

ADDITIONAL SITE INVESTIGATION & REMEDIATION STRATEGY

AT

BROOMLANDS FARM, ROBIN HOOD LANE, WARNHAM, WEST SUSSEX, RH12 3RR

IAN BAILEY
KALEX LIMITED

The Mill House
Albury Road
Little Hadham
Ware, SG11 2DQ

Report Title:	Additional Site Investigation & Remediation Strategy – Broomlands Farm, Robin Hood Lane, Warnham, West Sussex, RH12 3RR
Report Reference No:	LQ1146-R3

Prepared For:	Cordial Investments Ltd, Longfrey Cottage, Dorking Road, Chilworth, Guildford, GU4 8RH
Project Reference No:	LQ1146

Prepared by:	Kalex Limited The Mill House Albury Road Little Hadham Ware, SG11 2DQ Tel: 01279 771353

	Issue 1	Issue 2	Issue 3
Remarks	Version 1	Client Comments	Final issue
Date	29/11/2023	26/01/2024	27/08/2024
Prepared by:	Jeremy Head CEnv, FGS	Jeremy Head CEnv, FGS	Jeremy Head CEnv, FGS
Approved:	Ian Bailey MCIWM	Ian Bailey MCIWM	Ian Bailey MCIWM

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1. INTRODUCTION

1.1 Appointment

Kalex Limited was commissioned by Cordial Investments Ltd (the client), to undertake additional site investigation for contamination, and provide remediation recommendations for redevelopment at Broomlands Farm, Robin Hood Lane, Warnham, West Sussex, RH12 3RR.

1.2 Background

Planning permission reference DC/20/0716 was granted by Horshanm District Council in July 2020 for a residential scheme involving partial demolition of the central part of the agricultural building and conversion of the remaining parts of the building to create 4 dwellings with associated external alterations, car parking and landscaping. The proposed layout is on the **Proposed Landscape** Plan appended.

Planning permission Condition 6 relates to contamination and is reproduced below:

6 Pre-Commencement Condition: Prior to the commencement of development approved by this planning permission (or such other date or stage in development as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination, including asbestos contamination, of the site and extant structures shall each be submitted to and approved, in writing, by the local planning authority:
a) A preliminary risk assessment which has identified:

- all previous uses
- potential contaminants associated with those uses
- a conceptual model of the site indicating sources, pathways and receptors
- potentially unacceptable risks arising from contamination at the site.

b) A site investigation scheme, based on (a) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.
c) The site investigation results and the detailed risk assessment (b) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.
Any changes to these components require the express consent of the local planning authority. The scheme shall be implemented as approved.

16 Pre-Occupation Condition: Prior to the first occupation of any part of the development hereby permitted, a contamination verification plan shall be submitted to and approved, in writing, by the Local Planning Authority. The verification plan shall provide details of the data collected in order to demonstrate that the works set out in Condition 6 are complete, and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action where required.

27 Regulatory Condition: No soils shall be imported or re-used within the development site until the developer has submitted details of the chemical testing and assessment of the soils which demonstrates the suitability of the soils for the proposed use. The assessment shall be undertaken by a suitably qualified and competent person and full details shall be submitted to and approved in writing by the local planning authority.

Condition 6 was discharged in 2023 following submission of the ST Consult previous report, which is summarised in **Section 3.0**. This report is in support of Condition 16 and 27.

Limitations to the study are presented in **Appendix 01**.

1.3 Environmental Assessment Framework

The Land Contamination: Risk Management (LCRM) Guidance (EA, 2023) outlines how to assess if there is unacceptable risk and to recommend which options are the most suitable to manage the risk through the implementation of remediation, if necessary. The guidance is based upon The Model Procedures for the Management of Land Contamination, CLR 11, and was developed to provide a technical framework for risk management when dealing with land affected by contamination.

The process involves identifying, deciding on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK. Environmental assessors use a Source-Pathway-Receptor (SPR) style Conceptual Site Model (CSM) when determining the risk posed by a potentially contaminated site. For potential risk to arise each stage of the SPR linkage must be present, plausible, and significant.

