

GROUND CONTAMINATION INVESTIGATION AND ASSESSMENT

PHASE 2 - INTRUSIVE

**cnr. Cheal Road/Saltfleet Lane,
Surfleet
PE11 4BD**



Frontispiece - Aerial Image of Site

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Report on: Phase 2 investigation with trialpits

Report at: Cheal Road/Saltfleet Lane, Sutterton
PE11 4BD

Report for: Mr. and Mrs. C. Wheeler, Cheal Road,
Sutterton PE11 4BD

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1. INTRODUCTION

1.1 Background

It is proposed to redevelop the land on the corner of Cheal Road and Surfleet Lane with a residence together with an extension/conversion of the existing cold store barn, demolition of the existing agricultural barn and change of use of the existing land for residential garden.

The site has been used for commercial purposes so an assessment for the potential of contaminated ground is required.

A Phase 1 Desk Study, a copy of which is appended, established that there are LOW to VERY LOW risks of contamination and that the ground should be investigated after the existing site buildings have been removed.

1.2 Objectives

The Environment Agency Land Contamination: Risk Management (LCRM) guidance prescribes the following three step framework for managing land contamination in England.

LCRM Framework		Planning Condition
Stage 1	Risk Assessment	Site Characterisation
	Tier 1: Preliminary Risk Assessment (PRA)	
	Tier 2: Generic Quantitative Risk Assessment (GQnRA)	
	Tier 3: Detailed Quantitative Risk Assessment (DQnRA)	
Stage 2	Options Appraisal	Submission of Remediation Strategy
Stage 3	Remediation	
	Tier 1: Develop a Remediation Strategy (RS)	Implementation of Approved Remediation Strategy
	Tier 2: Remediation and Verification	
	Tier 3: Long term monitoring and maintenance (if required)	

Table 1 – Stages of risk assessment for contaminated land

This report attends to the Stage 1 Site Characterisation – Tier 2.

This report contains:

- a review of the previous investigations;
- a trial pit sampling/analysis investigation;
- an assessment of the new data; and

- recommendations for remediation.

1.3 Limitations

Langdale-Smith and Co has prepared this report solely for the use of the client and/or his agent on the basis of exchange of proposals and instructions, and the company accepts no responsibility or liability for use of this report by any party other than the person for whom it was commissioned, or for the consequences of the report being used for any other purpose other than that for which it was commissioned.

Should any third party wish to use or rely on the contents of the report, written approval should be sought.

It is strongly recommended that independent advice is sought by that third party with respect to its specific proposals or requirements.

The conclusions and recommendations in this report represent our professional opinion, derived from currently accepted industry practices, exercising all reasonable skill and care to be expected of a professional engineering and environmental consultancy of similar size and experience.

The assessments and judgements given in this report are directed by both the finite quantity of data on which they are based and the proposed works to which they are addressed, taking account of the resources devoted to it by agreement with the client or agent, whether in writing or subsequent verbal instructions.

2. PRELIMINARY CONCEPTUAL MODEL

2.1 Principles of the assessment

The following decision matrices are from CIRIA Report C552 'Contaminated Land Risk Assessment – a guide to good practice' 2001.

Highly likely	very likely short term, inevitable long term or already causing harm
Likely	possible short term and likely in the long term
Low likelihood	less likely in short term and unlikely in long term
Unlikely	improbable in the long term

Table 2 - definitions of likelihood of harm being caused

Severe	acute risk to Human Health likely to result in significant harm, short term risk of pollution to sensitive water courses, ecosystems or organisms that are part of that ecosystem, catastrophic damage to buildings or property
Medium	chronic damage to Human Health, long term risk of pollution to sensitive water resources, significant change in the ecosystems or organisms that are part of that ecosystem
Mild	pollution of non-sensitive water resources, significant damage to crop, buildings, structures, services
Minor	harm, not necessarily significant, that could result in unforeseen costs, non-permanent Human Health effects prevented by protective clothing, easily repaired damage to buildings, structures, services

Table 3 - definitions of consequences of harm

		Severe	Medium	Mild	Minor
PROBABILITY	Highly likely	Very high	High	Moderate	Moderate/Low
	Likely	High	Moderate/Low	Moderate/Low	Low
	Low likelihood	Moderate/Low	Moderate/Low	Low	Very low
	Unlikely	Moderate/Low		Very low	Very low

Table 4 - categories of risk used in this assessment

2.2 Sources

The sources of potential contamination are given in the CEM prepared by Delta-Simons, comprising of the remnants of the former agricultural use.

2.3 Receptors

Receptors comprise those material items or living beings that may be affected by contaminants, provided that there is a viable pathway for the contaminant to reach the Receptor.

