



**Additional Contamination Investigation and Remediation
Method Statement**

at
**Stoneham Continuing Care Retirement Community, Stoneham,
Eastleigh, Hampshire SO50 9HS**

for
Opus Stonham Developments

**Reference: 21248/RMS Rev1.2
February 2024**

Control Document

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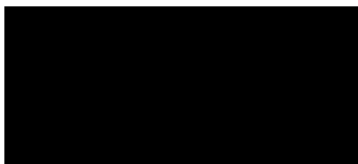
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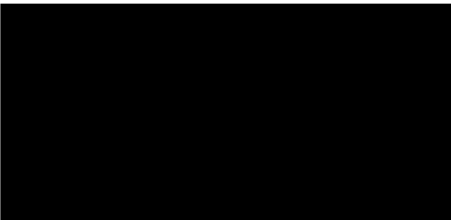
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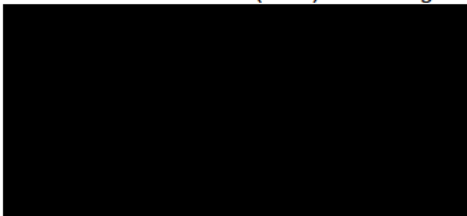
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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



Commission

This document comprises the Additional Contamination Investigation Report (ACIR) and Remediation Method Statement (RMS) and incorporates the results, discussion, and conclusions of this intrusive work. General site data is recorded below:

Commission Record	
Client	Opus Stonham Developments
Site Name	Stoneham Continuing Care Retirement Community, Stoneham, Eastleigh, Hampshire SO50 9HS
Grid Reference	SU 438 175
Soils Limited Quotation Ref	Q238304Rev102 dated 28 th November 2023
Clients Purchase Order	Q238304Rev102 dated 5 th December 2023

The record of revision to this document is presented below:

Record Of Revisions		
Revision	Date	Reason
1.0	February 2024	Original to Client
1.1	February 2024	Updated ABP as specialist asbestos consultant
1.2	March 2024	Updated with ABP Asbestos Risk Assessment and Remediation Report in Appendix E

Note(s): The latest revised document supersedes all previous revisions of the RMS produced by Soils Limited.

Documents associated with this development that must be referred to are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
17624/MIR Rev1.04	Main Investigation Report	Nov 2023	Soils Limited
1620005365-RAM-X-XX-RP-YE-01 Rev 02	Preliminary Investigation Report	Nov 2018	Ramboll
15251	Asbestos in soil Risk Assessment and Remediation Report	March 2024	ABP

This is a live document to be updated considering any additional analysis and if additional contamination was identified by the Discovery Strategy.

As agreed with the client this Remediation Method Statement will be revised following the additional works which could impact the scale of remediation given within this report.

Limitations and Disclaimers

This ACIR and RMS relates to the site located at Stoneham Continuing Care Retirement Community, Stoneham, Eastleigh, Hampshire SO50 9HS and was prepared for the sole benefit of Opus Stonham Developments (The “Client”). The report was prepared solely for the brief described in Section 1.1 of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Quotation Q23557, dated 12th October 2020 accepted by the Client in their Order Q23557, dated 2nd August 2023.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

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The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the Client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

If the term “competent person” is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post-graduate experience in the understanding and application of the appropriate codes of practice.

Within the report reference to ground level relates to the site level at the time of the investigation, unless otherwise stated.

The exploratory hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce an exploratory hole.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. “Contaminated Land” is defined in Section 57 of the Environment Act 1995 (as updated 2021) as:

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being or is likely to be caused”.

It must be noted that a detailed survey of the possible presence or absence of invasive species, such as Japanese Knotweed, is outside of the scope of investigation.

Deleterious materials may be present in any Made Ground that pose a potential risk to site workers, end users and adjacent vulnerable receptors. These could include a range of contaminants, including asbestos, especially if the material includes large fractions of demolition derived materials.

The investigation, analysis or recommendations in respect of contamination are made solely in respect of the prevention of harm to vulnerable receptors, using where possible best practice at the date of preparation of the report. The investigation and report do not address, define or make recommendations in respect of environmental liabilities. A separate environmental audit and liaison with statutory authorities is required to address these issues.

All environmental works are undertaken in the context of, and in compliance with, BS10175+A2 2017 and LCRM (EA 2021) and all other pertinent planning, standards, documentation and guidance appropriate to the site at the time of production which may include, but are not necessarily limited to, documents provided by BS/CEN/ISO, NHBC, AGS, CIEH, CIRIA, SoBRA and CLAIRE.

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Section I Introduction

I.1 Objective of Investigation

Opus Stonham Developments commissioned Soils Limited to undertake further additional contamination investigation and summary report to supply the Client and their designers with further information regarding environmental ground conditions in relation to potential risks identified in the previous investigation in 17624/MIR Rev1.04 dated November 2023 and to prepare an ACIR and RMS on land at Stoneham Continuing Care Retirement Community, Stoneham, Eastleigh, Hampshire SO50 9HS.

The scope of the investigation was outlined in the Soils Limited quotation reference Q23830 Rev102, dated 28th November 2023.

This document comprises the ACIR and RMS and must be read in conjunction with the documents referenced in Commission section.

I.2 Location

The site was located at Stoneham Continuing Care Retirement Community, Stoneham, Eastleigh, Hampshire SO50 9HS and had an approximate O.S Land Ranger Grid Reference of SU 438 175. The site location plan is given in Figure 1.

I.3 Site Development

The proposed development was to comprise construction of Care Village Apartments to the west of the site consisting of 13No. up to 2.5-storey accommodation blocks and development of Landmark Building Care Home, understood to include whole or partial footprint basement, to include 53No. apartments.

The proposed development was to include areas soft landscaping/communal open space as Residential without home-grown produce.

An aerial photograph of the site and its close environs prior to completion of the development has been included in Figure 2 for reference.

I.4 Geology

The 1:50,000 BGS map showed the site to be located upon bedrock of the London Clay Formation, with overlying superficial deposits of River Terrace Deposits anticipated to the west of the site and superficial deposits of Head anticipated to the east of the site. Made Ground was also anticipated due to previous development history.

I.4.1 Made Ground

Made Ground comprises material that has been placed or spread by man. It can comprise demolition material from former structures on the site or imported material placed to raise levels. Its composition can be very variable both laterally and with depth and may contain putrescible matter and voids.

1.4.2 Head

Head deposits are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted sands gravels.

1.4.3 River Terrace Deposits

The rivers Test and Itchen have deposited extensive spreads of River Terrace Deposits in the Southampton area, representative of ancient floodplains. In total, eleven terraces have been recorded. The River Terrace Deposits consist predominantly of gravels made up of subangular to subrounded flints with a significant sand component locally with lenses of silt, clay or peat.

The five highest terraces have appreciable clay content. Poorly sorted, clayey and sandy silts and silty clays overlie the 1st, 3rd, 5th and 6th terraces and locally at above terrace gravels.

River Terrace Deposits 1 was mapped to the west of the site.

1.4.4 London Clay Formation

The London Clay Formation in the Hampshire region comprises silty and sandy clay, clayey and sandy silt, silty sand; sporadic claystones and thin beds of flint pebbles. The formation includes the Bognor Sand, Whitecliff Sand, Durley Sand, Portsmouth Sand and Nursling Sand Members. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

Outcrops of the Whitecliff Sand were noted on BGS Geology Maps approximately 2.5km northeast and 3.5km west of the site.

The lowest part of the London Clay Formation rests on the Reading Formation (Lambeth Group).

Section 2 Site Works

2.1 Proposed Project Works

The proposed intrusive investigation was designed to provide additional information for the contamination assessment and allow the implementation of additional remediation strategies necessary to facilitate the safe development of the site.

The intended investigation, as outlined within the Soils Limited quotation (Q28304 Rev102, dated 28th November 2023), was to comprise the following items:

- Service clearance of trial holes by CAT and Signal generator (Genny)
- Concrete coring
- 8No. 2m deep windowless sampler boreholes
- 24No. locations to obtain samples for asbestos testing (at 0.2m and 0.5m bgl approx.)
- 8No. comprehensive laboratory contamination testing
- 48No. additional asbestos screening

2.1.1 Actual Project Works

The actual project works were undertaken on 8th to 9th January 2024, with subsequent sample logging, laboratory testing, and reporting. The actual works comprised:

- Service clearance of trial holes by CAT and Signal generator (Genny)
- Concrete coring
- 8No 2m deep windowless sampler boreholes (WS1 to WS8)
- 24No. locations to obtain samples for asbestos testing (at 0.2m and 0.5m bgl approx.) (HDTP1 to HDTP24)
- 8No. comprehensive laboratory contamination testing
- 47No. additional asbestos screening and 2No. asbestos quantification

8No. of Windowless sampler boreholes (WS1 to WS8) were backfilled with gravel and 24No. hand dug trial pits under asbestos safety precautions (HDTP1 to HDTP24) were backfilled with arisings.

All exploratory hole locations have been presented in Figure 3.

Following completion of site works, soil samples were logged, sub-sampled and sent to the laboratory for contamination testing.

2.2 Ground Conditions

On 8th January 2024, the seven boreholes were directly drilled through Made Ground and one windowless sampler borehole (WS7) was drilled from surface by concrete coring and then drilled by using a Premier Compact 110 Series windowless sampler rig, to

depth of 2.00m below ground level (bgl) at locations selected by Soils Limited and agreed by the Client.

On 8th and 9th January 2024, 24No. hand dug trial pits (HDTP1 to HDTP24) were excavated to depth ranging from 0.30m to 0.55m bgl. At HDTP3, only 0.20m Made Ground sample was obtained due to a concrete slab being encountered at 0.30m bgl.

The maximum depths of exploratory holes have been included in Table 2.1.

Table 2.1 Final Depth of Exploratory Holes

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
HDTP1	0.55	HDTP13	0.55
HDTP2	0.55	HDTP14	0.55
HDTP3	0.30	HDTP15	0.55
HDTP4	0.55	HDTP16	0.55
HDTP5	0.55	HDTP17	0.55
HDTP6	0.55	HDTP18	0.55
HDTP7	0.55	HDTP19	0.55
HDTP8	0.55	HDTP20	0.55
HDTP9	0.55	HDTP21	0.55
HDTP10	0.55	HDTP22	0.55
HDTP11	0.55	HDTP23	0.55
HDTP12	0.55	HDTP24	0.55
WS1	2.00	WS5	2.00
WS2	2.00	WS6	2.00
WS3	2.00	WS7	2.00
WS4	2.00	WS8	2.00

Note(s): The depths given in this table are taken from the ground level on-site at the time of investigation.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the exploratory hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report.

For more complete information about the soils encountered within the general area of the site reference must be made to the detailed records given within Appendix B, but for the purposes of discussion, the succession of conditions encountered in the exploratory holes in descending order can be summarised as:

Made Ground (MG)
River Terrace Deposits (RTD)

The ground conditions encountered in the exploratory holes are summarised in Table 2.2.

Table 2.2 Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
	Top	Bottom		
MG	GL	0.30-1.50	0.90	Soft slightly gravelly clayey SILT. Gravel is angular fine to coarse flint, brick and chalk. Rare rootlets.
RTD	0.30-1.50	0.55-2.00 ¹	Not Proven ²	Interbedded Soft brown slightly sandy, slightly gravelly CLAY to slightly clayey sandy GRAVEL. Sand is fine to medium. Gravel is angular to rounded, fine to coarse flint.

Note(s): ¹ Final depth of exploratory hole. ² Base of strata not encountered. The depths given in this table are taken from the ground level on-site at the time of investigation.

2.3 Ground Conditions Encountered in Exploratory Holes

The ground conditions encountered in exploratory holes have been described below in descending order. The engineering logs are presented in Appendix B.

2.3.1 Made Ground

Soils described as Made Ground were encountered in all exploratory holes from ground level to depths of between 0.30m (HDTP3 and HDTP9) and 1.50m bgl (WS6). Made Ground were recorded to base of all Trial Pits except HDTP9, so the full depth of the Made Ground was not established in these locations.

The Made Ground typically comprised soft slightly gravelly clayey SILT. Gravel is angular fine to coarse flint, brick and chalk. Rare rootlets.

The established depth of Made Ground found at each exploratory hole location have been included in Table 2.3.

Table 2.3 Established Depth of Made Ground

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
HDTP1	0.55 ¹	HDTP13	0.55 ¹
HDTP2	0.55 ¹	HDTP14	0.55 ¹
HDTP3	0.30 ¹	HDTP15	0.55 ¹
HDTP4	0.55 ¹	HDTP16	0.55 ¹
HDTP5	0.55 ¹	HDTP17	0.55 ¹
HDTP6	0.55 ¹	HDTP18	0.55 ¹
HDTP7	0.55 ¹	HDTP19	0.55 ¹
HDTP8	0.55 ¹	HDTP20	0.55 ¹
HDTP9	0.30	HDTP21	0.55 ¹
HDTP10	0.55 ¹	HDTP22	0.55 ¹

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
HDTP11	0.55 ¹	HDTP23	0.55 ¹
HDTP12	0.55 ¹	HDTP24	0.55 ¹
WS1	0.50	WS5	0.80
WS2	0.40	WS6	1.50
WS3	0.30	WS7	0.95
WS4	0.70	WS8	0.35

Note(s): ¹ Final depth of exploratory hole.

2.3.2 River Terrace Deposits

Soils described as River Terrace Deposits were encountered in one out of twenty-four hand dug trial pits (HDTP9) and all of the exploratory holes (WS1 to WS8) directly underneath the Made Ground and recorded to their base a maximum depth of 2.00m bgl.

It typically comprises interbedded, soft brown slightly sandy, slightly gravelly CLAY to slightly clayey sandy GRAVEL. Sand is fine to medium. Gravel is angular to rounded, fine to coarse flint.

The established depth of Kempton Park Gravel found at each exploratory hole location have been included in Table 2.4.

Table 2.4 Established Depth of Kempton Park Gravel

Exploratory Hole	Depth (m bgl)
HDTP9	0.55 ¹
WS1	2.00 ¹
WS2	2.00 ¹
WS3	2.00 ¹
WS4	2.00 ¹
WS5	2.00 ¹
WS6	2.00 ¹
WS7	2.00 ¹
WS8	2.00 ¹

Note(s): ¹ Final depth of exploratory hole.

Section 3 Determination of Chemical Analysis

3.1 Site Characterisation and Revised Conceptual Site Model

The Conceptual Site Model (CSM) was developed in the Preliminary Investigation Report undertaken by Ramboll (report ref.: 1620005365-RAM-X-XX-RP-YE-01 Rev 02, dated November 2018) and revised following the findings of the 17624/MIR Rev1.04 dated November 2023.

Further to the findings of 17624/MIR Rev1.04, additional soil sampling was commissioned by the Client to advise and confirm if remediation would be required, and to increase the confidence levels in the results for subsequent incorporation into the options appraisal.

In previous investigation 17624/MIR Rev1.04 dated November 2023, these were

- Asbestos Containing Material (ACM) was detected within one sample from WS03 at 0.20m bgl. The ACM was determined to comprise Microscopic fragments of Asbestos Cement comprising Chrysotile. Bundles of Chrysotile in Asbestos Containing Soil (ACS) was also noted at WS105 at 0.10m bgl.
- Above ground samples of visible ACM were noted in several locations including TPADD3, HP01 and HP04 and were shown to contain Chrysotile. The ACS from HP01 at 0.30m again contained bundles of Chrysotile.
- PAH levels exceeding guideline values at HP04:0.30m bgl from the stockpile from an above ground sample and also shown to contain Chrysotile.
- Groundwater samples indicate exceedances on PAH and Aro C12-C21 at location BH02, and exceedance on Nickel at WS01. Elevated concentrations of hydrocarbons (majority aromatic C21-C40) were identified in above surface samples (Stockpile) at HP01, HP02, HP04, TPADD1, TPADD2, S1 and below ground at WS103 and WS104 (although there are not in exceedance of the relevant criteria). In addition, borehole field logs indicate hydrocarbon odours at BH02, WS02, WS03 (unknown tank identified), WS09, WS103, WS104, WS105, SL8 between 0.25m and up to 1.90mbgl.

There were no significant visual or olfactory indicators of contamination noted in this additional investigation.

Superficial deposits of River Terrace Deposits were encountered underlying the Made Ground in HDTP9 and WS1 to WS8. Shallow groundwater was encountered within either the Made or Superficial Ground to the depth ranging between 0.30m and 1.50m bgl in all windowless sampling holes except WS6 and in HDTP14, HDTP21, HDTP22 and HDTP24.

3.2 Soil Sampling

Exploratory hole locations were established to provide an overview of ground conditions across the site in relation to the proposed construction, together with enabling the collection of samples to enable chemical characterisation of the underlying strata.

Representative samples for potential environmental testing were obtained from the exploratory holes at depths of between 0.20m and 1.00m to allow appropriate representation of the materials encountered, with additional samples to be obtained, if necessary, where there was visual or olfactory evidence of contamination.

Unless otherwise stated, analytical testing was based initially on a comprehensive suite of commonly identified inorganic and organic contaminants, taking into account the prevailing site conditions and the findings of the initial conceptual site model.

3.3 Determination of Chemical Analysis

The driver for determination of the analysis suite was the information obtained from the Preliminary Investigation Report, Main Investigation Report and Contamination Investigation Report intrusive investigation.

The chemical analyses were carried out on 6 samples of Made Ground and 2 samples of River Terrace Deposits. 47No. asbestos screening were also carried out in Made Ground. The nature of the analyses is detailed in Table 3.1.

Table 3.1 Chemical Analyses Suites - Soil

Determinants	Soil Tested	
	MG	RTD
Metal suites: Arsenic, Boron (Water Soluble), Cadmium, Chromium (total & hexavalent), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc	6	2
Organic Matter	6	2
pH	6	2
Polycyclic aromatic hydrocarbons (PAH) – (EPA 16)	6	2
Phenols – total monohydric	6	2
Extractable petroleum hydrocarbons (TPH) – CWG banding	6	2
BTEX and MTBE	6	2
Cyanide total & free	6	2
Waste acceptance criteria (WAC)	6	2
Asbestos screening	53	2
Asbestos Quantification	2	

The soil testing was carried out in compliance with the MCERTS performance standard, and the results are shown in Appendix C.2., test reports 24-00346.1, 24-00373.1 and 24-00648.1.

Section 4 Qualitative Risk Assessment

4.1 Assessment Criteria

The assessment criteria used to determine risks to human health are derived and explained within Appendix D.

4.2 Representative Contamination Criteria - Soil

In compiling this report reliance was placed on drawing number 2016/080/PL1 Revision E prepared by Opus Stonham Developments. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

Based on the proposed development, the results of the chemical analysis have been compared against generic assessment criteria (GAC) for a '**Residential without home grown produce**' end use, as presented in SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014 (C4SL), derived for the protection of human health. Where this document has not published screening values for determinants, GACs derived for the same end use have been adopted from the following published guidance; DEFRA Soil Guideline Values (SGV) and LQM/CIEH/Suitable 4 Use Level (S4UL).

To assess the potential toxicity of organic determinants (Petroleum Hydrocarbons and Polyaromatic Hydrocarbons) to the human health, soils samples were analysed for Soil Organic Matter (SOM). The selected samples analysed recorded, SOM values of between 0.9% and 7.1%. For each soil sample tested, the resultant SOM allowed for the correct comparison to be made with the appropriate guideline value for each organic determinant analysed.

4.3 Risk Assessment – Made Ground

Table 4.1 outlines the sample that have exceeded their relevant assessment criteria. The full laboratory report is presented in Appendix C.