Our approach follows the framework provided in the new guidance, the stages and tiers of which can be briefly summarised as follows:

Stage 1 Risk Assessment (RA)
Tier 1: Preliminary Risk Assessment (PRA, can include Exploratory Investigation)
Tier 2: Site Investigation and Generic Quantitative Risk Assessment (GQRA)
Tier 3: Detailed Quantitative Risk Assessment (DQRA)

Stage 2 Options Appraisal (OA)
Decide if sufficient up to date information is available.
Tier 1: Identify feasible remediation options.
Tier 2: Detailed evaluation of options.
Tier 3: Selection of final remediation option.

Stage 3 Remediation Strategy (RS)
Tier 1: Develop a Remediation Strategy.
Tier 2: Remediation and Verification.
Tier 3: Long term monitoring and maintenance (if required).

Based on the above, under the LCRM guidance this report would be considered to be a Stage 1, Tier 2 GQRA, Stage 2 Options Appraisal and Stage 3, Tier 1 Remediation Strategy.

2. Site Details

Table 2-1 briefly summarises the relevant details of the site, its history, geology and hydrogeology. More detail is available from the previous environmental assessment reports.

Table 2-1
Site Location & Environmental Setting

Site Address:	Broomlands Farm, Robin Hood Lane, Warnham, West Sussex, RH12 3RR
National Grid:	515230,132309
Site Area: **Elevation:**	• Approximately 0.3 hectares. • Approximately 43m AOD.
Surrounding Land Uses:	• North and south – Residential. East – Farm yard buildings. West – agricultural field.
Geology, Hydrogeology, Hydrology:	• Superficial Deposits are not recorded at the site. • Bedrock: Weald Clay Formation – mudstone with subordinate siltstone and sandstone, weathers to a clay. • The Weald Clay Bedrock geology is classed as Unproductive. • The nearest identified down gradient surface water feature is approximately 250m SSW, a drainage ditch along Broadbridge Road. • The site does not lie within an EA groundwater Source Protection Zone (SPZ).

3. Previous Environmental Assessment & Remediation

A combined Phase 1 and Phase 2 investigation was conducted by ST Consult in February 2023[1]. The desk study research found that the site has a history of agricultural and dairy farm uses dating to the late 19th Century. More recently the site was used as stables and was disused at the time of acquisition.

The site investigation comprised five percussive boreholes to a maximum depth of 2.2m[2] (referenced WLS01 to WLS05). Made ground was encountered in WLS02 to WLS05 and absent at WLS01. Made ground depths ranged between 0.35m and 0.5m, average 0.4m depth.

Made Ground was described as variable, dark brown mottled red-brown and grey-brown clayey sandy GRAVEL / sandy gravelly CLAY. Sand is fine to coarse grained including brick. Gravel was fine to coarse subangular brick, concrete, clinker, wood and blacktop.

Beneath the made ground, soils consistent with weathered Weald Clay were encountered, described as yellow brown mottled grey-brown silty CLAY between 0.4m and 1.8m depth. Underlying the yellow brown weathered clay was a very stiff, friable, fissured, red-brown CLAY / MUDSTONE from depths of between 1.1m to 1.8m and the maximum depth of the boreholes, 2.2m.

Other than the presence of made ground there were no visual or olfactory evidence of contamination.

A total of five samples of made ground and two samples of natural ground were tested for potential contaminants identified in the Phase 1 desk study.

From the made ground samples, one detected an elevated concentration of lead (WLS02 @ 0.2m) and two samples detected elevated concentrations of PAHs (WLS02 @ 0.2m and WLS03 @ 0.15m).

Asbestos was not visually identified during the investigation but was detected in soil samples WLS03 @ 0.15m and WLS04 @ 0.1m and quantified at 0.432% and 0.002% respectively. Both samples identified chrysotile asbestos in the samples.