2.4 Pathways

2.4.1 Direct exposure

	DIRECT EXPOSURE
P1	Outdoor ingestion of dust
P2	Indoor Ingestion of dust
P3	Consumption of home-grown vegetables
P4	Ingestion of soil attached to vegetables
P5	Outdoor exposure through dermal contact
P6	Indoor exposure through dermal contact
P7	Outdoor inhalation of fugitive dust
P8	Indoor inhalation of fugitive dust
P9	Outdoor inhalation of soil vapour
P10	Indoor inhalation of soil vapour
P11	Ingestion of surface water

Table 5 – Generic pathways of Direct Exposure

2.4.2 Sub-surface migration

	SUB-SURFACE MIGRATION
P12	Surface infiltration (e.g. from AST)
P13	Sub-surface infiltration (e.g. from UST)
P14	Anthropogenic (e.g. pipes, conduits)
P15	Permeable ground
P16	Groundwater (perched)
P17	Groundwater (unrestrained)

Table 6 – Generic pathways of Sub-surface migration

2.4.3 Assessment of potential pathways

The demolition process involved in the proposed works will unavoidably create concrete dust that may act as a conduit for harmful contaminants into the body via Direct Exposure.

As the structures that are due to be demolished are extremely well ventilated by large doors or a lack of covering structure, the indoor pathways P2, P6, P8, P10 have been discounted.

2.5 Preliminary Conceptual Exposure Model

Based on the possible sources, pathways and receptors identified, relevant contamination linkages (RCL's) from the proposed development have been created.

Potential contamination linkages are categorized through the risk classification matrix to assess whether any identified RCL's are present.

For an RCL to be actionable, the linkage must pose a threat greater than *low* or *very low*.

The CEM presented by Delta-Simons concluded that there was LOW TO MODERATE RISK from the potentially contaminated soils and/or groundwater located beneath the site to future site residents and maintenance/construction workers.

Other risks were deemed LOW TO VERY LOW.

3. GROUND INVESTIGATION

3.1 Strategy

The potential sources of contamination at this site have been generated by above ground activity so any contamination is likely to be in the superficial soil at the site.

All above-ground infrastructure has been removed and site has been stripped to expose the natural soil at the site.

No areas of localised contamination were apparent so a simple random selection of sample points focussing on the future open areas (*i.e.* areas not be overbuilt) would be satisfactory to describe the soil conditions.

The former site use was focussed on the west side of the site and given that this is the area for the proposed development samples should be taken from near the surface and at foundation depth.

On the east half that is, and will remain, garden and lawn, samples from near the surface will be adequate.



Fig 1 – view to northwest across site after stripping



Fig 2 – view to southeast across site of untouched land

3.2 Work undertaken and findings

3.2.1 Work undertaken

5 No. trialpits (TP1 – TP5) were excavated by a client-supplied 3.5 tonne tracked 360 with 2ft bucket, to 1.8 m bgl.

Additionally 2 No. trialpits (TP6 and TP7) were excavated to 0.4 m by hand.

Upon completion of each trialpit was reinstated using the excavated material.

3.2.2 Findings

The ground encountered was as anticipated, comprising of:

- 0.0 – 0.3 m loose brown sandy TOPSOIL
- 0.3 – 1.3 m firm/stiff yellow/brown sandy very clayey SILT
- 1.3 – 1.8 m firm yellow brown sandy very clayey SILT

The clayey SILT is taken to be the natural ground loosely described as the Tidal Flat deposits that is typical of the Fenland region.

No groundwater was encountered.

No organic material (*i.e.* Peat) was encountered.



Fig 3 – trialpit location plan

3.3 Sampling and analysis

Samples of the ground encountered in trialpits TP1 to TP5 were taken at 0.3 m and 0.8 m depth, providing samples from just below the Topsoil layer and from the underlying natural ground.

Samples from TP6 and TP7 were taken at 0.3 m, just below the Topsoil layer.

The samples were placed in amber glass jars, stored in a cooler box and shipped overnight to ELAB, a well-established UKAS-accredited laboratory.

The analytical suite, which was based on the preliminary CEM, comprised of:

- CLEA metals;
- Asbestos fibres;
- PAH; and
- pH, sulphate, organic content.

The full methodology of analysis and results are appended and shown tabulated for ease of comprehension (Table 7).

The LQM/CIEH soil guidance values (SGV) provide a list of concentrations of the various contaminants, below which the concentration is regarded as harmless to likely Receptors.

At this site the Receptors will be:

- construction workers;
- future residents with children;
- gardens with vegetable uptake; and
- buried utilities.

The most sensitive Receptor will be residents with children and gardens.

The concentrations detected from the soil analysis have been compared to the SGV for the most sensitive Receptor and concentrations that exceed the SGV are shown in red.