Table 4.1 Summary of GAC Exceedances – Made Ground

Location	Depth (m bgl)	Contaminant	Concentration	Guidance Level
None				
Note(s): Units mg/kg				

The risk assessment has established **no** potential pollutant linkage in relation to human health within the Made Ground across the site.

4.4 Risk Assessment – River Terrace Deposits

Table 4.1 outlines the sample that have exceeded their relevant assessment criteria. The full laboratory report is presented in Appendix C.

Table 4.2 Summary of GAC Exceedances – River Terrace Deposits

Location	Depth (m bgl)	Contaminant	Concentration	Guidance Level
None				
Note(s): Units mg/kg				

The risk assessment has established **no** potential pollutant linkage in relation to human health within the River Terrace Deposits across the site.

4.5 Asbestos

The test certificate for each sample submitted for contamination analysis during this investigation includes the results of an Asbestos Screen. Sample WS3:0.20m bgl was reported as 'Detected' with a material type of Chrysotile, present as fibre bundles. HP14:0.20m bgl was reported as 'Detected' with a material type of Amosite, present as free fibres. ABP, a specialist asbestos consultant, has been engaged for consultation.

The asbestos quantification results are shown in Table 4.3.

Table 4.3 Summary of Asbestos Quantification Results

Location	Depth (m bgl)	Type	Concentration (%)
HP14	0.20	Free fibres of Amosite	0.006
WS3	0.20	Bundles of Chrysotile fibres	0.009

4.6 Risk to Groundwater

No olfactory or visual evidence of hydrocarbon was recorded as being present at any location during this site investigation.

The previous Soils Limited investigation 17624/MIR Rev1.04 dated November 2023, the initial CSM identified no particular significant water risks, a general screening suite was devised consisting of typical industrial contaminants and general indicators of groundwater quality. The results found that the groundwater samples taken from BH02 had exceedances of PAH and aromatic hydrocarbons C12-C21, and exceedance of Nickel at WS01. It is noted that elevated concentrations of hydrocarbons (majority aromatic C21-C40) were identified in above surface samples (stockpile) at HP01, HP02, HP04, TPADD1, TPADD2, S1 and below ground at WS103 and WS104 (although they were not in exceedance of the relevant human health assessment criteria). In addition, borehole field logs indicate hydrocarbon odours at BH02, WS02, WS03 (formerly unknown tank identified), and in WS09, WS103, WS104, WS105, SL8 between 0.25m and up to 1.90mbgl.

Given aromatic hydrocarbons are mobile in the environment, the source of PAH and aromatic hydrocarbons C12-C21 at BH02, is likely to be from the nearby stockpile: samples TPADD1 and TPADD2 were noted in field logs as having hydrocarbon odours. The stockpile will be removed as part of the development, which will remove the

contaminant source identified. The existing concentrations will therefore not be added to, and will be degraded, dispersed and diluted over time. In addition, the proposed development locations around BH02 and WS01 will be hardstanding car park and the footprint of the building. This will inhibit infiltration through the Made Ground in this area, thereby, mitigating any leaching of contaminants. The proposed development will also provide a betterment of site conditions with surface water drainage management in addition to hardstanding cover. Therefore, following the remedial works proposed for the soils on site (stockpile removal and validation), the residual risk to the groundwater is very low to negligible and further remedial works are not necessary.

4.7 Risk from Ground Gas Ingression

With reference to Soils Limited report 17624/MIR Rev1.04 and the Geotechnical and Geoenvironmental Desk Study undertaken by Ramboll (report ref.:1620005365, dated November 2019) identified a low risk of ground gas associated with the underlying terrace gravels and areas of Made Ground on or adjacent to the site due to the potential for elevated levels of carbon dioxide to be present in such materials.

Subsequently, gas monitoring found that no significant methane, flow, trace gases or VOCs were recorded within the standpipes as a whole and none have given any indication of active gas from 25th May 2019 to 30th September 2019. It is considered that ground gas protection is not necessary for the site and characterisation of the of the site's gassing regime can be designated as Characteristic Situation 1, where no soil gas protection measures are considered necessary, and the risk is considered very low (CS1) to negligible.

4.8 Radon

The British Geological Survey, in conjunction with the Radiation Protection Division of the Health Protection Agency, indicates the site to lie within an area where there is a probability of 3-5% of present or future homes being above the action level of 200Bq/m³.

The guidance recommends that basic radon protective measures are required in any new structures. However, confirmation with local building control is advised.

4.9 Recommendations

Asbestos fibres were positively recorded in WS3:0.20m bgl and HP14:0.20m bgl. Soils Limited are not licenced asbestos practitioners or contractors and cannot advise on the potential implications of such findings in relation to health and safety, site development activities and compliance with CAR2012. ABP, the specialist asbestos consultant ABP, a specialist asbestos consultant, has been engaged for consultation and their Discovery Strategy regarding to asbestos was attached in the Appendix E.

The remedial objective for the site is to ensure site clean-up removes any unacceptable risk to the identified receptors of Human Health, Building Structures and Services and Groundwater receptor.

In essence the remedial objective must sever any source-pathway-receptor pollutant linkages that have been established. Once this has been achieved, by whatever means, there can theoretically be no risk.

Section 5 Option Appraisal

5.1 Objective

A risk was established to the human health receptors, due to the findings from the investigation 17624/MIR Rev1.04 dated November 2023.

- There was an above ground sample at HP04:0.30m (stockpile) found to have PAH levels exceeding guideline values.
- HP04:0.30m above ground sample (Stockpile) also contain asbestos as Cement bound Chrysotile.
- None of the other 58No samples tested from below ground showed elevated concentrations above their given trigger levels. This location can be considered as a hotspot.

The objective of the remediation strategy was therefore to remove the unacceptable risk to the human health and groundwater receptors due to the elevated PAHs levels within the stockpile.

The remediation objective was to break contaminant linkages and pathways to vulnerable human health receptors so that the underlying and remaining potentially contaminated soil would not pose an unacceptable (ideally low to negligible) exposure risk.

5.2 Remediation Options

HP04:0.3m was located above ground level within a stockpile, and comprised elevated PAH levels as well as asbestos, noted as Cement bound Chrysotile. The impacted soils will pose a risk through potential pathways such as ingestion, dermal contact and inhalation between end users and the impacted soils.

Since HP04:0.3m was the only location recording elevated concentrations of PAHs, it can be treated as a hotspot, with impacted soils removed within the area by a licensed asbestos specialist and disposal in a suitable landfill site according to the European Waste Catalogue waste code. Subsequent validation testing will be undertaken beneath the stockpile area to confirm the risk has been removed.

5.3 Final Remediation Strategy

To remove unacceptable risk to the identified vulnerable receptors by utilising an agreed methodology comprising:

1. Removal of stockpile and disposal of soil arranged by a license asbestos specialist due to the samples detected containing asbestos Cement bound Chrysotile

All material removal from site must be undertaken in accordance with appropriate health and safety protocols and UK waste legislation and guidance. Likewise, all excavation works must be carried out using appropriate health and safety procedures for asbestos

and the Made Ground encountered. Excavated materials must be appropriately characterised and removed off-site as waste. In order to facilitate this process, appropriately experienced, qualified, competent and licenced persons should be retained to assist or advise on this process.

All imported soil (granular backfill) must be obtained from a reputable source and analysed in accordance with the specification noted in Table 5.1. Following the importation of soils, validation will be required for the site at an appropriate frequency, in accordance with NHBC guidance and regulatory requirements as agreed.

The volume of material removed off-site must be recorded and appropriate legal and valid waste documentation (including destination of material and acceptance) retained for inclusion in a final validation report. Note that all non-hazardous waste documentation must be retained for at least 3 years following removal and any hazardous waste documentation for at least 6 years.

Stockpiles of excavated material must be located on hardstanding or impermeable liners whilst awaiting removal from site to avoid potential cross-contamination or re-contamination of existing exposed site areas. During wet weather it is recommended that stockpiles are also covered to prevent leaching and run-off and in hot dry weather dampened and/or covered as advised by a competent person to reduce or eliminate the potential for dust and fibre release.

Table 5.1 Screening Criteria for Imported Soils

Determinant	Concentration Not Exceeding (mg/kg)		
	1% SOM	2.5% SOM	6% SOM
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Anthracene	2400	5400	11000
Benzo(a)anthracene	7.2	11	13
Benzo(a)pyrene	5	5	5
Benzo(b)fluoranthene	2.6	3.3	3.7
Benzo(ghi)perylene	320	340	350
Benzo(k)fluoranthene	77	93	100
Chrysene	15	22	27
Dibenzo(ah)anthracene	0.24	0.28	0.30
Fluoranthene	280	560	890
Fluorene	170	400	860
Indeno(123-cd)pyrene	27	36	41
Naphthalene	2.3	5.6	13
Phenanthrene	95	220	440
Pyrene	620	1200	2000
Phenol	280	550	1100
Arsenic	37	37	37
Beryllium	1.7	1.7	1.7
Boron	290	290	290
Cadmium	11	11	11
Chromium (III)	910	910	910
Chromium (VI)	6	6	6

Determinant	Concentration Not Exceeding (mg/kg)		
	1% SOM	2.5% SOM	6% SOM
Copper	2400	2400	2400
Lead	210	210	210
Mercury	40	40	40
Nickel	180	180	180
Selenium	250	250	250
Vanadium	410	410	410
Zinc	3700	3700	3700
Asbestos	Not Detected	Not Detected	Not Detected
Organic matter	N/A	N/A	N/A
TPH	500	500	500

5.4 Remedial Constraints

It is necessary to ensure that the remediation work is undertaken with due consideration to the local population and complies with any requirements of the local authority. Where justified, it may be necessary to be flexible with the timing of certain site activities during the day to avoid raising concerns within the local area or presenting undue risks to adjacent receptors.

5.5 Remedial Timescale

The involvement of Soils Limited is recommended to be maintained until the end of the project, in order to validate the remedial works.

Section 6 Validation Plan

6.1 Validation Plan

A suitable and quantitative assessment must be made of the remediation works, with enough evidence being provided to illustrate the remedial works suitably and definitively whilst in progress and on their conclusion, for which abundant photographs are a useful addition to plans, surveys and other work instructions or confirmations. A verification plan is presented in Table 6.1 and an indicative plan of the remedial works methodology in Figures 4.

Table 6.1 Verification Plan

Item	Description	Responsible Party / Required Information
1. Discovery Strategy	Strategy in place to identify any unexpected contamination. Further details provided in Section 6.2.	Contractor.
2. Excavation of stockpile and waste and characterisation of waste	The excavation of Made Ground and natural soils to reduce the site to formation level. Further details provided in Section 7.	Asbestos Specialist to exam all excavation. Contractor: Volumes of exported material to be provided to Soils Limited. Waste transfer tickets and certificates. Soils Limited can undertake chemical analysis for waste characterisation at request from the Contractor.
3. Photographic evidence	Photographs to be taken including excavation of impacted soils and stockpile being removed. Proof of the depth of excavations must be included (either a readable tape measure of a staff)	Contractor to provide photos to Soils Limited or Soils Limited can attend site at request from the Contractor and/or Client.
4. Unexpected contamination	Statement to confirm where any unexpected contamination was or was not encountered.	Unexpected contamination encountered: The contractor to contact Soils Limited and in turn the Local Authority. No unexpected contamination: Contactor to provide a statement to this effect to Soils Limited.
5. Verification sampling	Testing samples for chemical testing underneath identified locations of the stockpile and wastes after removal	Soils Limited can arrange staff to undertake sampling and chemical testing.
6. Validation Report	To demonstrate compliance with the Remediation strategy a verification report shall be prepared and submitted to the Local Authority.	Soils Limited to produce Validation Report.

6.2 Discovery Strategy for Unexpected Contamination

As part of the remedial works additional areas of contamination may be discovered. Care must be taken during excavation works especially to investigate any soils, which appear

by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed. If any such sources are encountered, then Soils Limited must be informed.

As part of the validation confirmation will be required from the Client that no additional areas of potential contamination were discovered.

Table 6.2 below provides a non-exhaustive summary of the visual and olfactory indicators that may suggest potential contamination:

Table 6.2 Potential Contamination Indicators

Type of Contamination	Possible Visual Indicators	Olfactory Indicators
Heavy Metals	Bright colour staining and ashy soils	Typically, non-odorous
Hydrocarbons	Dark discolouration, oily sheens	Hydrocarbon-type odours: oil, petrol, diesel etc.
Possible ACS/ACM	Fibrous material or powder, often cement-bound (such as corrugated roofing material)	Non-odorous

Soils Limited will then arrange to attend site to inspect the area of concern and if appropriate undertaken logging, sampling and further laboratory testing of the material. Further recommendations will be made following receipt and appraisal of such supplementary laboratory test results. The Local Authority will be copied in on any additional sampling and validation.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded and the Local Authority, and a competent and Soils Limited. An approval from the Local authority must be sought prior to implementing any proposed mitigation action.

The discovery strategy must always remain on-site and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.

Discovery strategy was prepared by ABP Asbestos Consultants regarding asbestos and can refer to Appendix E.

Section 7 Materials Management and Health and Safety

7.1 Handling Soils Safely and within the Law

Any material excavated on-site may be classified as waste and it is the responsibility of the holder of a material to form their own view on whether it is waste or not. This includes determining when waste that has been treated in some way can cease to be classed as waste for a particular purpose. The site owner has a duty to ensure that any waste produced from the site, or soil imported to the site is handled safely and within the law.

One of the ways this can be achieved is set out in the Development Industry Definition of Waste Code of Practice (DoWCoP) (CL:AIRE, March 2011). This builds on the Environment Agency guidance document Definition of waste: developing greenfield and brownfield sites (2006).

The handling, re-use or disposal of waste is regulated by the Environment Agency. The Agency will take into account the use of the CoP in deciding whether to regulate materials as waste. If materials are dealt with in accordance with the CoP, the Agency considers that those materials are unlikely to be waste at the point when they are to be used for the purpose of land development. This may be because the materials were never discarded in the first place, or because they have been submitted to a recovery operation and have been completely recovered so that they have ceased to be waste.

Prior to disposal, the characteristics of any excavated soils will need classification in consultation with landfill sites and waste disposal contractors. Testing and analysis may be required to be carried out on the actual soil arisings which will constitute the waste. Any soil to be removed from site as part of the remedial process, or imported to site as part of remedial actions, should be transported by an appropriately licensed carrier, who should provide a copy of their waste management license for verification to Soils Limited prior to transporting any material to or from site.

Any material being transferred off site or imported to site must be accompanied by a written description that will enable anyone receiving it to dispose of it or handle it safely and appropriately.

For all materials excavated and scheduled for off-site disposal, the remediation contractor shall ensure that the appropriate duty of care reporting is maintained and that suitably licensed disposal facilities are used.

Any material designated for disposal should be stored safely and securely prior to removal from site. Any containers used for storing material should be in good condition and clearly labelled.

Waste materials must be prevented from blowing away. If waste is stored in skips or other similar containers, it should be ensured that they are covered or netted where necessary to prevent loose and lightweight material from blowing away. Consideration should be given to storing wastes under cover before disposal.

All employees and contractors working on the premises should be given instructions about how to handle and dispose of each type of waste that might be produced. Regular checks should be made to ensure that employees and contractors are following instructions.

Waste must be transferred in suitable and secure containers and vehicles to prevent waste from being spilled.

A separate, clearly signed and delineated area must be provided for the storage of all imported material to site, to ensure that no cross contamination between clean and contaminated materials can occur.

Management of materials in general accordance with guidance provided within the Definition of Waste; Development Industry Code of Practice will be undertaken and stockpile location, source and material use location and disposal notes, drawings and recorded volumes of imported soil, should be recorded in order to ensure that material fate is recorded sufficiently.

7.2 Health and Safety

The on-site preparatory works will comprise the establishment of a site office and welfare facilities. The contractor shall ensure that all aspects of construction health and safety are covered in their proposals and that the risks posed to third parties by potential migration of airborne dust and surface water run-off are considered appropriately.

Measures will be employed to ensure that no controlled waters should be placed at an unacceptable risk. This will include storage of fuels within bunded areas or containers.

Dust suppression measures will be available and utilised during works. Dust control would include damping down excavations and stockpiles during dry and breezy conditions when dust generation is highly likely.

A number of protective measures are listed below which apply to the intrusive work on site where there may be a risk of site personnel being exposed to potential contamination sources.

- Use good hygiene practices including regular hand washing and avoid hand to mouth contact.
- Take rest breaks, including meal and drinks in separate accommodation away from the workplace.
- Cover all cuts, abrasions and other breaks in the skin with waterproof dressings and/or gloves.
- Ensure first aid equipment is available and regularly maintained and that all site personnel are aware of the location of first aid equipment.
- Avoid personal contamination by the use of suitable protective clothing and ensure its safe disposal including suitable face masks in the presence of vapours.

- Use separate storage for keeping protective clothing apart from personal clothing which is not worn during working hours.
- Enclose by fencing off area as a use of engineering controls.
- Ensure high standards of cleanliness.
- Dispose of contaminated waste safely.
- Ensure adequate information, instruction and training on the likelihood of measures to be used.