Petroleum hydrocarbons were detected in shallow made ground samples from WLS03 @ 0.15m, WLS04 @ 0.1m and WLS05 @ 0.3m at concentrations exceeding UK WIR thresholds for the use of plastic water supply pipes

Two samples of natural soil generally returned contaminant concentrations below their respective GAC with the exception of an arsenic concentration detected in sample reference WLS01 @ 0.3m, which was 77mg/kg compared to a GAC of 37mg/kg.

Groundwater was measured in three of the exploratory holes between 1.1m and 2.1m. Due to the unproductive aquifer classification, groundwater was ruled out as a receptor and groundwater monitoring wells were not installed.

The report made preliminary recommendations for remedial measures comprising removal of made ground soils from all garden and soft landscaped areas and advised further assessment work. The further work related to the arsenic detection in WLS01 and recommended delineation and ascertain whether remediation was required in this part of the site. Further investigation was also recommended of the made ground in the location of WLS03 to determine the extent of asbestos containing materials in the made ground.

The report recommended that a remediation strategy be developed and agreed with the regulators prior to remediation.

1 Site Investigation & Risk Assessment Report, Broomlands Farm, Warnham, RH12 3PA, Reference J15346, dated 20 February 2023.
2 All depths are expressed as metres below existing ground level.

4. GROUND INVESTIGATION

4.1 Introduction

A total of eight trial pits were advanced on 15th September 2023 to maximum 1.9m depth using mechanical excavator to log ground conditions and take soil samples for laboratory analysis.

4.2 Trial Pit Locations

The locations are described in **Table 4-1** and indicated on the **Trial Pit Location Plan** appended to this report.

Table 4-1: Investigation Locations

Trial Pit Ref	Location Rationale
TP1	- Proposed private garden area - Trial pit an area previously not investigated
TP2	- Proposed private garden areas - Investigate natural soil in this area
TP3	
TP4	- Proposed private garden areas - Delineate contamination identified in made ground that area
TP5	
TP6	- Proposed private garden areas
TP7	
TP8	

Ground conditions were logged by a geoenvironmental engineer during excavation of the pits. Details of trial pits are shown on the logs in **Appendix 02** and a series of photographs are in **Appendix 03**.

4.3 Ground Conditions

Ground conditions mainly comprised made ground overlying a yellow brown silty CLAY, interpreted to represent a consistent thickness of made ground of variable composition overlying weathered Weald Clay Formation.

Made ground was described as yellow brown to red brown sandy gravelly CLAY with gravel of brick, concrete, asphalt, flint and rare chalk, with frequent brick cobbles. Ground conditions were broadly consistent with the previous investigation.

Surfacing was concrete hardstanding at locations TP1, TP3 and TP5, asphalt hardstanding at locations TP4, TP6 and TP8 and unmade aggregate materials, predominately brick at locations TP2 and TP7.

4.3.1 Visual and Olfactory Evidence of Contamination

There was no evidence of contamination noted during the trial pit excavation and sampling.

4.3.2 Groundwater Occurrence

Groundwater was not encountered.

4.4 Sample Storage & Transport

Dedicated containers (e.g., amber jars, vials, plastic tubs etc.) provided by the laboratory, were used for the collection of samples. To minimise the potential for cross contamination, disposable gloves were changed for each sample collected / equipment used was cleaned between each sampling event.

Loss of volatile compounds through desorption and volatilisation from the samples was limited by filling and tightly enclosing the samples in dedicated amber jars, thus ensuring minimal headspace, and storing at a low temperature (i.e., a refrigerated cool box), which further minimised biodegradation of organic compounds.

Samples were transported to the laboratory in dedicated containers maintained at a low temperature. All samples and analytical requests were recorded on the laboratory chain of custody form prior to dispatching for analysis.