Sample Location		TP1		TP2		TP3		TP4		TP5		TP6	TP7	LQM
Sample Depth (m bgl)		0.3	0.8	0.3	0.8	0.3	0.8	0.3	0.8	0.3	0.8	0.3	0.3	SGV
Arsenic	mg/kg	10.2	10.1	7.9	9.5	10.4	11.6	10.4	9.3	10.4	11.0	10.9	9.9	37
Barium	mg/kg	78.1	66.4	65.0	76.5	64.2	68.6	70.8	64.2	79.4	72.6	83.2	81.8	
Beryllium	mg/kg	1.0	0.7	0.5	0.6	0.7	0.8	0.6	0.6	0.5	0.6	0.5	0.6	1.7
Cadmium	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	11
Chromium	mg/kg	20.8	19.3	15.7	18.8	20.7	24.8	23.4	21.2	21.7	23.4	23.0	21.7	910
Copper	mg/kg	13.8	10.0	8.3	8.8	14.0	13.6	13.5	11.0	14.9	12.4	13.3	12.2	2400
Lead	mg/kg	28.3	13.9	10.3	11.5	26.9	20.1	19.5	14.8	41.1	17.0	30.5	23.2	200
Mercury	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	0.3	< 0.1	0.1	0.3	1.2
Nickel	mg/kg	16.1	17.9	13.5	17.2	17.6	22.1	20.4	20.2	18.3	22.2	16.9	16.7	130
Selenium	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	250
Vanadium	mg/kg	29.9	29.0	23.7	28.4	32.1	38.2	34.3	31.5	31.5	35.2	34.7	32.0	410
Zinc	mg/kg	58.3	45.8	37.3	43.3	67.3	61.1	63.1	50.8	82.2	58.2	63.7	55.9	3700
Water Soluble Sulphate	g/l	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.07	0.12	
pH	pH units	7.7	8.4	8.9	8.8	7.7	7.8	8.0	7.8	8.1	7.9	7.0	6.8	
Naphthalene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	2.3
Acenaphylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	170
Acenaphylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	210
Fluorene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	170
Phenanthrene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	95
Anthracene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	2400
Fluoranthene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2	< 0.1	0.2	< 0.1	0.4	0.1	280
Pyrene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.1	< 0.1	0.1	< 0.1	0.2	< 0.1	620
Benzo(a)anthracene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	7.2
Chrysene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	15
Benzo(b)fluoranthene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	2.6
Benzo(k)fluoranthene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	77
Benzo(a)pyrene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	2.2
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	27
Dibenzo(a,h)anthracene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.24
Benzo(g,h,i)perylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	320
Total PAH(16)	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.4	< 0.4	< 0.4	0.5	< 0.4	1.9	< 0.4	50

Table 7 – Lab results 23-50160

4. ASSESSMENT AND RECOMMENDATIONS

4.1 Proposed development

The footprint of the proposed development is shown in Fig 3, comprising of a large, detached residence on the west half of the site and open garden and lawn on the east half.

4.2 Qualitative risk assessment for the proposed development

The investigation has shown that there is no contamination at the site, from the previous agricultural use, that could be harmful to the proposed use.

4.3 Recommendations for remediation and validation

4.3.1 Remediation

No remedial works are required.

4.3.2 Validation

Upon completion of remedial works, a validation survey should be carried out by an independent competent person to assess whether the RS has been implemented correctly and is successful.

<< END >>

Preliminary Risk Assessment

Land off Cheal Road and Saltfleet Lane,
Gosberton Fen, Spalding

Presented to: **Mr C & Mrs H Wheeler**

Issued: August 2023

Delta-Simons Project No: 100442.588574

Report Details

Client	Mr C & Mrs H Wheeler
Report Title	Preliminary Risk Assessment
Site Address	Corner of Cheal Road/Saltfleet Lane, Gosberton Fen, Spalding, PE11 4BD
Report No.	100442.588574_REP_Cheal-Road-Gosberton_PRA_23-08-0704
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Drawing 1- Proposed Development Plans

APPENDICES

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Appendix B - Data Sources

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Appendix F - Selected Historical Maps

1.0 Introduction

1.1 Appointment

Delta-Simons has been requested by Origin Design Studio Limited on behalf of Mr C & Mrs H Wheeler (the "Client") to provide a Preliminary Risk Assessment in relation to the proposed redevelopment of land located on the corner of Cheal Road and Saltfleet Lane, Gosberton Fen, Spalding, PE11 4BD (the "Site").

This Report was undertaken in accordance with Delta-Simons' fee proposal dated 26th July 2023. The standard limitations associated with this Assessment are presented in Appendix A.

1.2 Context & Purpose

The aim of this report is to support the submission of a planning application for the proposed residential development. The development is subject to South Holland District Council Planning Application Ref. H08-0271-23. The Environmental Protection Officer's (EPO) comment on the application dated 11th May 2023 request standard contamination land conditions be applied to the planning decision.

The proposed development plans are included in Drawing 1.

To that end this study assesses the likely environmental issues associated with soil and groundwater conditions that may affect the proposed development of the Site. This report is designed in general accordance with guidance on Land Contamination: Risk Management pages of the GOV.UK web pages, the relevant requirements of the National Planning Policy Framework (NPPF) (as revised 2021) (paragraphs 174 & 183-184)¹ and the Planning Practice Guidance (Land Affected by Contamination)².

1.3 Scope of Works

The scope of works includes the following;

- Review of the environmental setting of the Site, including the current use / status of the Site and surrounding area, and review of the geology, hydrogeology and hydrology;
- Review of the historical activities of the Site and surrounding area;
- Review of regulatory information relating to the Site;
- Review of the online planning records for the Site;
- Consult and review information from the Local Authority in relation to Part 2A of the 1990 Environmental Protection Act;
- Complete a Site reconnaissance by undertaking a visual inspection of the Site;
- Develop an outline Conceptual Site Model, and undertake a Preliminary Risk Assessment with respect to potential contamination focussed on the proposed land use; and
- Provide commentary on potential land contamination constraints in the context of the proposed development.