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Appendix C.1 Conceptual Site Model

Appendix C.2 Chemical Laboratory Results

Appendix D Human Health Risk Assessment



Figure 1 – Site Location Map

Job Number
21248

Project

Stoneham Continuing Care Retirement Community,
Stoneham, Eastleigh, Hampshire SO50 9HS

Client

Opus Stonham Developments

Date

February 2024

Figure 2 – Aerial Photograph

Project

Stoneham Continuing Care
Retirement Community, Stoneham,
Eastleigh, Hampshire SO50 9HS

Client

Opus Stonham Developments

Date

February 2024

Job Number

21248



100 m

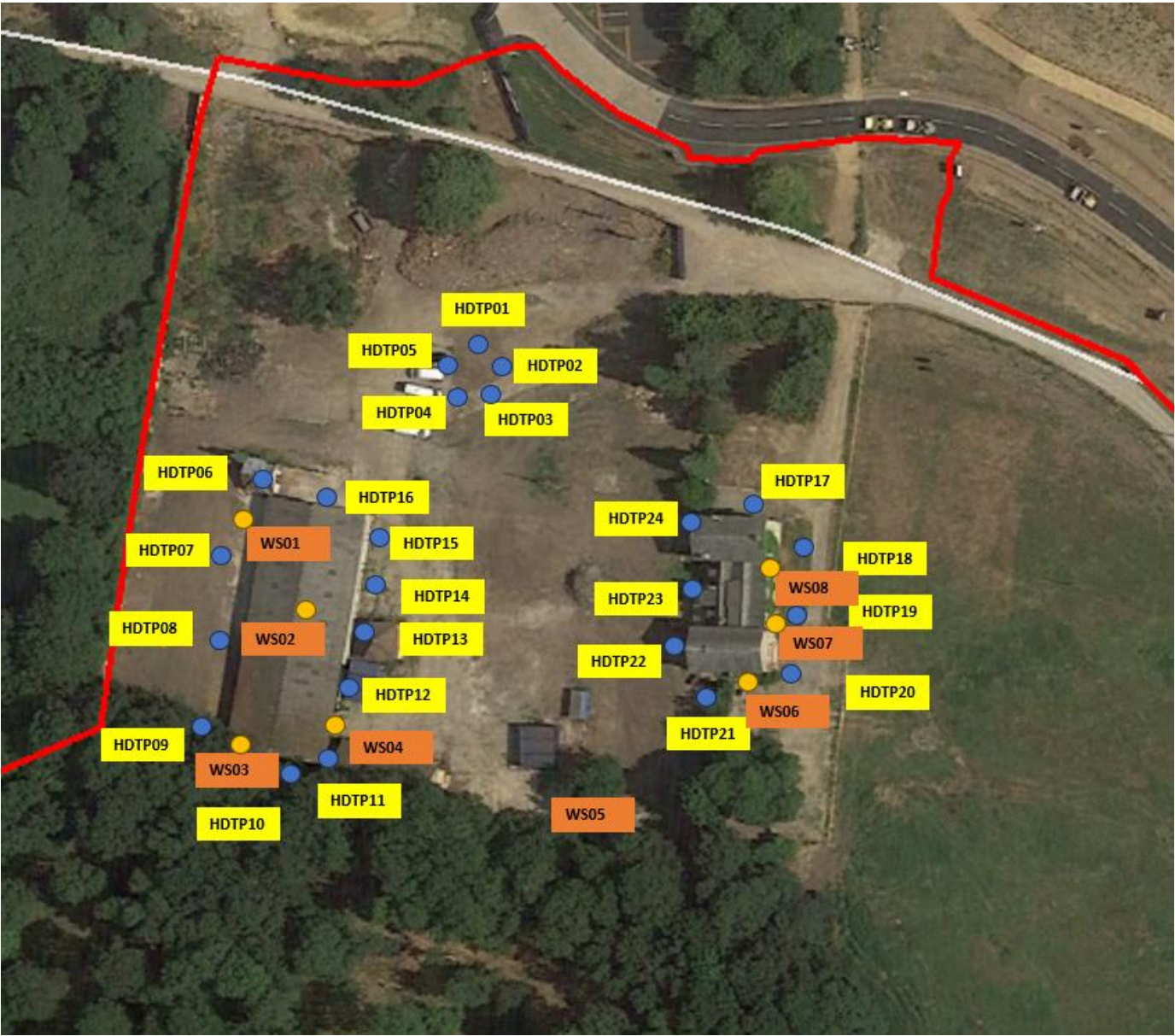


Figure 3 – Exploratory Hole Plan

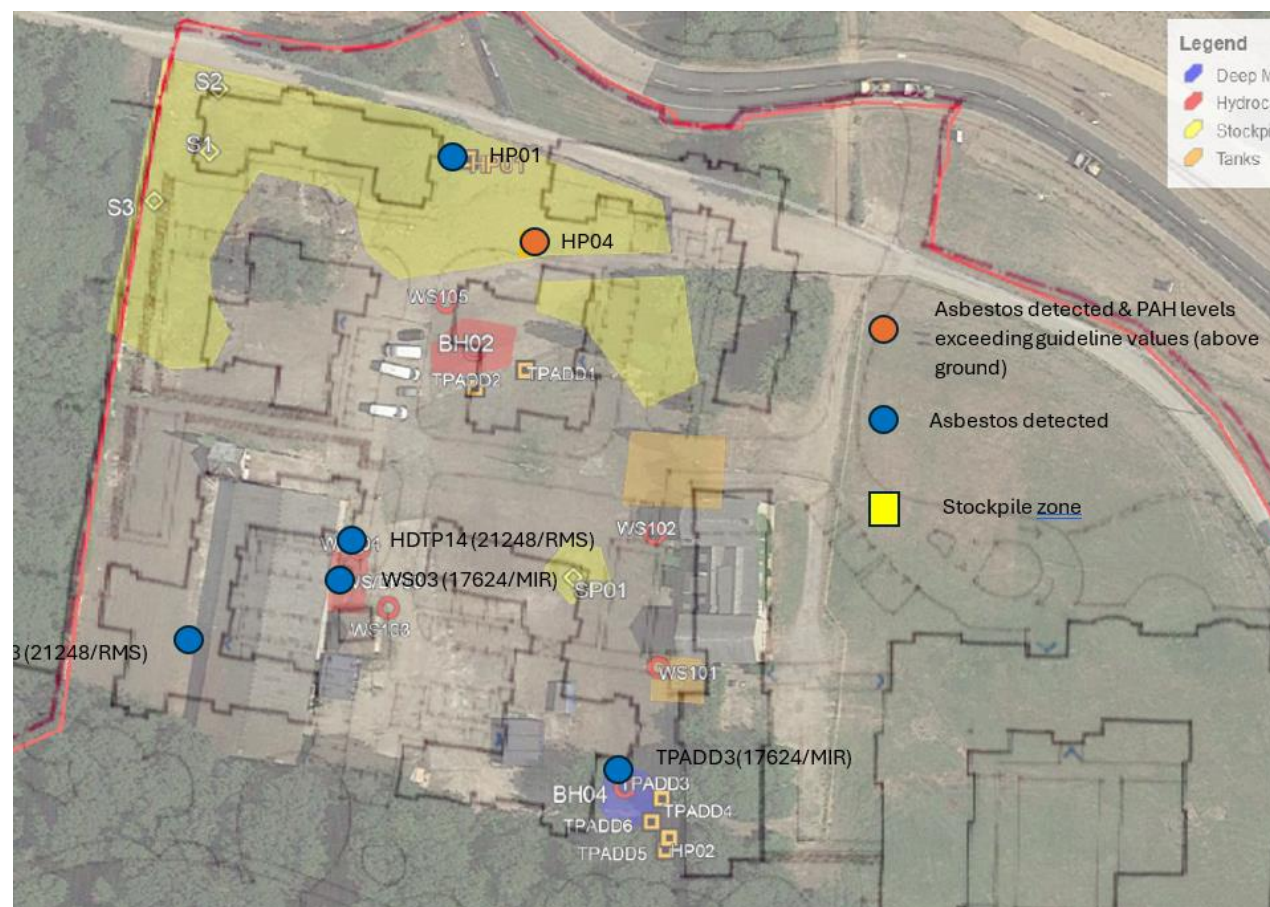
Project
Stoneham Continuing Care Retirement Community, Stoneham, Eastleigh, Hampshire SO50 9HS

Client
Opus Stonham Developments

Date
February 2024

Job Number
21248



**Figure 4 – Indicative Remedial Plan****Project**

Stoneham Continuing Care
Retirement Community, Stoneham,
Eastleigh, Hampshire SO50 9HS

Client

Opus Stonham Developments

Date

February 2024

Job Number

21248

Stockpile zone (coloured in Yellow) and blue/orange circle areas - WS03 (21248/RMS), HDTP14 (21248/RMS), TPADD3 (17624/MIR) and WS03 (17624/MIR) – Removal of spoil and wastes from the site before development by consulting asbestos-competent specialist and competent waste person before works to determine appropriate measures and any additional analysis is required to comply with the current guidance and legislation (CAR2012). Verification sampling and testing after stockpile and waste are removed.

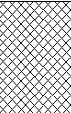
Appendix A Standards and Resources

The site works, soil descriptions and geotechnical testing was undertaken in accordance with the following standards were applicable:

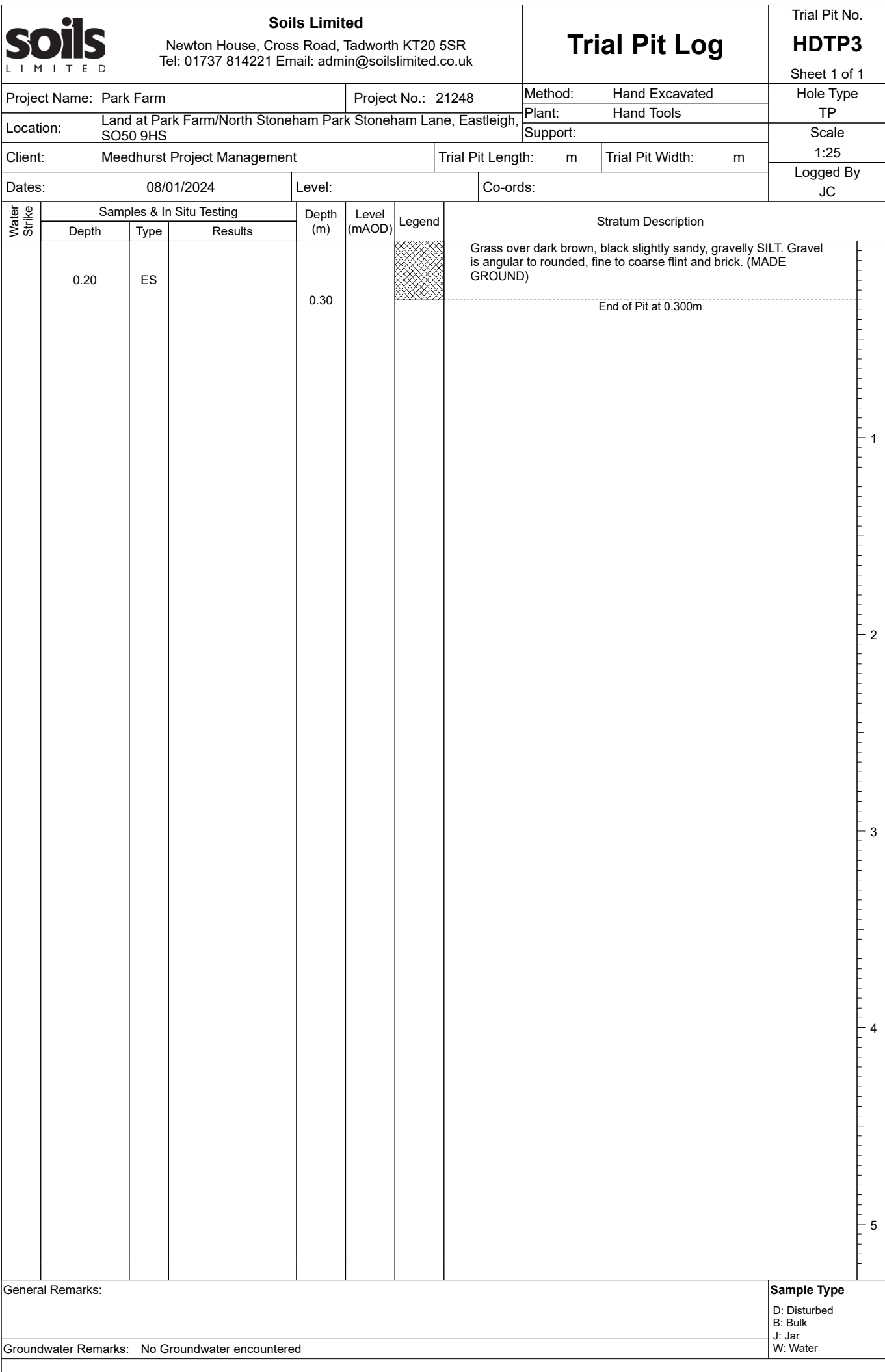
- BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites
- LCRM 2021 Environment Agency
- SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014
- CIRIA C733, Asbestos in soil and made ground: a guide to understanding and managing risks and CAR2012 regulations.
- Google Earth accessed in February 2024
- British Geological Survey Website & iGeology App accessed in February 2024

Appendix B Field Work

Appendix B.1 Engineers Logs

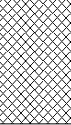
		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HOTP1 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					Dark brown, black slightly sandy, gravelly SILT. Gravel is angular to rounded, fine to coarse flint, brick, concrete and rare glass. (MADE GROUND)	
	0.50	ES		0.40 0.55			Grey, brown and black mottled, slightly gravelly CLAY. Gravel is angular to rounded fine to coarse flint, brick and concrete. (MADE GROUND)	
							End of Pit at 0.550m	
							1	
							2	
							3	
							4	
							5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

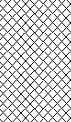
		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HDP2 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10			Orange, sandy, gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint and rare brick. (MADE GROUND)	
				0.40			Dark brown, black slightly sandy, gravelly SILT. Gravel is angular to rounded, fine to coarse flint, brick, concrete and rare glass. (MADE GROUND)	
	0.50	ES		0.55			Grey, silty, slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-angular fine to medium flint and brick. (MADE GROUND)	
							End of Pit at 0.550m	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

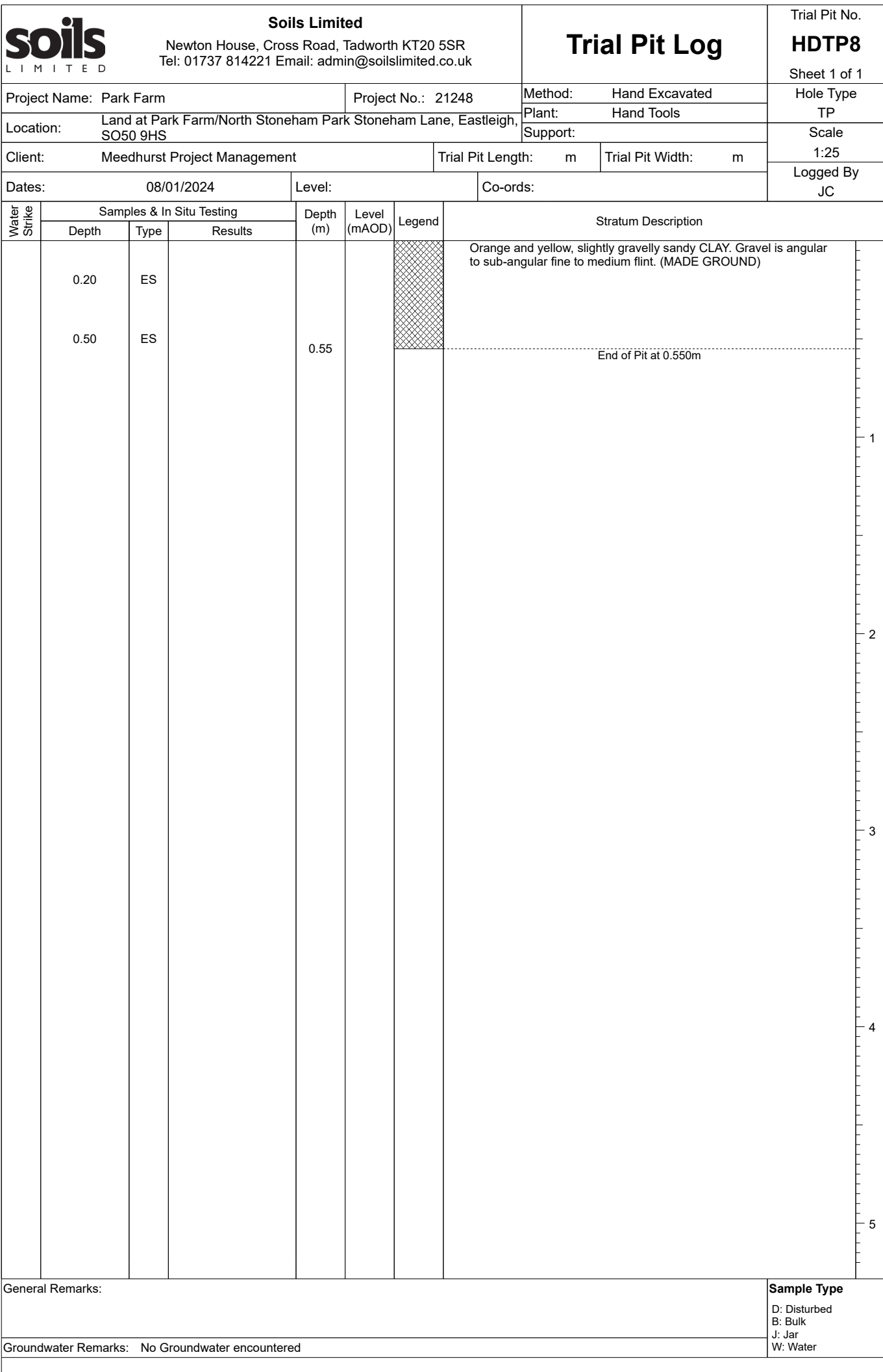


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Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10			Brown, sandy, gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint and rare brick. (MADE GROUND)	
				0.40			Dark brown, black slightly sandy, gravelly SILT. Gravel is angular to rounded, fine to coarse flint, brick, concrete and rare glass. (MADE GROUND)	
	0.50	ES		0.55			Grey, silty, slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-angular fine to medium flint and brick. (MADE GROUND)	
							End of Pit at 0.550m	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

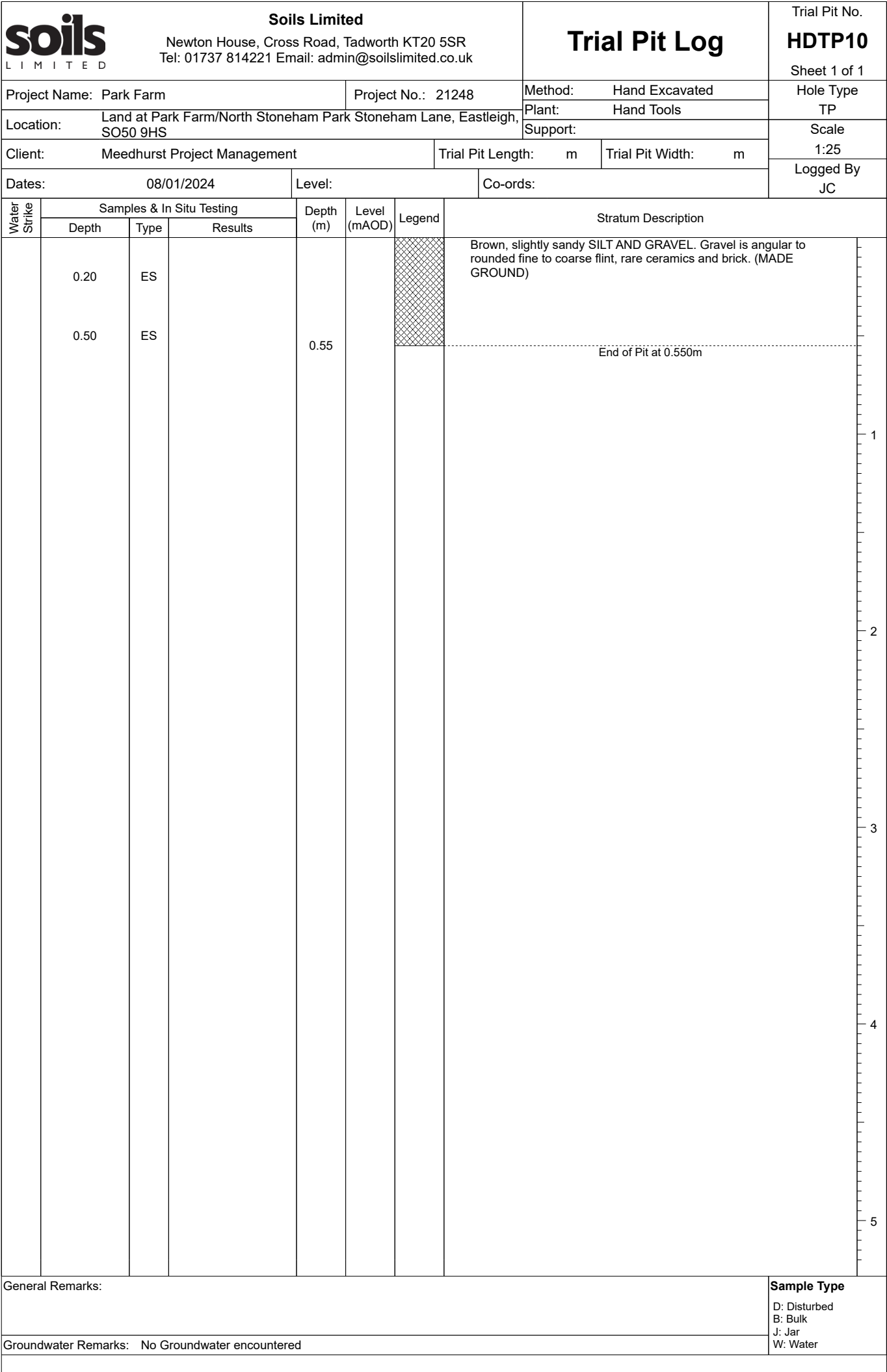
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Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10			Orange, sandy, gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint and rare brick. (MADE GROUND) Dark brown, black slightly sandy, gravelly SILT. Gravel is angular to rounded, fine to coarse flint, brick, concrete and rare ceramic. (MADE GROUND)	
	0.50	ES		0.45				
							End of Pit at 0.450m	
							1	
							2	
							3	
							4	
							5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