4.5 Scheduled Testing of Soil Samples

12 samples (6 made ground and 6 natural soil) were submitted for testing, which included a broad screen of potential contaminants associated with a wide range of potentially contaminative activities including those identified in the Stage 1, Tier 1 PRA, as detailed in the table below:

Metals / Semi metals			Hydrocarbons	Other contaminants
Antimony Arsenic Barium Beryllium Boron (water soluble) Cadmium	Chromium III Chromium VI Copper Lead Mercury	Molybdenum Nickel Selenium Vanadium Zinc	Speciated PAH BTEX & Speciated TPH (selected samples) Phenol (monohydric) VOC (PID Headspace)	Cyanide (total and free) Sulphate (total and water soluble) Sulphide pH Total Organic Carbon

Laboratory data certificates are presented in **Appendix 04**.

5. STAGE 1, TIER 2 GQRA

5.1 Introduction

This section comprises a generic assessment of the analytical results and other data gathered during the Tier 2 site investigation, through comparison of the measured concentrations of contaminants against appropriate GAC in relation to the proposed development.

A summary of soil quality data compared to Generic Assessment Criteria (GAC) is in **Appendix 05.**

5.2 Human Health

The proposed development comprises utilising the existing central building for residential use with soft landscaped private garden areas in accordance with the **Proposed Landscape Plan** appended. The proportions of hard paved areas and buildings compared with soft landscaped and private garden areas are approximately 1:1 (or 50% soft landscaped area and 50% buildings and hardstanding). Domestic gardens are proposed around the site perimeters and could be used for homegrown produce.

For the GQRA for human health, where appropriate, we have selected the generic residential GAC including the consumption of homegrown produce for comparison against the results as an initial conservative screen based on the scope of the proposed development.

The GQRA uses a combination of assessment criteria that are currently available to assist in the screening of soil data prior to determining whether further action is required. The LQM/CIEH S4UL guideline values have been used together with a C4SL for lead for the assessment of contaminant levels in soil:

- LQM/CIEH Suitable for Use Levels (S4ULs) – in 2015 Land Quality Management and the Chartered Institute of Environmental Health have published S4ULs derived following CLEA technical guidance and using the Environment Agency's CLEA UK model, with updated toxicological and exposure parameters and land uses following the publication of the draft Category 4 Screening Levels (C4SL - DEFRA).
- Where the S4UL values are not applicable, in this case for lead, the C4SL guideline value of 200mg/kg for residential with homegrown vegetables is appropriate for this initial screen.

Two samples of made ground returned total concentrations of contaminants PAHs, lead and petroleum hydrocarbons that exceeded their respective most conservative GAC for risks to human health in a residential end use scenario with homegrown produce. The contaminants exceeding the GAC in made ground are detailed in **Table 5-1** below.

Table 5-1: Made Ground Samples Exceeding GAC

Date Sampled	Units	GAC Residential with plant uptake @ 1% SOM	15/09/2023	15/09/2023
TP / BH No			TP4	TP5
Depth (m)			0.20	0.30
Strata Type			Made Ground	Made Ground
Lead (aqua regia extractable)	mg/kg	200	18	666
Benzo(a)anthracene	mg/kg	7.2	51	0.25
Benzo(b)fluoranthene	mg/kg	2.6	74	0.33
Benzo(a)pyrene	mg/kg	2.2	61	0.33
Indeno(123cd)pyrene	mg/kg	27	37	0.28
Dibenzo(ah)anthracene	mg/kg	0.24	9	< 0.1
Aromatic >C16 - C21	mg/kg	260	-	272

5.2.1 Asbestos Containing Material

No asbestos was observed in the site soils during the site investigation, and of the 12 representative samples of soil that were screened for asbestos as part of this investigation, fibres were not detected in any sample.

5.2.1 PAHs

PAH concentrations in the sample TP4 @ 0.2m detected PAH concentrations that exceeded their respective GAC for residential end use.

5.2.2 Metals

The concentration of lead in the sample TO5 @ 0.3m exceeded the GAC for residential end use.

5.2.3 TPH and BTEX

Two samples of made ground and one sample of natural soil were also tested for TPH (CWG method) and BTEX. Of the three soil samples tested, two samples returned concentrations below the laboratory limits of detection and the made ground sample TP5 @ 0.3m detected a total concentration of 1,069mg/kg including aromatic hydrocarbons in the carbon range >C16 - C21 (272mg/kg compared to a GAC of 260mg/kg).

