg	-	<0.1	-	-	<0.1	<0.1
VPH Aliphatic (>C8-C10)	\$	mg/kg	-	<0.05	-	-	<0.05	<0.05
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	0.68	-	-	<0.5	<0.5
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	0.93	-	-	<0.5	<0.5
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	<4.5	-	-	<4.5	<4.5
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	<1	-	-	<1	<1
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	-	NAD	NAD	-	-

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SOILS

Lab number			128842-7
Sample id			BH5
Depth (m)			0.50
Date sampled			23/11/2023
Test	Method	Units	
Arsenic (total)	CE264 ^M	mg/kg As	6.8
Boron (water soluble)	CE063 ^U	mg/kg B	0.5
Cadmium (total)	CE264 ^M	mg/kg Cd	<2
Chromium (total)	CE264 ^U	mg/kg Cr	34.7
Chromium (III)	CE208	mg/kg CrIII	34.7
Chromium (VI)	CE263	mg/kg CrVI	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	10.0
Lead (total)	CE264 ^U	mg/kg Pb	11.7
Mercury (total)	CE264 ^U	mg/kg Hg	<2
Nickel (total)	CE264 ^M	mg/kg Ni	16.9
Selenium (total)	CE264	mg/kg Se	<3
Zinc (total)	CE264 ^M	mg/kg Zn	65.8
pH	CE004 ^M	units	8.2
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	13
Sulphide	CE016	mg/kg S ²⁻	20
Cyanide (free)	CE077	mg/kg CN	<1
Cyanide (total)	CE077	mg/kg CN	<1
Thiocyanate	CE145 ^M	mg/kg SCN	1.2
Phenols (total)	CE078	mg/kg PhOH	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	0.6
Estimate of OMC (calculated from TOC)	CE197	% w/w	1.1
PAH			
Acenaphthene	CE087 ^M	mg/kg	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02
Anthracene	CE087 ^U	mg/kg	<0.02
Benzo(a)anthracene	CE087 ^U	mg/kg	<0.02
Benzo(a)pyrene	CE087 ^U	mg/kg	<0.02
Benzo(b)fluoranthene	CE087 ^M	mg/kg	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	<0.02
Benzo(k)fluoranthene	CE087 ^M	mg/kg	<0.03
Chrysene	CE087 ^M	mg/kg	<0.03
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02
Fluoranthene	CE087 ^M	mg/kg	<0.02
Fluorene	CE087 ^U	mg/kg	<0.02
Indeno(123cd)pyrene	CE087 ^M	mg/kg	<0.02
Naphthalene	CE087 ^M	mg/kg	<0.02
Phenanthrene	CE087 ^M	mg/kg	<0.02
Pyrene	CE087 ^M	mg/kg	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	<0.34
TPH			
VPH Aromatic (>EC5-EC7)	\$	mg/kg	-

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SOILS

Lab number	128842-7		
Sample id	BH5		
Depth (m)	0.50		
Date sampled	23/11/2023		
Test	Method	Units	
VPH Aromatic (>EC7-EC8)	\$	mg/kg	-
VPH Aromatic (>EC8-EC10)	\$	mg/kg	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-
VPH Aliphatic (>C5-C6)	\$	mg/kg	-
VPH Aliphatic (>C6-C8)	\$	mg/kg	-
VPH Aliphatic (>C8-C10)	\$	mg/kg	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-
Subcontracted analysis			
Asbestos (qualitative)	\$	-	-