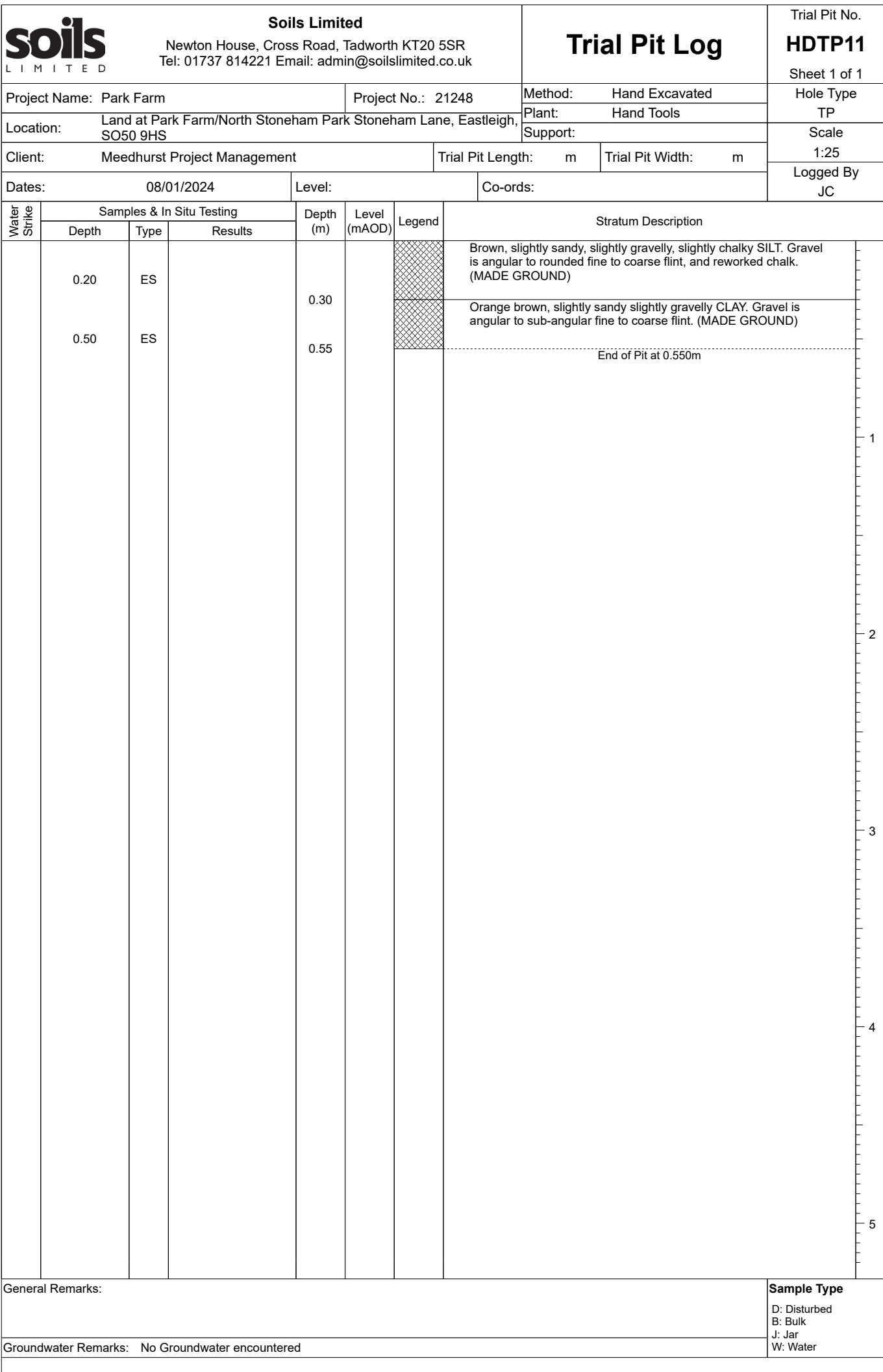
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Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10			Orange, sandy, gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint and rare brick. (MADE GROUND) Brown, slightly sandy, slightly gravelly CLAY. Gravel is angular fine to coarse flint and brick. (MADE GROUND)	
	0.50	ES		0.55				
							End of Pit at 0.550m	
							1	
							2	
							3	
							4	
							5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

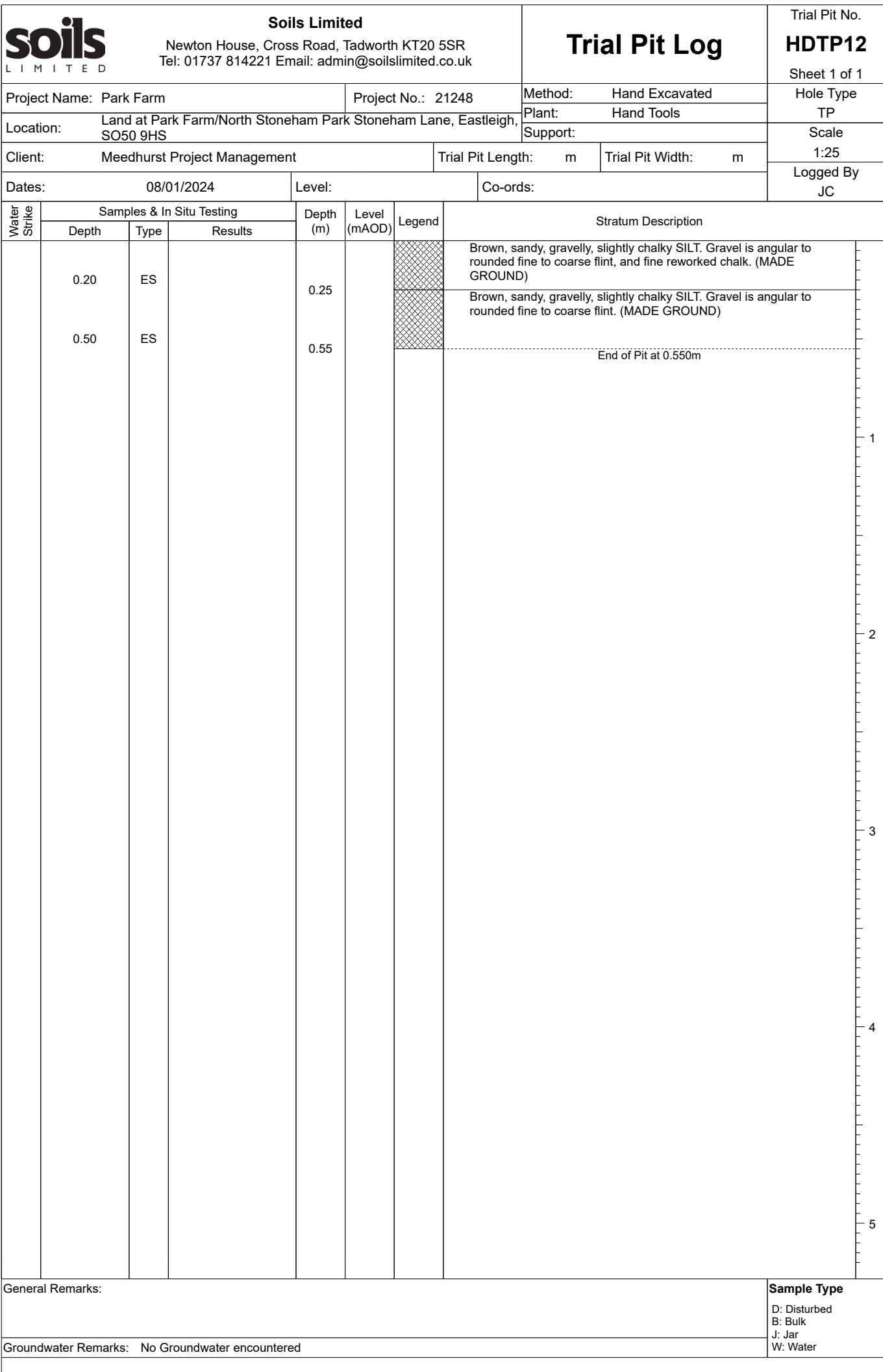
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Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.10			Orange, sandy, gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint and rare brick. (MADE GROUND) Brown, slightly sandy, slightly gravelly CLAY. Gravel is angular fine to coarse flint and brick. (MADE GROUND)	
	0.50	ES		0.55				
							End of Pit at 0.550m	
							1	
							2	
							3	
							4	
							5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								



		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HOTP9 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30			Grey silty GRAVEL. Gravel is angular to sub-rounded fine to coarse flint. . (MADE GROUND)	
	0.50	ES				Orange, slightly sandy CLAY. (RIVER TERRACE DEPOSITS)		
						End of Pit at 0.550m		
								1
								2
								3
								4
								5
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

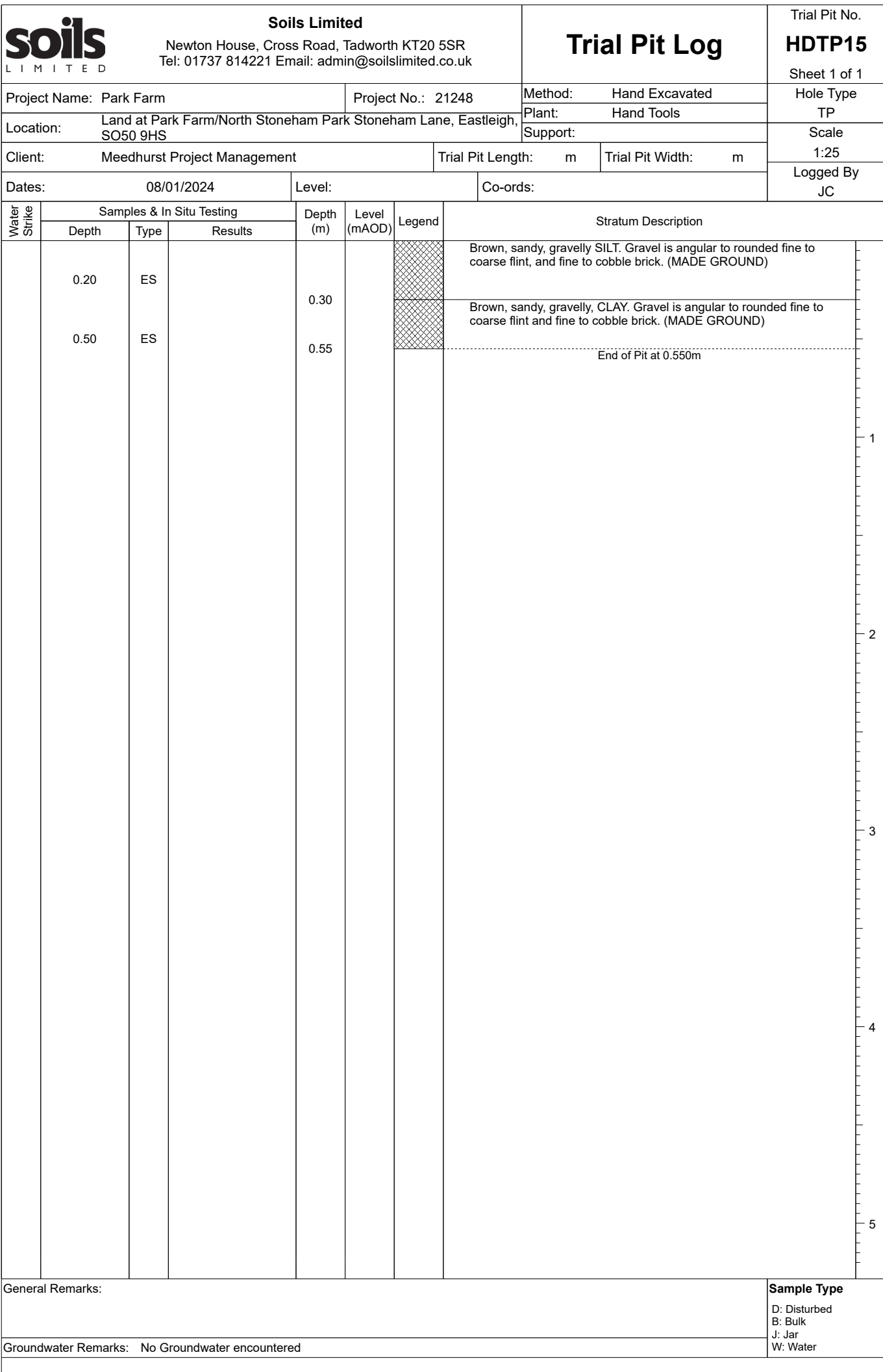




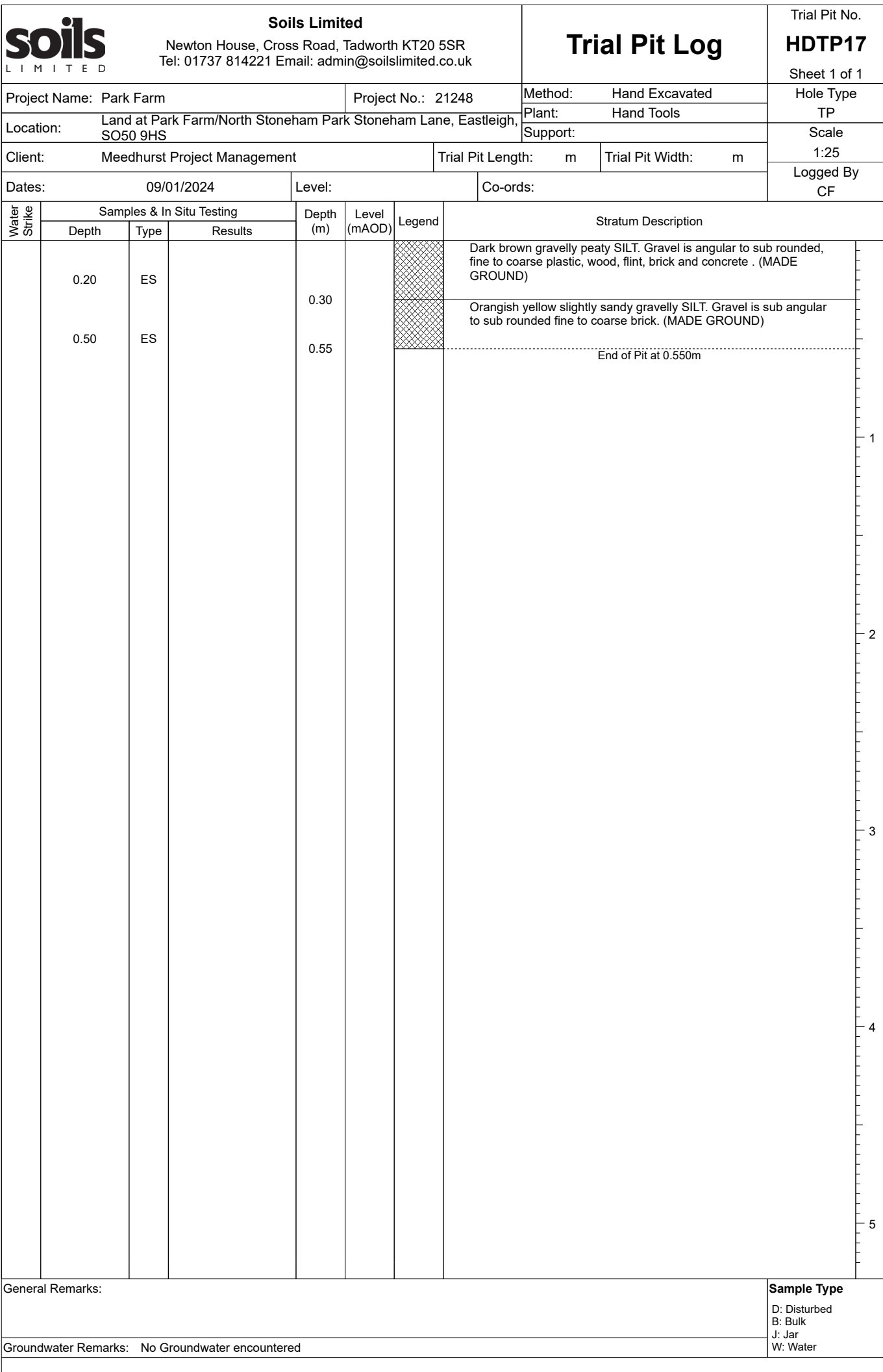


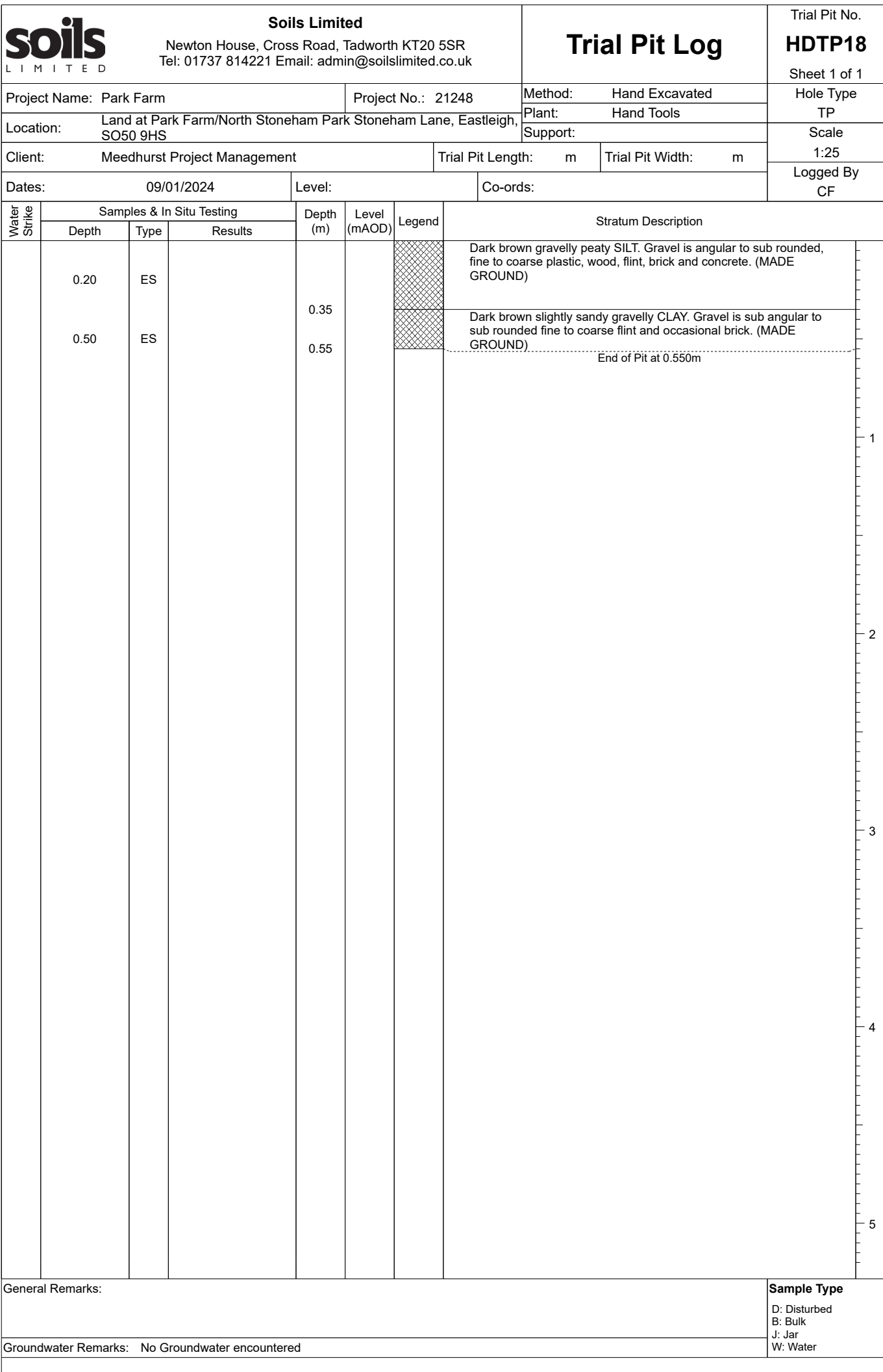
		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HDT P13 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30			Brown, sandy, gravelly SILT. Gravel is angular to rounded fine to coarse flint, and brick, rare fine reworked chalk. (MADE GROUND)	
	0.50	ES				Brown, sandy, gravelly, CLAY. Gravel is angular to rounded fine to coarse flint and brick. (MADE GROUND)		
						0.55		End of Pit at 0.550m
								1
								2
								3
								4
								5
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HOTP14 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30			Brown, sandy, gravelly SILT. Gravel is angular to rounded fine to coarse flint, and fine to cobble brick. (MADE GROUND)	
	0.50	ES		0.55			Brown, sandy, gravelly, CLAY. Gravel is angular to rounded fine to coarse flint and brick. (MADE GROUND)	
								End of Pit at 0.550m
1 2 3 4 5								
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: Groundwater encountered								