5.3 Landscape Planting

The samples of made ground and natural soils returned total concentrations of potential contaminants across the dataset that were below their respective GAC for risks to landscape planting.

5.4 Controlled Waters

Within the preliminary CSM presented in the Stage 1, Tier 1 PRA, controlled water (groundwater in the Weald Clay Formation which is classed as Unproductive) was ruled out as a potential pathway and receptor to contamination.

We have based our GQRA on the following information that is presented in the PRA:

- Geology is Unproductive Weald Clay Formation.
- The site is not in an EA designated SPZ.
- There are no groundwater abstractions identified within 1km.
- The nearest identified down gradient surface water feature is approximately 250m SSW, a drainage ditch along Broadbridge Road.
- There were no surface water abstraction permits identified by the desk study within 1km.

Based on the above, the sensitivity of the site in respect of controlled water is low. Furthermore, approximately half of the proposed development will be covered by permanent hardstanding (e.g., buildings and hard paving), which will limit surface infiltration and therefore the potential for infiltration of rainwater and vertical migration of mobile contaminants; whilst plausible, is unlikely to be significant.

5.5 Potable Water Supply Pipes

The uncontaminated naturally occurring Weald Clay Formation would not preclude the use of standard PE pipe materials.

Contaminant concentrations within the made ground exceeded some of the stringent thresholds for PE pipe materials, and remedial measures would be required; e.g. the removal of made ground materials from along the route of a suitably constructed water supply pipe trench to allow the use of standard PE pipes, or the use of (PE-Al-PE) barrier pipes (e.g., Protectaline or similar). This should be confirmed by the local water supply company.

6. Refined Conceptual Site Model

The table below presents a revised Tier 2 CSM for the site based upon the SPL identified within the Tier 2 site investigation and GQRA and summarises the relevant sources, pathways and receptors at the site based on the proposed development.

In this planning context, potential risks to receptors at the completed development are the primary consideration. The site CSM has been completed according to the methodology set out in CIRIA C552[3] and NIGLQ 2012[4].

[3] CIRIA C552 Contaminated Land Risk Assessment – A guide to Good Practice, 2001.

[4] Nuclear Industry Group for Land Quality (NIGLQ) 2012.

Source	Contaminant	Pathways	Receptors	Likelihood	Severity	Risk Rating	Comment
On Site: Made Ground materials.	Asbestos	Inhalation	Site users	Unlikely	Moderate	Medium Risk	Previous site investigation detected asbestos in two made ground samples out of 15 samples tested, composed of chrysotile at 0.002% and 0.432%. This investigation tested 12 soil samples for asbestos presence/absence and did not detect asbestos in any sample. Nevertheless, 2 made ground samples out of 10 detected asbestos in the previous investigation. Whilst half of the site will be under permanent hardstanding, areas of soft landscaping at ground level have a likely probability of exposure as the development will not break the exposure pathways.
	Metals, PAHs, Petroleum Hydrocarbons	Dermal contact, soil and soil dust ingestion, and inhalation of soil dust	Site Users – residents, visitors	Likely	Moderate	Medium Risk	On the basis of the proposed development plans there will be private gardens and soft landscaping. In these parts of the site the probability of exposure is considered likely as the development will not break the exposure pathways.
		Consumption of home grown produce	Site users				
		Root uptake	Landscape planting	Unlikely	Mild	Low Risk	The potential severity of phytotoxic contaminants in the near surface soils is considered of minor consequence. The probability of a contaminant linkage is considered likely due to the made ground associated with the current and historic use of the site.
		Intake of soil contaminants by animals	Domesticated pets or livestock	Likely	Mild	Medium Risk	The consequence of contaminants is considered mild and the probability of exposure is considered likely due to the made ground

Source	Contaminant	Pathways	Receptors	Likelihood	Severity	Risk Rating	Comment
							associated with the current and historic use of the site.
	TPH Compounds	Impaired performance of standard potable water pipes through permeation, deterioration or contamination	Water supply pipes	Likely	Mild	Medium Risk	Made ground returned concentrations of TPH that exceeded the respective threshold for PE pipes. The local water supply company should be consulted, and it is considered that based on the lab data and the site history remedial measures (e.g., removal of made ground from the route of the water supply pipe trench, should it coincide with this location and/or the use of barrier pipes) will be required.