Data sources used in this assessment are listed in Appendix B.

1.4 Limitations

The standard limitations associated with this Assessment are presented in Appendix A. In addition, there are the following specific limitations that apply to this Assessment:

- The Consultant undertaking the Site inspection maintained a general awareness for evidence of invasive plant species, particularly Japanese Knotweed. While none were observed during the walkover, it should be noted that the Consultant is not a trained ecologist and a separate survey undertaken by an experienced Ecologist would be necessary if a more robust assessment is needed; and

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPE_JULY_2021.pdf

² <https://www.gov.uk/guidance/land-affected-by-contamination>

- The Report includes a preliminary assessment for the potential for radon gas hazards. A detailed radon assessment falls outside of the scope of this Report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of the Local Authority.

2.0 Site Context & Data Review

The following sections provide a summary of the key site features based on the data sources listed in Appendix B. All distances, measurements and dates are approximate, and the accuracy limitations of the data sources should be noted.

2.1 Site Information

Site Overview			
			
Co-ordinates	Centred at National Grid Reference 523620,328710.	Elevation	4 m AOD
		Area	0.46 Ha
Site Location	Land located on the corner of Cheal Road and Saltfleet Lane, Gosberton Fen, Spalding, PE11 4BD. The Site is located in a rural area approximately 3.10km north northwest of the town of Pinchbeck.		

	Google Maps Link
Site Description	A Delta-Simons representative undertook a Site visit on 1st August 2023. A series of Site photographs are presented as Appendix D, and pertinent information that was observed or reported on-Site is summarised below. Tall trees and shrubs were present along the south and west boundaries of the Site. The Site was accessed via two entrances off Cheal Road. The entrances crossed drainage ditches which were noted along all boundaries except for the north, which was open to the adjacent field. The ditches were noted to be dry at the time of the walkover. The Site was occupied by a static caravan and one derelict brick building in the centre of the Site that was undergoing the replacement of the roof. Two storage containers were situated on hardstanding along the east of the Site. It is understood that the Site has recently undergone demolition including the removal of a tank to the east of the brick building and vegetation clearance. The Site layout is shown on the below photograph looking across the Site from the entrance in the south off Cheal Road.  Concrete hardstanding was present in the central area, from the main entrance up to the brick building and caravan. There were several stockpiles of brick and concrete across the Site in the southern areas. A stockpile was also noted across the secondary entrance off Cheal Road. Further concrete hardstanding was present in the western area, considered to represent the floor slab of a former building. The remainder of the Site surfacing generally comprised bare ground, with grass in the east and north. A number of broken fragments of suspected cement bound asbestos containing materials (ACMs) were identified on the bare ground along the frontage of the brick building and adjacent to the caravan. A number of services were noted across the Site including water supply, drainage and electricity.
Description of Adjacent and Surrounding Land Uses	The Site is located within an agricultural area, with open agricultural fields beyond to the north and south. A farm with associated residence is adjacent to the west. A residential property is to the east beyond Saltfleet Lane.

Where identified, the potential on-Site or off-Site sources of contamination are considered further in Section 3.

2.2 Physical Setting

The physical setting of the subject property can influence the susceptibility to, and relative magnitude of, environmental impacts and liabilities associated with on- and off-Site sources of contamination. The following table provides physical setting information for the subject property and surrounding area.

Published Geology	British Geological Survey (BGS) online viewer (mapapps2.bgs.ac.uk/geoindex) and mapping (bgs.ac.uk/maps) (1:50,000 Sheet Number 144, Spalding) indicates that ground conditions at the Site comprise: • Superficial deposits: Tidal Flat Deposits (clay and silt) and glacial deposits (Till) at depth; • Bedrock: Oxford Clay Formation (mudstone). From the BGS 1:50,000 sheet, the Oxford Clay Formation is estimated to be approximately 50 to 70 m thick in the area of the Site.
Site-Specific Geology	There are no BGS boreholes located within 500 m of the Site. BGS Borehole ref. (mapapps2.bgs.ac.uk/geoindex) TF22NW10 located approximately 930 m west recorded a general sequence of Tidal Flat Deposits to 6.55 m, sands and gravels to 9.60 underlain by the Oxford Clay Formation to approx. 58m bgl. The borehole reaches the Lincolnshire Limestone at approximately 86m bgl.
Aquifers and Groundwater Receptors	The Environment Agency (EA) data (magic.defra.gov.uk) provides the following aquifer classification and designations: • Superficial deposits: The Tidal Flat deposits are classified as Unproductive Strata and the glacial deposits are classified as a Secondary undifferentiated; • Bedrock: Unproductive Strata; • Source Protection Zones: The Site is not in a designated groundwater source protection zone, and there are no source protection zones within 1 km of the Site; • Groundwater Abstractions: There are no licensed groundwater abstractions within 1km of the Site.
Groundwater Levels and Flow Direction	The Tidal Flat Deposits and Oxford Clay Formation are classified as Unproductive Strata, as such a continuous body of groundwater is unlikely to be present. Localised perched groundwater may be present in the Tidal Flat Deposits and glacial deposits at depth.
Hydrology	The nearest surface water features are surface water drains running along the east, west and south sides of the Site. The wider area is characterised by a series of drainage ditches. The nearest waterway is the River Glen located approximately 1.1 km southeast of the Site. A raised overgrown ornamental pond is approximately 100m southeast of Site. According to the Envirocheck Report (included in Appendix E), the nearest licensed abstraction records from surface water is located approximately 555 m northeast of the Site, taken from a single point for spray irrigation. The Environment Agency Flood Maps indicate that the Site is within Flood Zone 3, high probability of flooding from rivers and the sea.
Site Topography	The Site is relatively flat and level.