		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HOTP16 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 08/01/2024				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30			Brown, sandy, gravelly SILT. Gravel is angular to rounded fine to coarse flint, and fine to cobble brick. (MADE GROUND)	
	0.50	ES		0.55			Brown, sandy, gravelly, CLAY. Gravel is angular to rounded fine to coarse flint and fine to cobble brick. (MADE GROUND)	
							End of Pit at 0.550m	
								1
								2
								3
								4
								5
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								







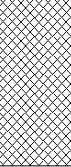
Soils Limited

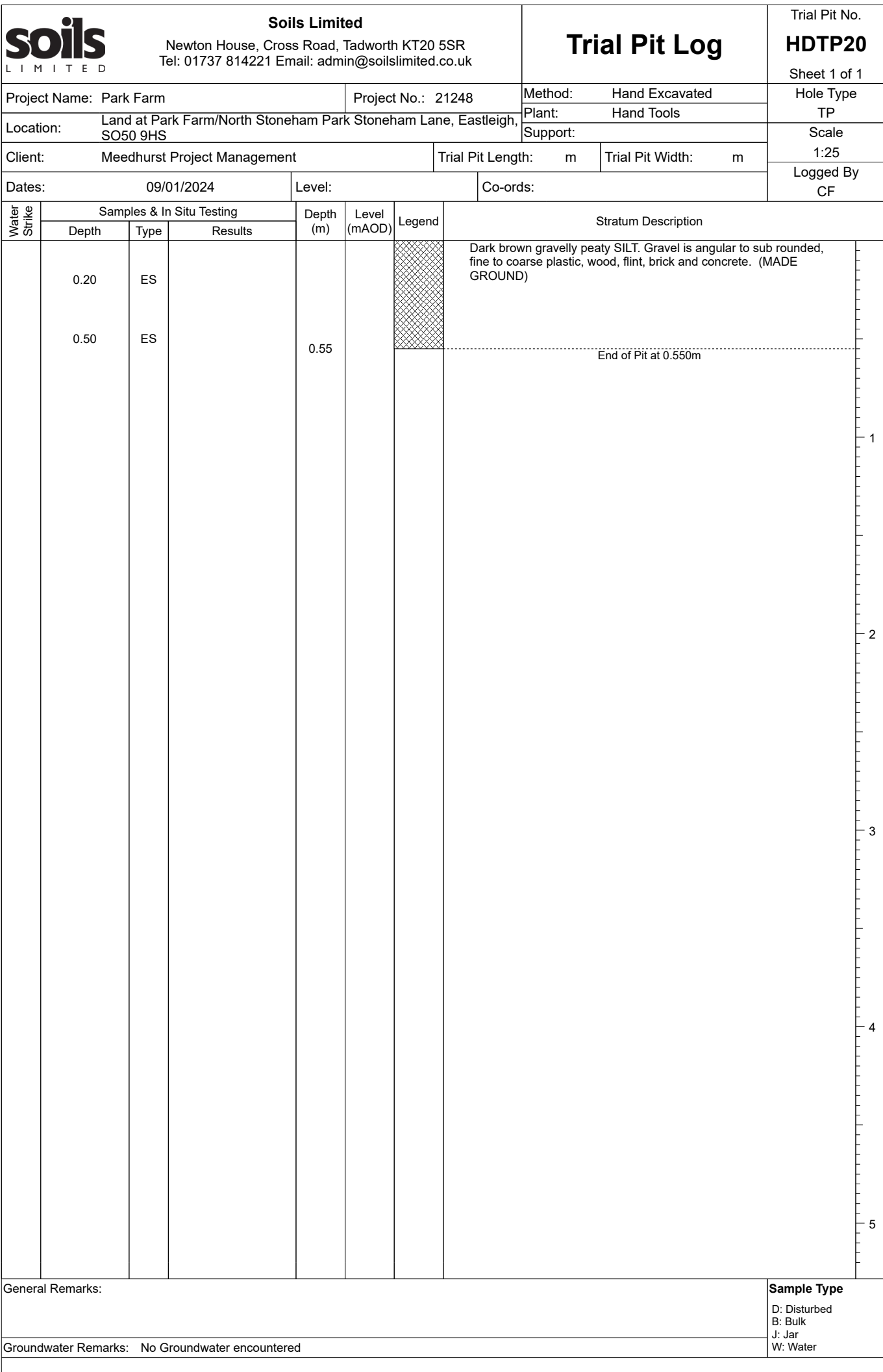
Newton House, Cross Road, Tadworth KT20 5SR
Tel: 01737 814221 Email: admin@soilslimited.co.uk

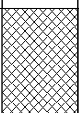
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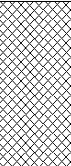
Trial Pit No.
HDT19

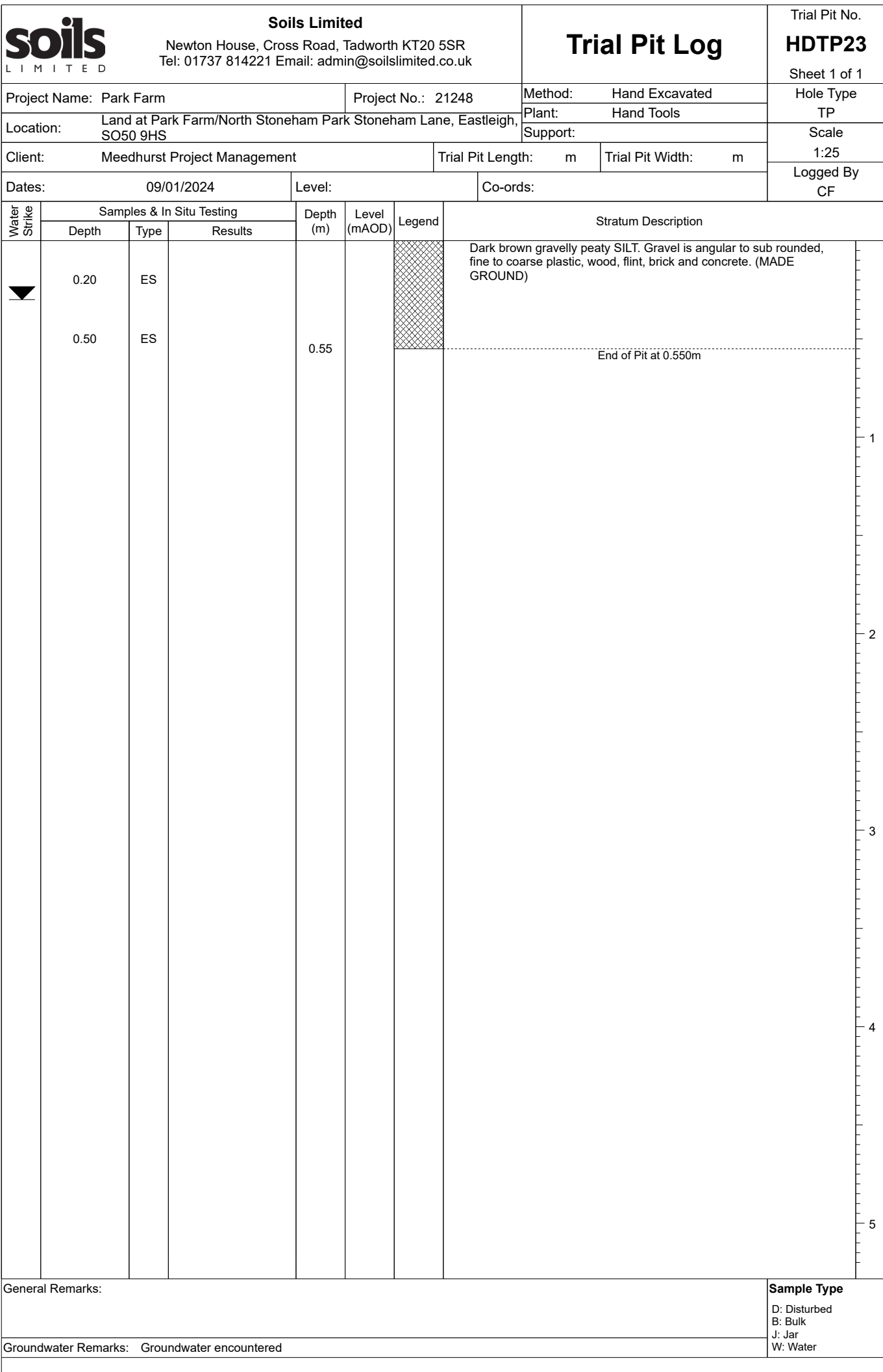
Sheet 1 of 1

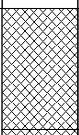
Project Name: Park Farm		Project No.: 21248		Method: Hand Excavated		Hole Type TP		
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS				Plant: Hand Tools				
Client: Meedhurst Project Management		Trial Pit Length: m		Trial Pit Width: m		Scale 1:25		
Dates: 09/01/2024		Level:		Co-ords:		Logged By CF		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.55			Dark brown gravelly peaty SILT. Gravel is angular to sub rounded, fine to coarse plastic, wood, flint, brick and concrete. (MADE GROUND)	
	0.50	ES						
End of Pit at 0.550m								
								1
								2
								3
								4
								5
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								



		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HOTP21 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 09/01/2024				Level:		Co-ords:		Logged By CF
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					Pinkish brown gravelly peaty SILT. Gravel is angular to sub rounded, fine to coarse plastic, wood, flint, brick and concrete. (MADE GROUND)	
	0.50	ES		0.35			Brown slightly sandy gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse flint and occasional brick. (MADE GROUND)	
				0.55			End of Pit at 0.550m	
								1
								2
								3
								4
								5
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: Groundwater encountered								

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HDT22 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 09/01/2024		Level:		Co-ords:		Logged By CF		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.55			Dark brown gravelly peaty SILT. Gravel is angular to sub rounded, fine to coarse plastic, wood, flint, brick and concrete. (MADE GROUND)	
	0.50	ES					End of Pit at 0.550m	
							1 2 3 4 5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No Groundwater encountered								



		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. HDT P24 Sheet 1 of 1	
Project Name: Park Farm				Project No.: 21248		Method: Hand Excavated		Hole Type TP
Location: Land at Park Farm/North Stoneham Park Stoneham Lane, Eastleigh, SO50 9HS						Plant: Hand Tools		
Client: Meedhurst Project Management				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 09/01/2024		Level:		Co-ords:		Logged By CF		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					Dark brown gravelly peaty SILT. Gravel is angular to sub rounded, fine to coarse plastic, wood, flint, brick and concrete. (MADE GROUND)	
	0.50	ES		0.40 0.55			Orangish brown slightly sandy gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse flint. (MADE GROUND)	
							End of Pit at 0.550m	
							1	
							2	
							3	
							4	
							5	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: Groundwater encountered								

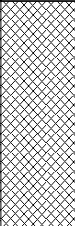
	Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS1					
	Contract Number: 21248		Start and End Date: 08/01/24		Logged By: AN		Checked By: ML		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.50)		Light grey slightly clayey slightly sandy GRAVEL. Gravel is angular to subangular flint, limestone with fragments sized 5mm to 80mm concrete and brick. MADE GROUND								
0.55	ES			0.50 (0.30)		Soft brown slightly sandy, slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to rounded, fine to coarse flint. (RIVER TERRACE DEPOSITS)								
0.85	ES			0.80		Firm brown slightly mottled light grey slightly sandy , CLAY. Sand Is fine. Very rare angular coarse flint gravel. (RIVER TERRACE DEPOSITS)								
1.30	ES			1.00		Soft yellowish brown mottled grey sandy CLAY. Sand is fine. Occasional light grey and yellowish brown sand bands. (RIVER TERRACE DEPOSITS)						1	▼	
1.80	ES			(1.00)										
				2.00		End of Borehole at 2.00m						2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.00			0	0.00	Groundwater encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

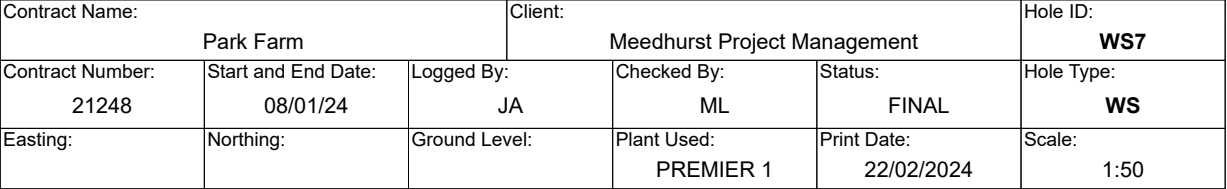
	Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS2					
	Contract Number: 21248		Start and End Date: 08/01/24		Logged By: AN		Checked By: ML		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50			
Weather:			Termination:								Sheet 1 of 1			
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Black slightly silty slightly silty GRAVEL. Sand is fine to medium. Gravel is angular to rounded, flint with fragments sized 5mm to 60mm clinker, brick and metal. MADE GROUND								
0.50	ES			0.40		Firm orangish brown slightly mottled sandy CLAY. Sand is fine. (RIVER TERRACE DEPOSITS)								
0.80	ES			(0.60)										
1.30	ES			1.00		Soft brown mottled light grey sandy CLAY. Sand is fine. Occasional yellowish brown sandy bands. (RIVER TERRACE DEPOSITS)						1		
1.80	ES			(1.00)		Yellowish brown SAND. Sand is fine								
				2.00		Yellowish brown SAND. Sand is fine								
						End of Borehole at 2.00m						2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.20			0	0.00	Groundwater encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

soils L I M I T E D	Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS3					
	Contract Number: 21248		Start and End Date: 08/01/24		Logged By: JA		Checked By: ML		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/ Installation	
0.20	ES			(0.30)		Soft brownish grey slightly sandy gravelly CLAY. Gravel is subangular fien to medium flint and brick. Rare rootlets. MADE GROUND Firm orangish brown slightly sandy silty CLAY. Sand is fine to medium. Occasional thin (up to 4cm) laminations of sand. (RIVER TERRACE DEPOSITS) <i>Orangish brown fine to medium SAND</i> Yellowish brown fine to medium SAND. (RIVER TERRACE DEPOSITS) Firm grey mottled orangish brown slightly sandy silty CLAY. Sand is fine. (RIVER TERRACE DEPOSITS) Yellowish grey slightly silty SAND. (RIVER TERRACE DEPOSITS) Firm grey mottled orangish brown slightly sandy silty CLAY. Sand is fine. Slight anaerobic odour. (RIVER TERRACE DEPOSITS) Yellowish brown fine to medium SAND. (RIVER TERRACE DEPOSITS) <i>Firm orangish brown mottled grey CLAY</i> <i>Firm orangish brown mottled grey CLAY</i>						1		
0.30														
0.50	ES			(0.40)										
0.70														
0.85	ES			(0.80)										
0.90														
1.10	ES			(0.35)										
1.25														
1.40	ES			(1.45)										
1.80	ES			(0.55)										
				2.00		End of Borehole at 2.00m						2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	No roots encountered					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.20			0	0.00	Groundwater encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS4					
	Contract Number: 21248		Start and End Date: 08/01/24		Logged By: JA		Checked By: ML		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft slightly gravelly clayey SILT. Gravel is angular fine to coarse flint, brick and chalk. Rare rootlets. MADE GROUND								
0.30				0.30		Soft brownish grey slightly sandyclayey GRAVEL. Gravel is subangular fien to medium flint and brick. Rare rootlets. MADE GROUND								
0.50	ES			(0.40)										
0.70				0.70		Soft orangish brown sandy silty CLAY. Sand is fine. (RIVER TERRACE DEPOSITS)								
0.80	ES			0.85		Firm orangish brown mottled light grey slightly sandy silty CLAY. Sand is fine to medium and occasionally appears in thin laminations. (RIVER TERRACE DEPOSITS)						1		
						Yellowish brown fine to medium SAND								
				(1.15)		Yellowish brown fine to medium SAND								
						Yellowish brown fine to medium SAND								
				2.00		Yellowish brown fine to medium SAND						2		
						End of Borehole at 2.00m								
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Roots encountered to 0.30m bgl					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.00			0	0.00	Groundwater encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

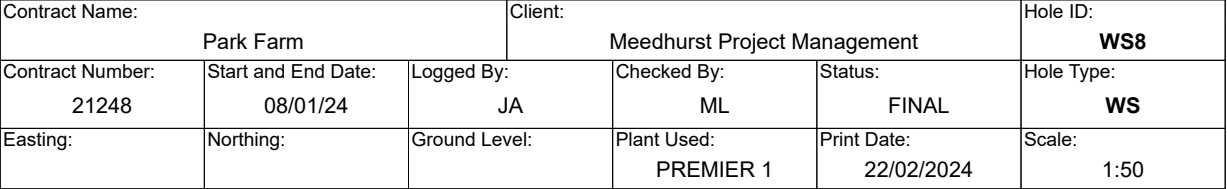
	Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS5					
	Contract Number: 21248		Start and End Date: 08/01/24		Logged By: JA		Checked By: ML		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Brownish grey clayey sandy GRAVEL. Gravel is subangular fine to coarse flint and brick. (MADE GROUND)								
0.50	ES			0.40		Orange and reddish brown sandy GRAVEL. Gravel is subangular fine to coarse brick. (MADE GROUND)								
				0.65		Black sandy GRAVEL. Gravel is subangular fine to coarse igneous rock. 1No. subangular cobble of igneous rock. (MADE GROUND)								
0.85	ES			0.80		Soft brown slightly sandy gravelly CLAY. Gravel is subangular fine to medium flint. (RIVER TERRACE DEPOSITS)						1		
				0.90		Orangish brown slightly clayey sandy GRAVEL. Gravel is subangular fine to coarse flint. (RIVER TERRACE DEPOSITS)								
				(1.10)										
				2.00		End of Borehole at 2.00m						2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	No roots encountered					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	No Groundwater encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

				Contract Name: Park Farm				Client: Meedhurst Project Management				Hole ID: WS6			
				Contract Number: 21248		Start and End Date: 08/01/24		Logged By: JA		Checked By: ML		Status: FINAL		Hole Type: WS	
				Easting:		Northing:		Ground Level:		Plant Used: PREMIER 1		Print Date: 22/02/2024		Scale: 1:50	
Weather:				Termination:								Sheet 1 of 1			
Samples & In Situ Testing				Strata Details								Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/ Installation		
0.40	ES			(1.50)		Soft brownish grey slightly sandy gravelly CLAY. Gravel is subangular fine to coarse flint, brick, concrete and clinker. MADE GROUND						1			
0.70	ES														
1.00	ES														
1.30	ES														
1.50				1.50		Bluish grey clayey SAND. Sand is fine to medium. Rare subangular fine to coarse flint gravel. (RIVER TERRACE DEPOSITS)						2			
1.70	ES			(0.50)											
					2.00	End of Borehole at 2.00m						2			
												3			
												4			
												5			
												6			
												7			
												8			
												9			
												10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	No roots encountered						
Chiselling					Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
									1.50			0	0.00	Groundwater encountered	
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.						