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			128842-2L	128842-5L
Sample id			TPB	TPE
Depth (m)			0.50	0.20
Test	Method	Units		
Arsenic (dissolved)	CE265 ^U	µg/l As	7.21	6.77
Boron (dissolved)	CE265	µg/l B	18	15
Cadmium (dissolved)	CE265 ^U	µg/l Cd	<0.1	<0.1
Chromium (dissolved)	CE265 ^U	µg/l Cr	1.2	1.4
Copper (dissolved)	CE265 ^U	µg/l Cu	3.7	6.1
Lead (dissolved)	CE265 ^U	µg/l Pb	1.6	5.0
Mercury (dissolved)	CE265	µg/l Hg	<0.05	<0.05
Nickel (dissolved)	CE265 ^U	µg/l Ni	1.8	2.3
Selenium (dissolved)	CE265 ^U	µg/l Se	1.29	<1.1
Zinc (dissolved)	CE265 ^U	µg/l Zn	4	23
pH	CE213 ^U	units	8.0	7.8
Sulphate	CE257 ^U	mg/l	2.0	<0.3
Sulphur (dissolved)	CE265 ^U	mg/l S	2.3	0.7
Sulphide	CE249	µg/l S ²⁻	<100	<100
Cyanide (free)	\$	µg/l CN	<5	<5
Cyanide (total)	\$	µg/l CN	<5	<5
Thiocyanate	CE014	µg/l SCN	<200	<200
Phenols (total)	CE148	µg/l PhOH	<10	<10
PAH				
Acenaphthene	CE051	µg/l	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1
Naphthalene	CE051	µg/l	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE264	Arsenic (total)	Aqua Regia Extraction, ICPOES	Dry	M	3	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	U	1	mg/kg B
CE264	Cadmium (total)	Aqua Regia Extraction, ICPOES	Dry	M	2	mg/kg Cd
CE264	Chromium (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Cr
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE263	Chromium (VI)	Discrete Analyser	Dry			mg/kg CrVI
CE264	Copper (total)	Aqua Regia Extraction, ICPOES	Dry	M	2	mg/kg Cu
CE264	Lead (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Pb
CE264	Mercury (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Hg
CE264	Nickel (total)	Aqua Regia Extraction, ICPOES	Dry	M	3	mg/kg Ni
CE264	Selenium (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Se
CE264	Zinc (total)	Aqua Regia Extraction, ICPOES	Dry	M	4	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE016	Sulphide	Distillation, Titration	Dry		10	mg/kg S ²⁻
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE145	Thiocyanate	Weak acid extraction, Colorimetry	Dry	M	1	mg/kg SCN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	U	0.03	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE002	Leachate preparation (EA)	L:S 10:1		-	-
CE265	Arsenic (dissolved)	Analysis by ICPMS	U	0.1	µg/l As
CE265	Boron (dissolved)	Analysis by ICPMS		4	µg/l B
CE265	Cadmium (dissolved)	Analysis by ICPMS	U	0.1	µg/l Cd
CE265	Chromium (dissolved)	Analysis by ICPMS	U	0.5	µg/l Cr
CE265	Copper (dissolved)	Analysis by ICPMS	U	0.6	µg/l Cu
CE265	Lead (dissolved)	Analysis by ICPMS	U	0.6	µg/l Pb
CE265	Mercury (dissolved)	Analysis by ICPMS		0.05	µg/l Hg
CE265	Nickel (dissolved)	Analysis by ICPMS	U	0.4	µg/l Ni
CE265	Selenium (dissolved)	Analysis by ICPMS	U	1.1	µg/l Se
CE265	Zinc (dissolved)	Analysis by ICPMS	U	3	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE257	Sulphate	Discrete Analyser	U	0.3	mg/l
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE249	Sulphide	Distillation, Titration		100	µg/l S2-
\$	Cyanide (free)	Continuous Flow Colorimetry		5	µg/l CN
\$	Cyanide (total)	Continuous Flow Colorimetry		5	µg/l CN
CE014	Thiocyanate	Colorimetry		200	µg/l SCN
CE148	Phenols (total)	Continuous Flow Colorimetry		10	µg/l PhOH
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l

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DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
128842-1	TPA	0.50	N	
128842-2	TPB	0.50	N	
128842-3	TPC	0.20	N	
128842-4	TPD	0.20	N	
128842-5	TPE	0.20	N	
128842-6	BH2	0.50	N	
128842-7	BH5	0.50	N	

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ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.