Mining & Quarrying	Reference to the Coal Authority on-line viewer (bgs.ac.uk/coalauthority) indicates that the Site is not within a Coal Mining Reporting Area. The Envirocheck Report does not record any other areas of quarrying or mineral extraction within the area of the Site.
Radon Gas	Public Health England (ukradon.org) data indicates that the Site is not located within an area of elevated radon potential, with less than 1% of homes being above the action level for radon. A detailed radon assessment falls outside of the scope of this Report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of the Local Authority.

2.3 Sensitive Land Use

Ecological Receptors	It is understood from information provided within the Envirocheck Report, that there are no statutory ecological receptors located within 1 km of the Site.
Heritage Interest	Historic England Records (historicengland.org.uk) indicates that Cheal House Screen Gate and Wall Piers (1359288) located directly west of the Site are Grade II listed.

2.4 Historical Use of the Site & Surrounding Area

2.4.1 Approach

The historical development of the Site and surrounding area has been assessed through a review of historical maps, aerial photographs, internet sources and Google Earth historical satellite imagery. A summary of the key historical Site uses and developments in the surrounding area is presented below. Copies of selected historical maps are included as Appendix F.

2.4.2 Historical Use Summary

The Site is recorded as unoccupied, assumed agricultural from first records in 1888 until between 1956 and 1973. From 1973 the Site is recorded as Cheal House Farm and comprises two buildings and hardstanding with associated access onto Cheal Road. A third small square structure of unknown use the east side of the Site is recorded from 1988.

Readily available aerial imagery dated 1999 shows three buildings on-Site in the central, west and east and the presence of two above ground storage tanks adjacent to the central building. By 2004 the building in the east of the Site is no longer present. The central and western building are shown to be of brick and timber construction with a suspected corrugated asbestos roofing from street view imagery dated March 2009. The tanks in the central are noted to be metal and placed on plinths. No further alterations are noted to imagery dated August 2022.

Cheal House is recorded as adjacent to the west of the Site from the first published Map available in 1887. The remainder of the Site is surrounded by agricultural land from 1887 until 1956 when a building is recorded to the east across Saltfleet Lane. A large pond is constructed between 1999 and 2004 100m southeast of the Site. Other minor residential development occurs in the surrounding area along with the upgrading of Cheal Road and Saltfleet Lane and the associated drains running alongside.

2.5 Environmental Database Review

The Landmark Envirocheck Report provides a database of environmental information held by various statutory bodies including the EA, Local Authority (LA), Health & Safety Executive (HSE) and Public Health England amongst others. A copy of the Envirocheck Report is provided in Appendix E and the most relevant information is summarised below.

- There are no relevant features of potential concern recorded as located on-Site or within the area of the Site; and
- There are no landfill sites, waste treatment or industrial facilities located within 500 m of the Site.

2.6 Planning Review/Regulatory Enquiries

On-line Planning Review	South Holland District Council Planning Portal	Date Accessed	04/08/2023
On-Site Applications	The following planning applications have been identified as relating to the Site: • H08-0861-21 - Conversion of agricultural building into dwelling. Condition 8 relates to contaminated land however no relevant reports are listed on the application. • H08-0443-22 - Erection of a dwelling - Condition 9 relates to contaminated land however no relevant reports are listed on the application. • H08-0271-23 - Proposed dwelling, extension/conversion to the existing cold store barn and demolition of existing agricultural barn, change of use of additional land to residential garden curtilage and temporary siting of caravan during construction phase - Current - under consideration. Environmental Protection Officer comments indicates that standard contaminated land conditions should be applied to the decision.		
Off-Site Applications	Within the wider area, no relevant planning applications records have been identified.		
Part 2A of the Environmental Protection Act (EPA) 1990	South Holland District Council website indicates that there are no sites in their area which are designated as contamination land under Part 2A of the Environmental Protection Act 1990. The Site is anticipated to be considered a low risk in the context of Part 2A of the Environmental Protection Act 1990.		

2.7 Previous Reports

No third-party reports have been made available to review from the Client or sourced through a review of planning application records.

3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors, to support the identification and assessment of contaminant linkages.