Samples & In Situ Testing	Strata Details	Groundwater
---------------------------	----------------	-------------

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
Chiselling					Installation				Water Strikes
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)
									1.40
					Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.				



Weather:	Termination:	Sheet 1 of 1
----------	--------------	--------------

Samples & In Situ Testing			Strata Details						Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/ Installation	
0.20	ES			(0.35)		Soft dark brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular fine to medium flint and brick. Rare rootlets. MADE GROUND	1			
0.50	ES			0.35		Dark brown slightly clayey slightly sandy GRAVEL. Gravel is subangular fine to medium flint. (RIVER TERRACE DEPOSITS)				
0.80	ES			0.60		Orangish brown slightly clayey GRAVEL. Gravel is suabngular fine to coarse flint. (RIVER TERRACE DEPOSITS)				
				(1.00)						
				1.60		Soft orangish brown sandy CLAY. Sand is fine. (RIVER TERRACE DEPOSITS)				
				(0.40)						
				2.00						
						End of Borehole at 2.00m	2			
							3			
							4			
							5			
							6			
							7			
							8			
							9			
							10			

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
									Roots encountered to 0.30m bgl
Chiselling					Installation				
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m) Casing (m) Sealed (m) Time (mins) Rose to (m) Remarks
									1.00 0 0.00 Groundwater encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.

Appendix C Chemical Laboratory Analyses

Appendix C.1 Conceptual Site Model

Table C.1.1 CSM Revised Post-Chemical Analyses

Source	Potential Contaminant	Exposure Pathway	Receptor	Initial Assessment from Desk Study and Main Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
Surface wastes and demolition-based Spoil including concrete, glass, plastics, hydrocarbons and asbestos	Metals, hydrocarbons, asbestos, concrete	Inhalation of dust	Site Workers/Site Maintenance	Mild	Likely	Moderate/low	Removal of spoil and wastes from site prior to development will reduce all risks to very low.	Recommend consultation with asbestos competent asbestos specialist and competent waste person prior to works to determine appropriate measures and any additional analysis required to comply with current guidance and legislation (CAR2012)
			End Users	Mild	Unlikely	Very low		
			Off-site Users	Mild	Unlikely	Very low		
		Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance	-	-	-	Hydrocarbon vapour risk and gas risk removed as source is above ground.	
			End Users	-	-	-		
			Off-site Users	-	-	-		
	Metals, hydrocarbons	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Mild	Unlikely	Very low	Risk to construction removed as source is above ground.	
			End Users	Mild	Unlikely	Very low		
	Metals, hydrocarbons	Migration via surface runoff	Surface Water	Minor	Unlikely	Very Low	Water risk unlikely as groundwater probably perched and not in continuity at shallow depth or to underlying water table.	
		Migration in solution via groundwater	Shallow Aquifer	Minor	Unlikely	Very Low		
			Deep Aquifer	Minor	Unlikely	Very Low		
			Direct contact with construction material	Buried structures	-	-		
		Buried Services		-	-	-		
		Migration of gases via permeable soils	Site Workers/Site Maintenance	-	-	-		
			End Users	-	-	-		
			Off-site Users	-	-	-		
			Building and confined spaces	-	-	-		
Fuel and oil wastes	Hydrocarbons and metals	Inhalation of dust	Site Workers/Site Maintenance	Minor	Unlikely	Very Low	Groundwater samples from BH02 indicate exceedances on PAH and Aro C12-C21 at location BH02, and exceedance on Nickel at WS01.	
			End Users	Minor	Unlikely	Very Low		
			Off-site Users	Minor	Unlikely	Very Low		
	Hydrocarbons and metals	Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance	Minor	Unlikely	Very Low	The proposed development locations around BH02 and WS01 will be hardstanding car park and the footprint of the building. This will inhibit infiltration through the Made Ground in this area, thereby, mitigating any leaching of contaminants. The proposed development will also provide a betterment of site conditions with surface water drainage management in addition to hardstanding cover. Therefore, the risk to the groundwater is very low to negligible and remedial works are not necessary.	
			End Users	Minor	Unlikely	Very Low		
			Off-site Users	Minor	Unlikely	Very Low		
	Hydrocarbons and metals	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Minor	Unlikely	Very Low		
			End Users	Minor	Unlikely	Very Low		
	Hydrocarbons and metals	Migration via surface runoff	Surface Water	Minor	Unlikely	Very Low		
		Migration in solution via groundwater	Shallow Aquifer	Minor	Unlikely	Very Low		
			Deep Aquifer	Minor	Unlikely	Very Low		
			Direct contact with construction material	Buried structures	Minor	Unlikely		Very Low
		Buried Services		Minor	Unlikely	Very Low		
	Hydrocarbons and metals	Migration of gases via permeable soils	Site Workers/Site Maintenance	Minor	Unlikely	Very Low		
			End Users	Minor	Unlikely	Very Low		
			Off-site Users	Minor	Unlikely	Very Low		
			Building and confined spaces	Minor	Unlikely	Very Low		

Appendix C.2 Chemical Laboratory Results



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Soils Ltd
St Day Road
Redruth
TR16 5HY

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-00373

Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS

Project / Job Ref: 21248

Order No: None Supplied

Sample Receipt Date: 16/01/2024

Sample Scheduled Date: 16/01/2024

Report Issue Number: 1

Reporting Date: 22/01/2024

Authorised by:

Steve Knight
Customer Support Manager

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

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



Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP01	HP01	HP02	HP02	HP03
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.50	0.20
Reporting Date: 22/01/2024	DETS Sample No	694169	694170	694171	694172	694173

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP04	HP04	HP05	HP05	HP06
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.40	0.20
Reporting Date: 22/01/2024	DETS Sample No	694174	694175	694176	694177	694178

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP06	HP07	HP07	HP08	HP08
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.50	0.20	0.50	0.20	0.50
Reporting Date: 22/01/2024	DETS Sample No	694179	694180	694181	694182	694183

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP09	HP09	HP10	HP10	HP11
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.50	0.20
Reporting Date: 22/01/2024	DETS Sample No	694184	694185	694186	694187	694188

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Kent ME17 2JN
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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP11	HP12	HP12	HP13	HP13
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.50	0.20	0.50	0.20	0.50
Reporting Date: 22/01/2024	DETS Sample No	694189	694190	694191	694192	694193

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP14	HP14	HP15	HP15	HP16
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.50	0.20
Reporting Date: 22/01/2024	DETS Sample No	694194	694195	694196	694197	694198

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE	free fibres				
Asbestos Type ^(S)	PLM Result	N/a	ISO17025	Amosite				
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	0.006				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HP16	HDTP17	HDTP17	HDTP18	HDTP18
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.50	0.20	0.50	0.20	0.50
Reporting Date: 22/01/2024	DETS Sample No	694199	694200	694201	694202	694203

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HDTP19	HDTP19	HDTP20	HDTP20	HDTP21
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.50	0.20
Reporting Date: 22/01/2024	DETS Sample No	694204	694205	694206	694207	694208

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HDTP21	HDTP22	HDTP22	HDTP23	HDTP23
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.50	0.20	0.50	0.20	0.50
Reporting Date: 22/01/2024	DETS Sample No	694209	694210	694211	694212	694213

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Kent ME17 2JN
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Soil Analysis Certificate						
DETS Report No: 24-00373	Date Sampled	None Supplied	None Supplied			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	HDTP24	HDTP24			
Project / Job Ref: 21248	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20	0.50			
Reporting Date: 22/01/2024	DETS Sample No	694214	694215			

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected			
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-00373

Soils Ltd

Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS

Project / Job Ref: 21248

Order No: None Supplied

Reporting Date: 22/01/2024

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

D Dried

AR As Received



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List of HWOL Acronyms and Operators	
DETS Report No: 24-00373	
Soils Ltd	
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	
Project / Job Ref: 21248	
Order No: None Supplied	
Reporting Date: 22/01/2024	

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
—	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym



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DETS Report No: 24-00648

Site Reference: Land At Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS

Project / Job Ref: 21248/ML

Order No: 21248/ML

Sample Receipt Date: 15/01/2024

Sample Scheduled Date: 24/01/2024

Report Issue Number: 1

Reporting Date: 31/01/2024

Authorised by:

Steve Knight
Customer Support Manager

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

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Soil Analysis Certificate						
DETS Report No: 24-00648	Date Sampled	11/01/24				
Soils Ltd	Time Sampled	None Supplied				
Site Reference: Land At Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	TP / BH No	WS3				
Project / Job Ref: 21248/ML	Additional Refs	None Supplied				
Order No: 21248/ML	Depth (m)	0.20				
Reporting Date: 31/01/2024	DETS Sample No	695334				

Determinand	Unit	RL	Accreditation			
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	0.009		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-00648

Soils Ltd

Site Reference: Land At Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS

Project / Job Ref: 21248/ML

Order No: 21248/ML

Reporting Date: 31/01/2024

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

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List of HWOL Acronyms and Operators	
DETS Report No: 24-00648	
Soils Ltd	
Site Reference: Land At Park Farm, North Stoneham Park, Stoneham Lane, Eastleigh, SO50 9HS	
Project / Job Ref: 21248/ML	
Order No: 21248/ML	
Reporting Date: 31/01/2024	

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
—	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

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DETS Report No: 24-00346

Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS

Project / Job Ref: 21248/ML

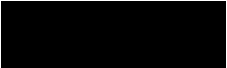
Order No: 21248/ML

Sample Receipt Date: 15/01/2024

Sample Scheduled Date: 15/01/2024

Report Issue Number: 1

Reporting Date: 19/01/2024


Steve Knight
Customer Support Manager

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

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Soil Analysis Certificate						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24	11/01/24	11/01/24
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	TP / BH No	WS1	WS2	WS3	WS4	WS5
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 21248/ML	Depth (m)	0.20	0.50	0.20	0.50	0.50
Reporting Date: 19/01/2024	DETS Sample No	694020	694021	694022	694023	694024

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE			Bundles of Chrysotile fibres		
Asbestos Type ^(S)	PLM Result	N/a	ISO17025			Chrysotile		
pH	pH Units	N/a	MCERTS	9.5	7.5	7.8	7.5	7.8
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Organic Matter (SOM)	%	< 0.1	MCERTS	7.1	0.9	1.9	0.9	1.9
Arsenic (As)	mg/kg	< 2	MCERTS	3	7	13	4	5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	4	13	25	13	13
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9	7	16	8	17
Lead (Pb)	mg/kg	< 3	MCERTS	35	13	174	63	191
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	3	5	10	7	6
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	8	23	37	14	18
Zinc (Zn)	mg/kg	< 3	MCERTS	10	18	147	56	362
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	TP / BH No	WS6	WS7	WS8		
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 21248/ML	Depth (m)	0.70	1.00	0.20		
Reporting Date: 19/01/2024	DETS Sample No	694025	694026	694027		

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	8.0	6.0	7.5		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
Organic Matter (SOM)	%	< 0.1	MCERTS	1	1.1	3		
Arsenic (As)	mg/kg	< 2	MCERTS	3	6	7		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	8	16	11		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	9	19		
Lead (Pb)	mg/kg	< 3	MCERTS	31	10	131		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	3	6	7		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	12	27	24		
Zinc (Zn)	mg/kg	< 3	MCERTS	20	36	86		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24	11/01/24	11/01/24
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, S050 9HS	TP / BH No	WS1	WS2	WS3	WS4	WS5
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 21248/ML	Depth (m)	0.20	0.50	0.20	0.50	0.50
Reporting Date: 19/01/2024	DETS Sample No	694020	694021	694022	694023	694024

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, S050 9HS	TP / BH No	WS6	WS7	WS8		
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 21248/ML	Depth (m)	0.70	1.00	0.20		
Reporting Date: 19/01/2024	DETS Sample No	694025	694026	694027		

Determinand	Unit	RL	Accreditation	(n)			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.14	
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.13	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24	11/01/24	11/01/24
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	TP / BH No	WS1	WS2	WS3	WS4	WS5
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 21248/ML	Depth (m)	0.20	0.50	0.20	0.50	0.50
Reporting Date: 19/01/2024	DETS Sample No	694020	694021	694022	694023	694024

Determinand	Unit	RL	Accreditation	(n)				
Aliphatic >C5 - C6 : HS 1D MS AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS 1D MS AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH CU 1D AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	4	< 2	< 2	< 2
Aromatic >C12 - C16 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	3	< 2	< 2	< 2
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH CU 1D AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	TP / BH No	WS6	WS7	WS8		
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 21248/ML	Depth (m)	0.70	1.00	0.20		
Reporting Date: 19/01/2024	DETS Sample No	694025	694026	694027		

Determinand	Unit	RL	Accreditation	(n)					
Aliphatic >C5 - C6 : HS 1D MS AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8 : HS 1D MS AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2		
Aliphatic >C10 - C12 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2		
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3		
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3		
Aliphatic >C21 - C34 : EH CU 1D AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10		
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21		
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2		
Aromatic >C10 - C12 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2		
Aromatic >C12 - C16 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2		
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3		
Aromatic >C21 - C35 : EH CU 1D AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10		
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21		
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42		



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24	11/01/24	11/01/24
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, S050 9HS	TP / BH No	WS1	WS2	WS3	WS4	WS5
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 21248/ML	Depth (m)	0.20	0.50	0.20	0.50	0.50
Reporting Date: 19/01/2024	DETS Sample No	694020	694021	694022	694023	694024

Determinand	Unit	RL	Accreditation	(n)		
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	16
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eateleigh, SO50 9HS	TP / BH No	WS6	WS7	WS8		
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 21248/ML	Depth (m)	0.70	1.00	0.20		
Reporting Date: 19/01/2024	DETS Sample No	694025	694026	694027		

Determinand	Unit	RL	Accreditation	(n)			
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	



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Soil Analysis Certificate - PCB (7 Congeners)						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24	11/01/24	11/01/24
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, S050 9HS	TP / BH No	WS1	WS2	WS3	WS4	WS5
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 21248/ML	Depth (m)	0.20	0.50	0.20	0.50	0.50
Reporting Date: 19/01/2024	DETS Sample No	694020	694021	694022	694023	694024

Determinand	Unit	RL	Accreditation	(n)				
PCB Congener 28	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 52	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 101	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 118	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 138	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 153	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PCB Congener 180	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total PCB (7 Congeners)	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - PCB (7 Congeners)						
DETS Report No: 24-00346	Date Sampled	11/01/24	11/01/24	11/01/24		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, S050 9HS	TP / BH No	WS6	WS7	WS8		
Project / Job Ref: 21248/ML	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 21248/ML	Depth (m)	0.70	1.00	0.20		
Reporting Date: 19/01/2024	DETS Sample No	694025	694026	694027		

Determinand	Unit	RL	Accreditation	(n)			
PCB Congener 28	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 52	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 101	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 118	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 138	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 153	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 180	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
Total PCB (7 Congeners)	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-00346	
Soils Ltd	
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	
Project / Job Ref: 21248/ML	
Order No: 21248/ML	
Reporting Date: 19/01/2024	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
694020	WS1	None Supplied	0.20	5.1	Brown gravelly sand with stones and concrete
694021	WS2	None Supplied	0.50	15.9	Light brown sandy clay
694022	WS3	None Supplied	0.20	14.2	Brown sandy gravel with stones and brick
694023	WS4	None Supplied	0.50	5.7	Brown sandy clay
694024	WS5	None Supplied	0.50	13.5	Light brown sandy clay with brick
694025	WS6	None Supplied	0.70	9.4	Brown sandy gravel with stones and concrete
694026	WS7	None Supplied	1.00	14.9	Light brown sandy clay with stones
694027	WS8	None Supplied	0.20	15.5	Brown sandy clay with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{u/s}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-00346

Soils Ltd

Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS

Project / Job Ref: 21248/ML

Order No: 21248/ML

Reporting Date: 19/01/2024

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

D Dried
AR As Received



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List of HWOL Acronyms and Operators	
DETS Report No: 24-00346	
Soils Ltd	
Site Reference: Land at Park Farm, North Stoneham Park, Stoneham Lane, Eatleigh, SO50 9HS	
Project / Job Ref: 21248/ML	
Order No: 21248/ML	
Reporting Date: 19/01/2024	

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Appendix D Human Health Risk Assessment

HUMAN HEALTH RISK ASSESSMENT

Introduction

The statutory definition of contaminated land was initially defined in the Environmental Protection Act 1990, ref. 1.1, which was introduced by the Environment Act 1995, ref. 1.2, and retained in the Environment Act 2021, ref 1.3, as;

‘Land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) pollution of controlled waters is being, or is likely to be, caused.’

The UK guidance on the assessment of contaminated land has developed as a direct result of the introduction of these Acts. The technical guidance supporting the original legislation was summarised in a number of key documents collectively known as the Contaminated Land Reports (CLRs). These have since been replaced or superseded by Land Contamination Risk Management (LCRM) 2021, ref 1.4 produced and administrated by the Environment Agency online through the .GOV.uk website <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> .

However, the basic definitions, methodology and guidance remain essentially the same utilizing the UK Contaminated Land Exposure Assessment Models (CLEA) as within the original CLR and planning guidance it replaces or supersedes.

In establishing whether a site fulfils the statutory definition of ‘contaminated land’ it remains necessary to identify, whether a pollutant linkage exists in respect of the land in question and whether the pollutant linkage:

- is resulting in significant harm being caused to the identified receptor in the pollutant linkage,
- presents a significant possibility of significant harm being caused to that receptor,
- is resulting in the pollution of the controlled waters which constitute the receptor, or
- is likely to result in such pollution.

A ‘pollutant linkage’ may therefore be defined as the confirmation of a link between a contaminant ‘source’ and a vulnerable at risk ‘receptor’ by means of a ‘pathway’ and that the risk is potentially significant. If there is no complete linkage, risk defaults to low to negligible and can never be potentially significant.

Assessment Methodology

A four-stage assessment process is followed for identifying potential pollutant linkages on a site. These stages are summarised in the table below:

No.	Process	Description
1	Hazard Identification	Establishing contaminant sources, pathways and receptors (the conceptual model).
2	Hazard Assessment	Analysing the potential for unacceptable risks (what linkages could be present, what could be the effects).
3	Risk Estimation	Trying to establish the magnitude and probability of the possible consequences (what degree of harm might result and to what receptors, and how likely is it).
4	Risk Evaluation	Deciding whether the risk is unacceptable in the context of existing and future proposals.

Stages 1 and 2 develop an initial '*conceptual model*' based upon information collated from desk-based available and existing site information and a walkover of the site as recommended in BS10175 and LCRM. The formation of any conceptual model is an iterative process and as such it should be updated and refined throughout each phase of the project to reflect any additional information obtained and unknowns being resolved and identify the potential contaminants of concern at the site, i.e. those with the potential to cause significant harm to identified receptors.

The extent of the desk studies and enquiries to be conducted should be in general accordance with BS10175 and other UK guidance to produce an initial conceptual model highlighting the known potential risks, remaining unknowns and contaminants of concern. The information from these enquiries is presented in a desk study or preliminary report with recommendations, if necessary, for further work based upon the conceptual model findings and any identified or unresolved unknowns.