7. STAGE 2 OPTIONS APPRAISAL

The Tier 2 GQRA has concluded that approximately half of the site, being covered by buildings and hard standing, will break the Significant Pollutant Linkages (SPL) in those parts of the site and rendered a low risk. The SPLs that remain and need consideration are caused by the previous detection of asbestos in one area and elevated concentrations of lead and PAHs in the made ground, a potential risk to human health, domestic pets and livestock and potable water pipes.

Although asbestos was not detected in the soil samples in this investigation, potential exposure to asbestos presence in made ground should be considered due to the detections in the made ground in the previous investigation.

The above are considered a potential risk in areas of the site where (a) in-situ made ground remains within 1m of the final completed surface level and (b) there is no permanent hard standing barrier. Such areas include areas of soft landscaping in the private garden areas and within the landscaped parts of the central courtyard area.

To break the SPL identified an options appraisal (OA) followed by a detailed remediation scheme (RS) will be required.

The objective of the OA is to establish an appropriate remediation option or combination of options to implement during the development as a means of reducing or controlling the risks associated with a relevant pollutant linkage to an acceptable level.

In the first instance it is necessary to decide if there is sufficient up to date information upon which to base the OA. Once the validity of the supporting information has been ascertained there are 3 tiers to follow in an OA:

- Stage 2, Tier 1: Identify feasible remediation options.
- Stage 2, Tier 2: Undertake a detailed evaluation of options.
- Stage 2, Tier 3: Select your final remediation options.

To effectively evaluate and identify remediation options it may be necessary to collect more site investigation data and to update the CSM. It may also be necessary to obtain general information relating to:

- Regulatory controls (e.g., what permits may be required).
- Noise restrictions (e.g., some remediation techniques may need to be controlled).
- Baseline ambient air quality.
- Weather conditions during remediation (e.g., it may be necessary to consider seasonal variations in water levels and potential for flooding).

The OA has been summarised in the following table.

Supporting Information	The options appraisal is based on a previous Phase 1 desk study and site investigation in January 2023, and additional investigation and laboratory testing in September 2023, both of which were carried out at a time when the site was in the same configuration as present. The site investigation combined with the previous investigation comprised 8 exploratory locations across the circa 3000m² site, a density equivalent to a 20m sampling grid, but when combined with the previous investigation locations the total number of locations is 13 which is equivalent to a 15m grid and this investigation supplements the previous investigation data. The samples were submitted to an MCERTS accredited laboratory for testing from which no deviations were reported in respect of sample containers, holding times, labelling etc. The testing undertaken included a broad range of potential contaminants associated with a wide range of potentially contaminative activities together with targeted contaminants of concern associated with the potential sources of contamination identified in the PRA (e.g., speciated TPH, BTEX etc.). The scope of testing is considered appropriate in respect of the uses (current and past) of the site and immediate surrounds. The site works and reports have been compiled by experienced/competent geo-environmental engineers in line with current good practice guidance. Therefore, the PRA, site investigation and RA reports are considered sufficient upon which to base the Stage 2 OA.
Stage 2 Tier 1 Feasible Options	**1. Breaking the Exposure Pathway(s)** In terms of breaking SPL to sensitive receptors e.g., human health (end users, ground workers and neighbours), or landscape planting (root uptake) for example, an option would be to break the respective pathway(s) of potential exposure. This may involve placing a barrier between the source and the receptor, such as a layer of permanent hardstanding, or a cover layer of suitable soil placed above any remaining near surface soil in sensitive end use areas. This type of option would break the relevant exposure pathway(s) to the receptor(s) without removing the actual source of contamination. The suitability of these methods is dependent on the nature of the development and in the case of cover layers is partly dependent upon whether it is possible to raise the completed levels of the development in sensitive end use areas. If this were not the case, then it may be necessary to remove, or at least partly remove, the source of contamination (made ground) to accommodate the required depth of cover. **2. Source Removal** Removal of the source(s) of contamination (i.e., made ground) coinciding with areas of sensitive end use (e.g., area of soft landscaping) would break the long-term SPL by removal of source of contamination.
Stage 2 Tier 2 Detailed Evaluation	Considering the relatively straightforward nature of the options appraisal, a detailed evaluation is not considered necessary.
Stage 2 Tier 3 Final Remediation Option	The development is approximately 50% buildings and hard paving, and as such, the development itself will create a permanent barrier across parts of the site, where the SPL will be broken. Soft landscaping is proposed in areas of private gardens and the central courtyard area where there will be no barrier and the SPL will be active.