3.2 Overall Site Sensitivity

The Site is considered to be of a very low environmental sensitivity given the presence of unproductive superficial deposits and bedrock and the absence of potentially sensitive environmental receptors.

3.3 Potential Contamination Sources

A source is a contaminant or pollutant that is in, on or under the land that has the potential to cause harm or pollution.

The following are considered in the CSM:

- The Site's previous use for agricultural purposes and the identified historical tanks in the central area of the Site represent a potential source of contamination;
- Made Ground is anticipated to be present, associated with the historical development and demolition of former buildings, which may include hydrocarbons, metals and metalloids, and asbestos; and
- No significant potential sources of hazardous ground gases have been identified. Made Ground deposits are likely to be present beneath the Site, however, is not considered to be significant potential source of gas generation due to the time since the Site underwent development.

There is the potential for organic material to be present within the underlying Tidal Flat Deposits, however, natural organic material is not considered a significant source of ground gas given the very low volumes of gas generation.

3.4 Potential Pathways

A pathway is a route by which a receptor is or could be affected by contaminant.

The potential pathways are considered to be as follows:

- Direct contact, ingestion or inhalation of soil bound contaminants / dust during or following redevelopment;
- Inhalation of organic vapours associated with contamination;
- Migration of ground gas / vapours into on-Site buildings causing asphyxiation or risk of explosion; and.
- Leaching of contamination into perched groundwater.

Given the cohesive nature of the underlying geology, it is considered unlikely that a continuous body of shallow groundwater is present beneath the Site which could represent a potential receptor for any leached contamination. Subsequently, nearby surface watercourses are not considered to be at risk from any on-Site contamination due to the anticipated absence of a groundwater body providing continuity between the Site and the watercourses.

3.5 Potential Receptors

A receptor is something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings crops or animals.

Relevant potential receptors are considered to include:

- Future Site users and maintenance workers;
- Construction workers;
- Third parties during construction (adjacent Site users and adjacent residents);
- The Built Environment (new buildings and infrastructure / utilities).

The underlying geology is classified as Unproductive Strata and is not considered to be a potential receptor, and no source protection zones or groundwater abstractions have been identified in the vicinity of the Site.

3.6 Contaminant Linkage Assessment

The following table assessed the potential contaminant linkages associated with the redevelopment of the Site to a residential end use.

Risk definitions are included in Appendix C.

Source(s)	Pathway(s)	Receptor(s)	Risk	Comments	Requires Investigation
Potentially contaminated soils and/or groundwater located beneath the Site.	Direct contact/ ingestion and inhalation of dust and vapours.	Future Site residents.	Low to Moderate Risk	Potential sources of contamination have been identified associated with the former agricultural use, relating to potential Made Ground and hydrocarbon contamination associated with historical tanks. Intrusive investigation is recommended to determine the risks posed to future Site residents.	Yes
	Direct contact, ingestion and inhalation of dust and vapours.	Maintenance workers/ construction workers.	Low to Moderate Risk	Desk-based assessment has identified the potential for contamination to be present. As with all developments, safe working practices should be undertaken and appropriate Personal Protective Equipment (PPE) should be used. Intrusive investigation should include an assessment of risk posed to future construction and maintenance workers.	Yes
	Leaching of contaminants and vertical migration.	Groundwater beneath the Site.	Very Low Risk	Potential sources of contamination have been identified associated with the Site's former agricultural use; however, the underlying geology is cohesive in nature and classified as Unproductive Strata, as such shallow groundwater is not anticipated, although localised perched water may be present.	No
	Permeation of hydrocarbons through plastic pipe work.	Water supply pipes.	Low Risk	Hydrocarbons, especially aromatics and chlorinated solvents are known to permeate plastic pipes, particularly when encountered at high concentrations. Given the former use, the risk of contamination affecting new water supply pipes should be considered during further investigation and assessment.	Yes
Ground gas.	Vertical and lateral migration of ground gases.	Site users & the buildings on-Site.	Low Risk	Potential significant sources of ground gas have not been identified at or in the area of the Site; however, investigation should include assessment to confirm the presence/absence of ground gas and vapour beneath the Site.	Yes

Source(s)	Pathway(s)	Receptor(s)	Risk	Comments	Requires Investigation
Potentially contaminated soil and groundwater from off-Site sources.	Lateral migration and subsequent inhalation.	Groundwater beneath the Site and future Site users.	Very Low Risk	Given the cohesive nature of the geology beneath the Site and the surrounding area, and the anticipated absence of a continuous body of groundwater in shallow soils, the risk associated with migration of contamination from off-Site sources is considered to be very low.	No

4.0 Conclusions & Recommendations

4.1 Land Contamination Risks and Liabilities

Uncertainty and Data Gaps	This assessment is based on desk study and site walkover information only. No Site-specific ground investigation data has made available for review.
Soils and Groundwater	Significant or widespread contamination is unlikely; however localised contamination associated with the former agricultural use of the Site including tanks, and the recent demolition may be present and an intrusive investigation is recommended.
Ground Gas	No significant potential sources of hazardous ground gases have been identified; although the presence of ground gas cannot be discounted. It is recommended that ground gas assessment is undertaken to confirm that ground gas protection measures are not required.
Volatile Organic Vapours	The former tanks on-Site represent a potential source of volatile vapours, although the risk associated with vapour sources at the Site are considered to be low due to the localised potential area and cohesive soils.
Potential Contaminated Land Development Risks	Widespread or significant contamination is considered unlikely, and the preliminary risk assessment has identified a low to moderate risk of soil/groundwater contamination and hazardous ground gas at the Site.