If potential pollutant linkages or potentially significant unknowns are identified within the initial conceptual model, further site investigation and report will be recommended and usually required under planning. Such investigation should be based on and driven by the findings of the initial conceptual model and planned in general accordance with BS10175, LCRM and other current UK guidance where relevant. The number of exploratory holes and samples collected for analysis should be consistent with the size, extent and nature of the site, the identified contaminants of concern and the level of initial risk identified in the initial conceptual model. This will enable a contamination risk assessment to be conducted in accordance with current UK requirements, at which point the conceptual model can be updated and any relevant pollutant linkages can be further quantified and any remaining unknowns resolved. As previously this is an iterative process that may highlight or require additional investigation to resolve to the satisfaction of the regulator.

A two-stage investigation process may therefore be more appropriate where time constraints are less of an issue with the first intrusive investigation being conducted as an initial or screening assessment to confirm or validate the presence of potential sources on site identified in the initial conceptual model and to investigate if additional unknown sources not previously identified are present. This helps to define the scope, extent and requirements of a second more refined and targeted investigation to delineate wherever possible the extent of the identified contamination, contaminants of concern and/or remaining unknowns.

All site works should be undertaken in general accordance with the British Standards BS 10175, ref. 5, for environmental only investigations and BS 5930:2015, ref. 1.6, in the case of combined Geoenvironmental and/or Geotechnical investigations.

The results of analysis are compared initially against generic guidance values which are dependent on the proposed end-use of the development and which must ultimately be based on traceable, scientifically valid and justified exposure and chemical data using the UKCLEA methodology.

The end-use and therefore potential exposure pathways may be defined as one of the following under current UK guidance;

- Residential with homegrown produce i.e. typical low rise and low-density housing with gardens where vegetables and fruits may be grown for home consumption.
- Residential without homegrown produce i.e. low-density housing where no gardens are present where vegetables and fruits could be grown for home consumption.
- Allotments – i.e. areas where vegetables and fruits are grown for home consumption but are not specifically associated with a residential property.
- Public open space residential – i.e. grassed areas adjacent and/or directly related to high density housing and other common or communal open areas on which underlying soils could be exposed but on which vegetables and fruits are not grown for consumption.
- Public open space – i.e. areas such as parks, playing fields and other recreational areas to which public access is possible but otherwise to which there is no direct residential linkage.
- Commercial – i.e. industrial premises where there is limited exposure to soil and residents are not present on site.

Standard Land-use Scenarios

The standard land-use scenarios used to develop exposure models are further detailed in the following sections:

Residential with homegrown produce

Generic scenario assumes a house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

-
- Critical receptor is assumed to be a young female child (zero to six years old)
 - Exposure pathways include direct soil and indoor dust ingestion, consumption of home-grown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
-

A sub-set of the Residential land-use is **Residential without Homegrown produce**. The generic scenario assumes low density housing with communal landscaped gardens where the consumption of homegrown vegetables will not occur and the pathways of direct ingestion and produce inputs are suitably moderated.

Allotments

Areas of open space commonly made available to local users but remote from residential properties, but on which tenants may grow fruit and vegetables for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make only occasional accompanied visits.

Although some allotment holders may choose to keep animals on allotments, potential exposure to animal products is not currently considered within the CLEA model.

-
- Critical receptor is a young female child (zero to six years old)
 - Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours but at reduced exposure levels reflecting non-residential status.
-

Commercial

This generic scenario assumes a typical commercial or light industrial property at which employees spend most time indoors and are involved in office-based or relatively light physical work.

-
- Critical receptor is a working female adult (aged 16 to 65 years old).
 - Exposure duration is over working lifetime
 - Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours but exposure reduced to reflect non-residential nature and general lack of open spaces.
-

Public Open Space within Residential Area

This generic scenario refers to any grassed area up to 0.05 ha that is associated with residential properties but is not for their exclusive use and on which no fruit or vegetables are grown for home consumption.

-
- Grassed area of up to 0.05 ha and a considerable proportion of this (up to 50%) may be bare soil which can be interacted with directly
 - Predominantly used by children for play and/or access
 - Sufficiently close proximity to home for tracking back of soil to occur, thus indoor exposure pathways apply
-

-
- older children chosen as the critical receptor on basis that they will use site most frequently (age class 4-9 years)
-
- ingestion rate assumed to be 75 mg.day⁻¹
-

Public Open Space Park

This generic scenario refers to any public park or grassed space that is more than 0.5ha in area:

-
- Public park (>0.5 ha), predominantly grassed and may also contain children's play equipment and border areas of soil containing flowers or shrubs (75% assumed cover)
-
- Female child age classes 1-6
-
- Soil ingestion rate of 50 mg.day⁻¹
-
- Occupancy period outdoors = 2 hours.day⁻¹
-
- Exposure frequency of 170 days.year⁻¹ for age classes 2-18 and 85 days.year⁻¹ for age class 1
-
- Outdoor exposure pathways only (no tracking back of soils).
-

Human Health Generic Quantitative Risk Assessment (GQRA) involves the comparison of contaminant concentrations measured in soil at the site with Generic Assessment Criteria (GAC) generated using the CLEA model based on the exposure and land use scenario assumptions noted above.

GAC's are deliberately conservative values adopted to ensure that they are applicable to the majority of possible contaminated sites and below which there is considered a low to negligible risk to identified human health receptors, i.e. there can be no harm. These values may be published Contaminated Land Exposure Assessment Model (CLEA) derived GAC's derived by a competent third party or the Environment Agency / DEFRA. It is imperative to the risk assessor to understand the uncertainties and limitations associated with these GAC's to ensure that they are used appropriately.

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses or the contaminant is susceptible to wide variation depending on factors such as form and bioavailability, then a Detailed Quantitative Risk Assessment (DQRA) may be undertaken to develop site specific or remediation values for relevant soil contaminants based on site and contaminant specific conditions.

In 2014, the publication of Category 4 Screening Levels (C4SL), refs 1.8 and 1.9, as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3) ref 1.7 used in the generation of SGVs. C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern. Where a C4SL has been published, Soils Limited has adopted them as GAC for these six substances.

For all other substances the soils will be compared to Suitable For Use Levels (S4ULs) published by LQM, ref. 1.10, which were developed for around 85 substances and are

intended to enable a screening assessment of the risks posed by soil quality on development sites. The updated LQM/CIEH GAC publication was developed to accommodate recent developments in the understanding of chemical, toxicological and routine exposure to soil-based contaminants.

Where no S4UL or C4SL is available, assessment criteria may be generated using the Contaminated Land Exposure Assessment (CLEA) Software Version 1.07, ref. 1.11, Toxicological and physico-chemical/fate and transport data used to generate the criteria has been derived from a hierarchy of data sources as follows:

1. Environment Agency or Department of Environment Food and Rural Affairs (DEFRA) documents;
2. Other documents produced by UK Government or state organisations;
3. European institution documents;
4. International organisation documents;
5. Foreign government institutions.

In the case of the majority of contaminants considered, the toxicological data has been drawn originally from the relevant CLR 9 TOX report, or updated toxicological data published by the Environment Agency (2009), where available. Where no TOX report is available reference has been made to appropriately determined health criteria values, derived from the above-noted hierarchy, as this is considered to represent appropriate peer reviewed data sources. Similarly, fate and transport data should also be determined by reference to appropriate sources and the CLEA model assumptions.

Chemical laboratory test results are processed as follows. A statistical analysis of the results is conducted, as detailed in CIEH and CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', ref. 1.12. Individual concentrations are then compared to the selected guideline values to identify and isolate concentrations of contaminants that are in excess of the selected screening low or no risk criteria.

Where the risk estimation identifies significant concentrations of one or more contaminants, further risk evaluation needs to be undertaken often as a site specific DQRA in line with current guidance to determine and confirm if the identified exceedances are significant in the context of the proposed development or activity.

References

- 1.1 The Environmental Protection Act, Part IIA, Section 78, DoE 1990.
- 1.2 Environment Act 1995, Section 57, DoE 1995.
- 1.3 Environment Act 2021 OEP 2021.
- 1.4 Land Contamination Risk Management Gov.UK (EA) 2021
- 1.5 BS 10175: 2011+A2:2017 '*Investigation of potentially contaminated sites. Code of practice*', British Standards Institute, 2017
- 1.6 BS 5930: 2015+A1:2020 '*Code of practice for ground investigations*', British Standards Institute, 2015
- 1.7 Science Report SC050021/SR3 '*Updated technical background to the CLEA model*', Environment Agency, 2008
- 1.8 DEFRA SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination, published March 2014.
- 1.9 Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). '*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*', Revision 2, DEFRA research project SP1010.
- 1.10 The LQM/S4ULs for Human Health Risk Assessment, Nathanail P, McCaffery C, Gillett A, Ogden R, and Nathanail J, Land Quality Press, Nottingham, published 2015.
- 1.11 CLEA '*Software Version 1.071*' (downloaded from the CL:AIRE website , <https://www.claire.co.uk/home/news/44-risk-assessment/178-soil-guideline-values>)
- 1.12 CIEH '*Guidance on Comparing Soil Contamination Data with a Critical Concentration*', Chartered Institute of Environmental Health (CIEH) and Contaminated Land: Applications in Real Environments (CL:AIRE), May 2008.

Land Use			Residential With or Without Plant Uptake									Public Open Space (POS)										Name	Authority	Date			
			With			Without			Allotments			Commercial			Residential						Park						
			SOM	1.0	2.5	6	1	2.5							6	1	2.5	6	1	2.5	6				1	2.5	6
Type	Contaminants	Species	Year																								
Metals	Antimony		2010					550						7500								EIC/AGS/ CL:AIRE	EIC/AGS/ CL:AIRE	2010			
	Arsenic		2014			37		40			49			640			79		168		C4SL	DEFRA	2014				
			2015			37		40			40			640			79		170		S4UL	LQM/CIEH	2015				
	Barium		2010					1300						22000							EIC/AGS/ CL:AIRE	EIC/AGS/ CL:AIRE	2010				
	Beryllium		2015			1.7		1.7			35			12			2.2		63		S4UL	LQM/CIEH	2015				
	Boron		2015			290		11000			45			240000			21000		46000		S4UL	LQM/CIEH	2015				
	Cadmium		2015			11		85			1.9			190			120		532		S4UL	LQM/CIEH	2015				
	Chromium	III	2014			26		149			4.9			410			220		880		C4SL	DEFRA	2014				
			2015			910		910		18000		8600		1500		33000		S4UL	LQM/CIEH	2015							
			2014			21		21		170		49		23		250		C4SL	DEFRA	2014							
		VI	2015			6		6			1.8			33			7.7		220		S4UL	LQM/CIEH	2015				
	Copper		2015			2400		7100			520			68000			12000		44000		S4UL	LQM/CIEH	2015				
	Lead					210		310			84			6000			760		1400		C4SL	DEFRA	2014				
	Mercury	Elemental	2012			1.0		1.0			26			26								SGV	DEFRA	2012			
			2015			1.2		1.2		21		58			16		30		S4UL	LQM/CIEH	2015						
		Inorganic	2012			170		170			80			36000								SGV	DEFRA	2012			
			2015			40		56		19		1100			120		240		S4UL	LQM/CIEH	2015						
		Methyl	2012			11		11			8			410								SGV	DEFRA	2012			
			2015			11		15			6			320			40		68		S4UL	LQM/CIEH	2015				
	Molybdenum		2010						670						17000						EIC/AGS/ CL:AIRE	EIC/AGS/ CL:AIRE	2010				
	Nickel		2012			130		130			230			1800								SGV	DEFRA	2012			
			2015			130		180			53			980			230		800		S4UL	LQM/CIEH	2015				
	Selenium		2012			350		350			120			13000								SGV	DEFRA	2012			
			2015			250		430			88			12000			1100		1800		S4UL	LQM/CIEH	2015				
	Vanadium		2015			410		1200			91			9000			2000		5000		S4UL	LQM/CIEH	2015				
	Zinc		2015			3700		40000			620			730000			81000		170000		S4UL	LQM/CIEH	2015				
BTEX & MTBE	Benzene		2012			0.33		0.33			0.07			95							SGV	DEFRA	2012				
			2014			0.87		3.3			0.18			98			140		230		C4SL	DEFRA	2014				
			2015	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73	90	100	110	S4UL	LQM/CIEH	2015			
	Toluene		2012			610		610			120			4400								SGV	DEFRA	2012			
			2015	130	290	660	880	1900	3900	22	51	120	65000	110000	180000	56000	56000	56000	87000	95000	100000	S4UL	LQM/CIEH	2015			
	Ethylbenzene		2012			350		350			90			2800								SGV	DEFRA	2012			
			2015	47	110	260	83	190	440	16	39	91	4700	13000	27000	24000	24000	25000	17000	22000	27000	S4UL	LQM/CIEH	2015			
	Xylenes	o-xylene	2012			250		250			160			2600								SGV	DEFRA	2012			
			2015	60	140	330	88	210	480	28	67	160	6600	15000	33000	41000	42000	43000	17000	24000	33000	S4UL	LQM/CIEH	2015			
		m-xylene	2012			240		240			180			3500								SGV	DEFRA	2012			
			2015	59	140	320	82	190	450	31	74	170	6200	14000	31000	41000	42000	43000	17000	24000	32000	S4UL	LQM/CIEH	2015			
		p-xylene	2012			230		230			160			3200								SGV	DEFRA	2012			
			2015	56	130	310	79	180	310	29	69	160	5900	14000	30000	41000	42000	43000	17000	23000	31000	S4UL	LQM/CIEH	2015			
Petroleum Hydrocarbons Fractions	Aliphatic >C5 - C6		2015	42	78	160	42	78	160	730	1700	3900	3200	5900	12000	570000	590000	600000	95000	130000	180000	S4UL	LQM/CIEH	2015			
	Aliphatic >C6 - C8		2015	100	230	530	100	230	530	2300	5600	13000	7800	17000	40000	600000	610000	620000	150000	220000	320000	S4UL	LQM/CIEH	2015			
	Aliphatic >C8 - C10		2015	27	65	150	27	65	150	320	770	1700	2000	4800	11000	13000	13000	13000	14000	18000	21000	S4UL	LQM/CIEH	2015			
	Aliphatic >C10 - C12		2015	130	330	760	130	330	770	2200	4400	7300	9700	23000	47000	13000	13000	13000	21000	23000	24000	S4UL	LQM/CIEH	2015			
	Aliphatic >C12 - C16		2015	1100	2400	4300	1100	2400	4400	11000	13000	13000	59000	82000	90000	13000	13000	13000	25000	25000	26000	S4UL	LQM/CIEH	2015			
	Aliphatic >C16 - C35		2015	65000	92000	110000	65000	92000	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	S4UL	LQM/CIEH	2015			
	Aliphatic >C35 - C44		2015	65000	92000	140000	65000	92000	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	S4UL	LQM/CIEH	2015			
	Aromatic >C5 - C7		2015	70	140	300	370	690	1400	13	27	57	26000	46000	86000	56000	56000	56000	76000	84000	92000	S4UL	LQM/CIEH	2015			
	Aromatic >C7 - C8		2015	130	290	660	860	1800	3900	22	51	120	56000	110000	180000	56000	56000	56000	87000	95000	100000	S4UL	LQM/CIEH	2015			
	Aromatic >C8 - C10		2015	34	83	190	47	110	270	8.6	21	51	3500	8100	17000	5000	5000	5000	7200	8500	9300	S4UL	LQM/CIEH	2015			

Land Use			Residential With or Without Plant Uptake									Allotments		Commercial			Public Open Space (POS)									Name	Authority	Date
			With			Without			Residential								Park											
			SOM	1.0	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6	1	2.5	6							
Type	Contaminants	Species	Year																									
	Aromatic >C10 - C12		2015	74	180	380	250	590	1200	13	31	74	16000	28000	34000	5000	5000	5000	9200	9700	10000	S4UL	LQM/CIEH	2015				
	Aromatic >C12 - C16		2015	140	330	660	1800	2300	2500	23	57	130	36000	37000	38000	5100	5100	5000	10000	10000	10000	S4UL	LQM/CIEH	2015				
	Aromatic >C16 - C21		2015	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800	S4UL	LQM/CIEH	2015				
	Aromatic >C21 - C35		2015	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015				
	Aromatic >C34 - C44		2015	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015				
	Aliphatic + Aromatic >C44 - C70			1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900	S4UL	LQM/CIEH	2015				
Polycyclic Aromatic Hydrocarbons (PAH' s) (mg/kg)	Acenaphthene		2015	210	510	1100	3000	4700	6000	34	85	200	84000	97000	100000	15000	15000	15000	29000	30000	30000	S4UL	LQM/CIEH	2015				
	Acenaphthylene		2015	170	420	920	2900	4600	6000	28	69	160	83000	97000	100000	15000	15000	15000	29000	30000	30000	S4UL	LQM/CIEH	2015				
	Anthracene		2015	2400	5400	11000	31000	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000	S4UL	LQM/CIEH	2015				
	Benzo(a)anthracene		2015	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29	49	56	62	S4UL	LQM/CIEH	2015				
	Benzo(a)pyrene		2014			5			5.3			5.7			76			10		21	C4SL	DEFRA	2014					
			2015	2.2	2.7	3	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7	11	12	13	S4UL	LQM/CIEH	2015				
	Benzo(b)fluoranthene		2015	2.6	3.3	3.7	3.9	4.0	4.0	0.99	2.1	3.9	44	44	45	7.1	7.2	7.2	13	15	16	S4UL	LQM/CIEH	2015				
	Benzo(ghi)perylene		2015	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	S4UL	LQM/CIEH	2015				
	Benzo(k)fluoranthene		2015	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190	370	410	440	S4UL	LQM/CIEH	2015				
	Chrysene		2015	15	22	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57	93	110	120	S4UL	LQM/CIEH	2015				
	Dibenz(a,h)anthracene		2015	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.43	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4	S4UL	LQM/CIEH	2015				
	Fluoranthene		2015	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100	6300	6300	6400	S4UL	LQM/CIEH	2015				
	Fluorene		2015	170	400	860	2800	3800	4500	27	67	160	63000	68000	71000	9900	9900	9900	20000	20000	20000	S4UL	LQM/CIEH	2015				
	Indeno(1,2,3-cd)pyrene		2015	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82	150	170	180	S4UL	LQM/CIEH	2015				
	Naphthalene		2015	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190	460	1100	4900	4900	4900	1200	1900	3000	S4UL	LQM/CIEH	2015				
	Phenanthrene		2015	95	220	440	1300	1500	1500	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300	S4UL	LQM/CIEH	2015				
	Pyrene		2015	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000	S4UL	LQM/CIEH	2015				
	Coal Tar(Bap as surrogate matter)		2015	0.79	0.98	1.1	1.2	1.2	1.2	0.32	0.67	1.2	15	15	15	2.2	2.2	2.2	4.4	4.7	4.8	S4UL	LQM/CIEH	2015				
Chloroalkanes & alkenes	1,2 Dichloroethane		2015	0.0071	0.011	0.019	0.0092	0.013	0.023	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28	S4UL	LQM/CIEH	2015				
	1,1,1 Trichloroethane		2015	8.8	18	39	9	18	40	48	110	240	660	1300	3000	140000	140000	140000	57000	76000	100000	S4UL	LQM/CIEH	2015				
	1,1,2,2 Tetrachloroethane		2015	1.6	3.4	7.5	3.9	8	17	0.41	0.89	2	270	550	1100	1400	1400	1400	1800	2100	2300	S4UL	LQM/CIEH	2015				
	1,1,1,2 Tetrachloroethane		2015	1.2	2.8	6.4	1.5	3.5	8.2	0.79	1.9	4.4	110	250	560	1400	1400	1400	1500	1800	2100	S4UL	LQM/CIEH	2015				
	Tetrachloroethene		2015	0.18	0.39	0.9	0.18	0.4	0.92	0.65	1.5	3.6	19	42	95	1400	1400	1400	810	1100	1500	S4UL	LQM/CIEH	2015				
			2021	0.31	0.7	1.6	0.32	0.71	1.6	2	4.8	11	24	55	130	3200	3300	3400	1400	1900	2500	C4SL	CLAIRE	2021				
	Tetrachloromethane (Carbon Tetrachloride)		2015	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400	S4UL	LQM/CIEH	2015				
	Trichloroethene (TCE)		2015	0.016	0.034	0.075	0.017	0.036	0.08	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120	S4UL	LQM/CIEH	2015				
			2021	0.0093	0.02	0.043	0.0097	0.02	0.045	0.032	0.072	0.16	0.73	1.5	3.4	76	78	79	41	54	69	C4SL	CLAIRE	2021				
	Trichloromethane		2015	0.91	1.7	3.4	1.2	2.1	4.2	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100	S4UL	LQM/CIEH	2015				
Vinyl Chloride (Chloroethene)		2015	0.00064	0.00087	0.0014	0.00077	0.001	0.0015	0.00055	0.001	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4	S4UL	LQM/CIEH	2015					
		2021	0.0064	0.01	0.017	0.015	0.019	0.029	0.0017	0.0031	0.0058	1.1	1.4	2.2	7.8	7.8	7.8	18	19	19	C4SL	CLAIRE	2021					
Explosives	2,4,6 Trinitrotoluene		2015	1.6	3.7	8.1	65	66	66	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270	S4UL	LQM/CIEH	2015				
	RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)		2015	120	250	540	13000	13000	13000	17	38	85	210000	210000	210000	26000	26000	27000	49000	51000	53000	S4UL	LQM/CIEH	2015				
	HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)		2015	5.7	13	26	6700	6700	6700	0.86	1.9	3.9	110000															