4.2 Recommendations and Other Development Considerations

Ground Investigation Recommendations	Based on the preliminary assessment, intrusive investigation is considered to be required to support the proposed redevelopment of the Site to a residential end use. Dependent on the findings of the investigation, a Remediation and Verification Strategy may be required to detail any mitigation measures required to be implemented during the construction of the residential house. Verification sampling and production of a Validation Report would be required to be submitted to planning to provide evidence of the implementation of the specified mitigation measures prior to the occupation of the Site.
Other Development Considerations	The following development considerations/potentially pertinent factors could be anticipated with respect the site: • Upgraded water supply pipes may be required for the development, however, this should be confirmed with the local water authority, informed by the recommended intrusive investigation; • Existing topsoil at the Site is unlikely to be suitable for use within garden and landscaped areas, therefore, it is anticipated that imported certified clean topsoil will be required for all landscaped and garden areas; and • In the event that unexpected contamination is identified during development, which was not identified during the proposed intrusive investigation, a qualified environmental consultant should be contacted to enable investigation and assessment under a Discovery Strategy.

Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP1

Logged By: TSLs

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
1	2		loose brown silty TOPSOIL			
			firm/stiff yellow/brown slightly clayey silty SAND		1	
						roots to 0.8 m bgl
			firm yellow/brown slightly clayey silty SAND		2	
2	1		End of Trialpit			Pit dry and sidewalls stable
3	0					
4	-1					
5	-2					

Langdale-Smith and Co Limited

Engineering and Environmental Geologists
01673 858766

Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP2

Logged By: TSLs

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
1	2		loose brown silty TOPSOIL			
			firm/stiff yellow/brown slightly clayey silty SAND		1	
					2	roots to 0.8 m bgl
			firm yellow/brown slightly clayey silty SAND			Pit dry and sidewalls stable
2	1		End of Trialpit			
3	0					
4	-1					
5	-2					

Langdale-Smith and Co Limited

Engineering and Environmental Geologists
01673 858766

Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP3

Logged By: TSLS

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
1	2		firm/stiff yellow/brown slightly clayey silty SAND		1	no roots
					2	
			firm yellow/brown slightly clayey silty SAND			Pit dry and sidewalls stable
2	1		End of Trialpit			
3	0					
4	-1					
5	-2					

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01673 858766

Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP4

Logged By: TSLS

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
1	2		firm/stiff yellow/brown slightly clayey silty SAND		1	no roots
					2	
			firm yellow/brown slightly clayey silty SAND			Pit dry and sidewalls stable
2	1		End of Trialpit			
3	0					
4	-1					
5	-2					

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Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP5

Logged By: TSLs

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
1	2		loose brown silty TOPSOIL			
			firm/stiff yellow/brown slightly clayey silty SAND		1	
					2	roots to 0.8 m bgl
			firm yellow/brown slightly clayey silty SAND			Pit dry and sidewalls stable
2	1		End of Trialpit			
3	0					
4	-1					
5	-2					

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Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP6

Logged By: TSLS

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown silty TOPSOIL			
			firm/stiff yellow/brown slightly clayey silty SAND		1	
			End of Trialpit			
1	2					
2	1					
3	0					
4	-1					
5	-2					

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Project No. 69 022

Project Name: Gosberton

Client: Chris Wheeler

Site: Cheal Rd

Location: see plan

Date excavated: Sep 15, 2023

Excavated by: 5 tonne minidigger

Contractor: cleint

Elevation (m AOD): 3

OS Coords: 523620 328710

TRIALPIT: TP7

Logged By: TSLS

Orientation: N/S

Face Logged: E

Depth (m)	Elevation (mAOD)	Symbols	SOIL DESCRIPTION	Groundwater	Samples	Comments
			loose brown silty TOPSOIL			
			firm/stiff yellow/brown slightly clayey silty SAND		1	
			End of Trialpit			
1	2					
2	1					
3	0					
4	-1					
5	-2					

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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-50160

Issue: 1

Date of Issue: 25/09/2023

Contact: Tim Langdale-Smith

Customer Details: Langdale Smith & Co Ltd
Wrangham House
Market Place
Wragby
Lincolnshire LN8 5OU

Quotation No: Q22-03338

Order No: Not Supplied

Customer Reference: 69 022

Date Received: 20/09/2023

Date Approved: 25/09/2023

Details: Gosberton

Approved by:

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 23-50160, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
339699	TP1	15/09/2023	20/09/2023	Silty clayey loam	
339700	TP1	15/09/2023	20/09/2023	Silty clayey loam	
339701	TP2	15/09/2023	20/09/2023	Sandy clayey loam	
339702	TP2	15/09/2023	20/09/2023	Sandy clayey loam	
339703	TP3	15/09/2023	20/09/2023	Silty clayey loam	
339704	TP3	15/09/2023	20/09/2023	Silty clayey loam	
339705	TP4	15/09/2023	20/09/2023	Silty clayey loam	
339706	TP4	15/09/2023	20/09/2023	Silty clayey loam	
339707	TP5	15/09/2023	20/09/2023	Silty loam	
339708	TP5	15/09/2023	20/09/2023	Silty clayey loam	
339709	TP6	15/09/2023	20/09/2023	Silty clayey loam	
339710	TP7	15/09/2023	20/09/2023	Silty clayey loam	



Results Summary

2683

Report No.: 23-50160, issue number 1

ELAB Reference				339699	339700	339701	339702	339703	339704	339705	339706	339707	339708	339709	339710	
Customer Reference																
Sample ID																
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
Sample Location				TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP4	TP5	TP5	TP6	TP7	
Sample Depth (m)																
Sampling Date				15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	
Determinand		Codes	Units	LOD												
Soil sample preparation parameters																
Moisture Content		N	%	0.1	26.2	20.3	16.7	16.4	14.6	14.7	13.2	11.4	17.4	13.6	12.4	11.7
Material removed		N	%	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed		N		0	None	None	None	None	None	None	None	None	None	None	None	None
Metals																
Arsenic		M	mg/kg	0.5	10.2	10.1	7.9	9.5	10.4	11.6	10.4	9.3	10.4	11.0	10.9	9.9
Barium		U	mg/kg	1	78.1	66.4	65.0	76.5	64.2	68.6	70.8	64.2	79.4	72.6	83.2	81.8
Beryllium		M	mg/kg	0.5	1.0	0.7	0.5	0.6	0.7	0.8	0.6	0.6	0.5	0.6	0.5	0.6
Cadmium		M	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium		M	mg/kg	1	20.8	19.3	15.7	18.8	20.7	24.8	23.4	21.2	21.7	23.4	23.0	21.7
Copper		M	mg/kg	4	13.8	10.0	8.3	8.8	14.0	13.6	13.5	11.0	14.9	12.4	13.3	12.2
Lead		M	mg/kg	1	28.3	13.9	10.3	11.5	26.9	20.1	19.5	14.8	41.1	17.0	30.5	23.2
Mercury		M	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	0.3	< 0.1	0.1	0.3
Nickel		M	mg/kg	1	16.1	17.9	13.5	17.2	17.6	22.1	20.4	20.2	18.3	22.2	16.9	16.7
Selenium		M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium		M	mg/kg	0.5	29.9	29.0	23.7	28.4	32.1	38.2	34.3	31.5	31.5	35.2	34.7	32.0
Zinc		M	mg/kg	4.5	58.3	45.8	37.3	43.3	67.3	61.1	63.1	50.8	82.2	58.2	63.7	55.9



Results Summary

2683

Report No.: 23-50160, issue number 1

ELAB Reference				339699	339700	339701	339702	339703	339704	339705	339706	339707	339708	339709	339710
Customer Reference															
Sample ID															
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP4	TP5	TP5	TP6	TP7
Sample Depth (m)															
Sampling Date				15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023
Determinand	Codes	Units	LOD												
Anions															
Water Soluble Sulphate	M	g/l	0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.07	0.12
Miscellaneous															
pH	M	pH units	0.1	7.7	8.4	8.9	8.8	7.7	7.8	8.0	7.8	8.1	7.9	7.0	6.8
Polyaromatic hydrocarbons															
Naphthalene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Acenaphthene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2	< 0.1	0.2	< 0.1	0.4	0.1
Pyrene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.1	< 0.1	0.1	< 0.1	0.2	< 0.1
Benzo(a)anthracene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Benzo(b)fluoranthene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Benzo(k)fluoranthene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Benzo(a)pyrene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Indeno(1,2,3-cd)pyrene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Dibenzo(a,h)anthracene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	N	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	N	mg/kg	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.4	< 0.4	< 0.4	0.5	< 0.4	1.9	< 0.4



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Results Summary

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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.

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 (%)
339699		TP1	Brown clay	No asbestos detected	n/t	n/t	n/t	n/t
339701		TP2	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t
339703		TP3	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t
339705		TP4	Brown sandy soil, organics	No asbestos detected	n/t	n/t	n/t	n/t
339707		TP5	Brown sandy soil, concrete	No asbestos detected	n/t	n/t	n/t	n/t
339709		TP6	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t
339710		TP7	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

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Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	21/09/2023	113	Electromeric
PAH (GC-FID)	N	As submitted sample	21/09/2023	133	GC-FID
Water soluble anions	M	Air dried sample	21/09/2023	172	Ion Chromatography
Asbestos identification	U	Air dried sample	25/09/2023	281	Microscopy
Aqua regia extractable metals	M	Air dried sample	21/09/2023	300	ICPMS

Tests marked N are not UKAS accredited

Report Information

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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