Land Use			Residential With or Without Plant Uptake									Public Open Space (POS)									Name	Authority	Date	
			With			Without			Allotments			Commercial			Residential			Park						
			SOM	1.0	2.5	6	1	2.5							6	1	2.5	6	1	2.5				6
Type	Contaminants	Species	Year																					
	I,3-Dichlorobenzene		2015	0.4	1	2.3	0.44	1.1	2.5	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470	S4UL	LQM/CIEH	2015
	I,4-Dichlorobenzene		2015	61	150	350	61	150	350	15	37	88	4400	10000	25000	17000	17000	1700	36000	36000	36000	S4UL	LQM/CIEH	2015
	1,2,3,-Trichlorobenzene		2015	1.5	3.6	8.6	1.5	3.7	8.8	4.7	12	28	102	250	590	1800	1800	1800	770	1100	1600	S4UL	LQM/CIEH	2015
	1,2,4,-Trichlorobenzene		2015	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700	2600	4000	S4UL	LQM/CIEH	2015
	1,3,5,-Trichlorobenzene		2015	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380	580	860	S4UL	LQM/CIEH	2015
	1,2,3,4,-Tetrachlorobenzene		2015	15	36	78	24	56	120	4.4	11	26	1700	3080	4400	830	830	830	1500	1600	1600	S4UL	LQM/CIEH	2015
	1,2,3,5,- Tetrachlobenzene		2015	0.66	1.6	3.7	0.75	1.9	4.3	0.38	0.9	2.2	49	120	240	78	79	79	110	120	130	S4UL	LQM/CIEH	2015
	1,2,4, 5,- Tetrachlobenzene		2015	0.33	0.77	1.6	0.73	1.7	3.5	0.06	0.16	0.37	42	72	96	13	13	13	25	26	26	S4UL	LQM/CIEH	2015
	Pentachlorobenzene		2015	5.8	12	22	19	30	38	1.2	3.1	7	640	770	830	100	100	100	190	190	190	S4UL	LQM/CIEH	2015
	Hexachlorobenzene		2015	1.8	3.3	4.9	4.1	5.7	6.7	0.47	1.1	2.5	110	120	120	16	16	16	30	30	30	S4UL	LQM/CIEH	2015
Phenols & Chlorophenols																								
	Phenols		2012	420			420			280			3200									SGV	DEFRA	2012
			2015	120	200	380	440	690	1200	23	42	83	440	690	1300	440	690	1300	440	690	1300	S4UL	LQM/CIEH	2015
	Chlorophenols (4 Congeners)		2015	0.87	2	4.5	94	150	210	0.13	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100	S4UL	LQM/CIEH	2015
	Pentachlorophenols		2015	0.22	0.52	1.2	27	29	31	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120	S4UL	LQM/CIEH	2015
Others																								
	Carbon Disulphide		2015	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700	S4UL	LQM/CIEH	2015
	Hexachloro-1,3-Butadiene		2015	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51	S4UL	LQM/CIEH	2015
	Sum of PCDDs, PCDFs and dioxin-like PCB's.		2012	8			8			8			240									SGV	DEFRA	2012
NOTE																								
	Priority	Guideline (mg kg ⁻¹)																						
	1	Site Specific Assessment Criteria (SSAC) (Soils Limited)																						
	2	2014: Category 4 Screening Level (C4SL) (Contaminated Land: Application in Real Environment (CL:ARE), 2014 and 2021)																						
	3	2012: Soil Guideline Value (SGV) (Environment Agency, 2009)																						
	4	2015: Suitable 4 Use Level (S4UL) (Nathanail <i>et al</i> , 2015)																						
For Generic Risk Assessment, the values in Bold should have priority unless site specific, Client or regulatory requirements dictate otherwise – which must be justified																								
Table reviewed January 2022																								

Appendix E ABP Asbestos in soil Risk Assessment and Remediation Report

Asbestos in soil Risk Assessment and Remediation Report

Site:

Stoneham Continuing Care Retirement Community
Stoneham
Eastleigh
Hampshire
SO50 9HS

Client:

Meedhurst Project Management
Sterling House
High Street
Ascot
Berkshire
SL5 7HG

Project No. 15251

Report 1

Report Issue Date: 07/03/2024

Sara Mason

MSc Tech IOSH MFAAM

ABP Associates Ltd is a UKAS Accredited Inspection Body for the Surveying of Asbestos in Premises

A.B.P. Associates Limited, Registered in England No. 4128328

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1.0 INTRODUCTION

ABP Associates Limited have been requested by Michael Corby of Meedhurst Project Management to prepare an asbestos in soil risk assessment and remediation report based on recent sampling by Soils Limited.

Asbestos contamination has been located during recent site investigation works at Stoneham Continuing Care redevelopment site. Small quantities of loose chrysotile and amosite fibre has been detected in the soil at shallow depths, as well as visually identifiable asbestos cement in stockpiled soils. This report details an asbestos remediation strategy incorporating suitable risk assessments and safe working practices to work within the requirements of Control of Asbestos Regulations 2012 (CAR 2012) during disturbance and remediation of the soils.

The aim of the remediation works is to remove the receptor pollutant linkages, which requires removal of the source of contamination and therefore preventing any future risk to site occupants.

2.0 BACKGROUND INFORMATION

The following documents have been made available to and reviewed by ABP Associates Ltd in the production of this report.

- Stockpile Sampling Letter Report, Omina; Ref: A11580/211018/L1, 29th October 2021.
- Additional Chemical Testing Letter Report, Omina; Ref: A11580/230525/L2, 2nd June 2023
- Main Investigation Report at Stoneham Continuing Care Retirement Community, Soils Limited; Ref: 17624/MIR Rev1.04_R27, November 2023.
- Additional Contamination Investigation and Remediation Method Statement at Stoneham Continuing Care Retirement Community, Soils Limited; Ref: 21248/RMS Rev1.2, February 2024.

It is understood that asbestos was discovered in stockpiled soils and buried material during Omina site sampling works in October 2021 and June 2023. Asbestos was detected during analysis in the form of chrysotile fibre bundles and asbestos cement. It is understood that these contaminated soils have since been removed from site and disposed of appropriately.

Soils Limited initially carried out a site investigation across the proposed redevelopment area dated November 2023. Additional more targeted sampling was carried out in January 2024 around the two remaining buildings and a stockpile area. The extent of the asbestos contamination is detailed below.

3.0 EXTENT OF ASBESTOS CONTAMINATION

Asbestos has been located within the surface or near surface soils at several locations across the site. The results from the Soils Limited Main site investigation (MIR) and Additional Sampling and Remediation Method Statement (RMS) reports are summarised in the table below:

Location	Depth	Asbestos type	Asbestos form	Quantity (% w/w)
TPADD3 (MIR) ¹	Surface	Chrysotile	Cement	Bulk sample [#]
HP01 (MIR)	Surface	Chrysotile	Cement	Bulk sample [#]
HP01 (MIR)	0.3 (m bgl)	Chrysotile	Bundles	N/A*
HP04 (MIR)	Surface	Chrysotile	Cement	Bulk sample [#]
WS105 (MIR)	0.1 (m bgl)	Chrysotile	Bundles	N/A*
WS3 (RMS) ²	0.2 (m bgl)	Chrysotile	Bundles	0.009
HDTP14 (RMS)	0.2 (m bgl)	Amosite	Free fibres	0.006

*These soil samples were not quantified during the MIR.

[#]Bulk samples were taken of visually identifiable ACMs.

¹ Data extracted from Soils Limited MIR, Ref: 17624/MIR Rev1.04_R27, November 2023

² Data extracted from Soils Limited RMS, Ref: 21248/RMS Rev1.0, February 2024.

4.0 SOIL RISK ASSESSMENT

It is understood the site will be redeveloped into a retirement complex with associated hard and soft landscaped communal areas.

Asbestos cement fragments and loose amosite and chrysotile fibres have been detected in the surface and near surface soils in locations adjacent buildings and in stockpiled soil. It is likely these soils will be disturbed during future groundworks associated with the redevelopment. Loose asbestos fibres in dry soil are likely to release airborne asbestos fibres and create a potential health hazard when disturbed.

A JIWG Decision Support Tool for the Categorisation of Work Activities Involving Asbestos in Soil or Construction & Demolition Materials in accordance with CAR 2012 was run for the disturbance of asbestos contaminated soils, using loose amosite fibres at 0.006% w/w as a 'worst case scenario'. The current hazard and exposure ranking is classified as a medium risk and the disturbance of the soils would be non-licensable work (NLW) for the work with asbestos containing soils (refer to Appendix 2).

We recommend that NLW asbestos trained operatives undertake a watching brief and implement control measures during disturbance of soils. The operatives can react if visible bonded asbestos is discovered, and implement dust suppression techniques (i.e. dampening down of soils during dry periods).

5.0 REMEDIATION STRATEGY

- The stockpiled soil at HP01 and HP04 will require removal from site. The presence of visible asbestos cement would currently classify this soil as hazardous waste. It may be possible to remove the visible asbestos content at HP01 by handpicking of asbestos cement fragments, which could reduce the classification to non-hazardous waste and hence reduce disposal

costs. It is understood it would not be possible to do this at HP04 due to elevated PAH levels.

- Surface asbestos cement contamination at TPADD3 should be removed as a hotspot and disposed of as hazardous waste. A surface skim should also be carried out of the surface soils to ensure all contamination is removed.
- All other locations, WS105, WS3 and HFTP14 should be removed as hotspots. It is recommended the soil is excavated in these locations to a depth of at least 0.3m bgl. Provided no visible ACMs are uncovered, and subject to WAC/ chemical testing, the soil could be disposed of as non-hazardous waste due to no visible ACM content and analysis results <0.1% w/w asbestos.

6.0 REMEDIATION METHODOLOGY

The following remediation works are proposed:

1. The contractor will provide a written risk assessment and method statement for approval before work commences.
2. Employ a watching brief during excavation of soil and removal of stockpiles.
3. Groundworkers should have as a minimum in date asbestos awareness training.
4. Set up a suitable decontamination area for NLW operatives.
5. Implement fibre suppression with a water bowser, depending on weather conditions.
6. Handpick under controlled conditions visible bonded asbestos, if found (not at HP04).
7. Dispose of asbestos waste as hazardous waste.
8. Test remaining soils in remediation areas to ensure contamination removed.

The proposed remediation works are outlined in detail below.

6.1 Site Set Up and Welfare

The work area should be suitably fenced preventing persons entering the site that are not involved with the works. Welfare facilities should be setup and provided by the client.

In line with good practice, an area should be designated to change into disposable type 5/6 coveralls, respirator fitted with P3 filter and work boots (cleanable boots with no laces i.e. wellington boots) to prevent any back tracking of soils into welfare facilities or vehicles.

Any handpicked bonded asbestos will be double bagged and disposed of as asbestos waste (in accordance with the Hazardous Waste Regulations) along with any used overalls and mask filters. A consignment note should be provided to the client for the health and safety file for any soils and asbestos waste disposed of offsite during the works.

6.2 Site personnel

All site personnel should have a suitable site induction highlighting the potential asbestos risk. Only operatives specifically trained (CAT B Non-Licensable Work, Reg 10 CAR 2012) for works with asbestos in soil will be employed to conduct the watching brief and handpicking of asbestos cement products under locally controlled conditions, if applicable.

Operatives conducting the watching brief on the ground and/or handpicking any asbestos cement will don disposable coveralls (Type 5/6), cleanable safety footwear

(no laces) and gloves and have available a half face mask fitted with a P3 filter which they will be face fit tested for.

A personal decontamination procedure will be in place for all operatives when leaving the work area. This will include washing and/or removal of work boots.

6.3 Asbestos remediation methodology

The remediation methodology has been developed from current CIRIA guidance as well as using processes that ABP have found successful working on similar remediation projects;

8.4.1 Soil disturbance during remediation works

A trained watching brief should attend all times during the soil remediation works. The soil from the stockpile areas should be slowly excavated and loaded onto suitable waste disposal vehicles which are able to cover the material during transportation.

Contaminated soil around the buildings should be slowly excavated to ensure it can be inspected adequately by the watching brief. If any asbestos cement is uncovered during this process, it could be handpicked by the watching brief and disposed of as asbestos waste.

A dust suppression spray will be available throughout the above processes to ensure the soil is kept damp and potential fibre release kept to a minimum.

8.4.2 Testing post remediation works

Once the stockpiles and the hotspots around the buildings have been removed, the underlying soil should be inspected, and soil samples taken for analysis to ensure all contamination has been removed. If the surface soils test positive for asbestos, then further excavation and removal of soil may be required.

7.0 DISCOVERY STRATEGY IF UNEXPECTED ACMs ARE UNCOVERED

If ACMs other than asbestos cement are uncovered, the works should stop immediately in that area until a suitably qualified person is able to attend and evaluate the risk. Samples will be taken if necessary and barriers put around to identify and prevent access. Where possible any such occurrences will be removed as non-licensed work but in the unlikely event that visible high-risk products such as AIB or insulation are uncovered the works may require a licensed contractor and be notifiable to the HSE.

Appendix 1
Site location plans

Stoneham – Site location of asbestos in soils

Plan combining positive asbestos locations (extracted from Soils Limited RMS).

Soils Limited 21248/RMS Rev 1.0

Stoneham RMS

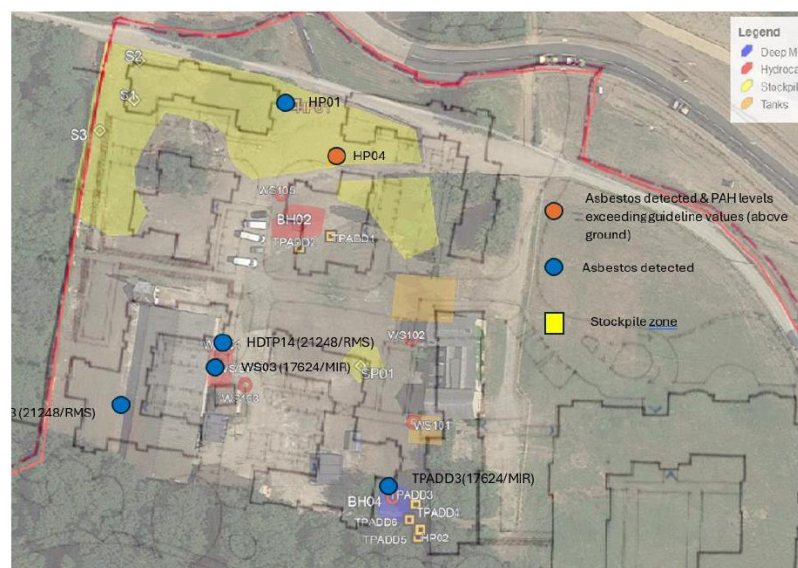


Figure 4 – Indicative Remedial Plan

Project
Stoneham Continuing Care
Retirement Community, Stoneham,
Eastleigh, Hampshire SO50 9HS

Client
Opus Stonham Developments

Date
February 2024

Job Number
21248

Stockpile zone (coloured in Yellow) and blue/orange circle areas - WS03 (21248/RMS), HDT14 (21248/RMS), TPADD3 (17624/MIR) and WS03 (17624/MIR) – Removal of spoil and wastes from the site before development by consulting asbestos-competent specialist and competent waste person before works to determine appropriate measures and any additional analysis is required to comply with the current guidance and legislation (CAR2012). Verification sampling and testing after stockpile and waste are removed.

Appendix 2

JIWG Decision Support Tools

The decision tool has been run to determine the work category for the disturbance of asbestos containing soils. It is based on the information in the Soils Limited analysis results from the main site investigation and follow up sampling and testing.

Work categories DST (Worst case scenario - Loose Amosite fibres 0.006 %w/w)

JIWG
Joint Industry Working Group
Asbestos in Soil and Construction & Demolition Materials

Project Reference	ABP 15251
Site Name	Stoneham Continuing Care Retirement Community
Client	Meedhurst Project Management
Run by	Natalie O'Rourke
Date	23-Feb-24
Scenario details	Disturbance of asbestos containing soils

Decision Support Tool for CAR2012 Work Categories

Stage 1
Hazard Factors

Select ACM type (run model for each type to generate 'Worst Case' output)
Extent of degradation of ACMs at outset of work
Friability and degree of bonding by matrix (ACM matrix, not ground materials)
Distribution of Visible Asbestos Across Affected Area
Amount of asbestos fibre in selected ACM/fibre type as % of host material

Sub-total

Hazard ranking

Free dispersed fibres/fibre bundles	2
Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
No visible ACMs/fibre bundles	0
Very Low quantities - <0.001 to 0.01 %wt/wt	1

Note: the asbestos licensing regime is unaffected by the type of asbestos fibre present in ACMs

Score

11

Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.



Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Stage 2

Exposure Factors

Score

Anticipated airborne fibre concentration - Control Limit or SALI?

<0.01 fibres/ml

1

Anticipated duration of exposure to asbestos

> 2 hours in a 7 day period and Up to 10 hours in a day (e.g. full time occupational exposure)

4

Activity type and effect on deterioration of ACMs during work

Sampling, manual or mechanical (significant deterioration expected)

2

Best description of primary host material matrix (soil/made ground)

Made Ground - Recycled Aggregate, Track Ballast

4

Respirable fibre index for ACM - RIVM report 711701034 (2003)

High

4

Sub-total

15

Exposure ranking

Medium

Combined hazard and exposure ranking

26

Medium



Joint Industry **Working Group**

Asbestos in Soil and Construction & Demolition Materials

Stage 3

Risk Assessment Outputs

Probable Licensing Status

Non-Licensed Work

RPE*

EN140 with P3 filter half mask

Dust Suppression**

Localised mechanical dust suppression

Hygiene/Decontamination***

Localised and enhanced personal decontamination facilities

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.

**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)

***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

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