	The selected remedial option is based on the proposed development scheme and soft landscaping plans. The developer intends to reduce levels across the soft landscaped areas as part of their original scheme plans. This development plan will result in the complete removal of near surface soil (made ground) from proposed garden areas and other areas of soft landscaping, e.g. shared courtyard, and, where required for growth medium for landscape plating, installation of suitable replacement soils in areas of soft landscaping at ground level. The remediation scheme proposed in Section 8.0 includes measures to remove the source(s) of contamination and break exposure pathways as detailed above. In addition, other measures, not necessarily part of the remediation strategy to ensure the proposed development is undertaken in accordance with good environmental practice are dealt with in the Site Management Procedures detailed in Section 9.0.

8. STAGE 3 REMEDIATION STRATEGY

8.1 Introduction

The following sections outline the measures required to break the remaining active SPL identified in the refined CSM.

Risks to human Health and domestic pets and livestock in areas of soft landscaping: Potential risks from elevated contaminant concentrations will be broken by removing all of the made ground to protect end users of the development from the identified contaminants in landscaped areas.

8.2 Validation Procedure

During excavations in areas of proposed soft landscaping, a geo-environmental engineer should confirm that the required depth of made ground has been removed and to inspect the soils at formation level (visual and olfactory observations) for evidence of unexpected contamination.

Should any unexpected contamination be encountered then the discovery strategy should be implemented. The location, size, and extent of the remedial excavation(s) in areas of soft landscaping should be recorded (e.g., on a sketch plan and/or photographic records etc.) for inclusion in the verification report. Upon confirmation that the required depth has been achieved, the remedial excavations can have any additional planting medium applied, as required by a landscape specification.

Upon completion of the works, the contractor should supply all duty of care documentation (e.g., waste transfer notes) confirming that all contaminated soils from any remedial excavations have been removed and/ or managed appropriately.

8.3 Imported Soils

Prior to importation, the developer should obtain a declaration from the source, including laboratory testing results if applicable to small batches. Laboratory certificates of analysis / source certification should be provided by the supplier for all soil-based materials imported to the site and the results assessed for compliance with an appropriate specification for the works, industry good practice and relevant residential without homegrown produce (i.e., C4SL and/or S4UL, as detailed in the table overleaf) and landscape planting GAC (i.e., BSI 2015b).

On delivery to site:

- The contractor should confirm the soils that are delivered to the site to check that they are consistent with those in the source.
- The developer should keep records of the quantity delivered to site and the depth of placement.

8.4 Post Remediation Monitoring

The RS presented in Section 8 in conjunction with the proposed development and site management procedures detailed in Section 9 have been developed to achieve the remediation objectives in a relatively short timeframe. As such, it is not intended that the site will be subjected to an onward long-term monitoring programme. During the development, the discovery strategy as outlined in Section 9.3 should be implemented.

Imported Clean Cover Criteria

Determinand	Unit	Proposed GAC
Asbestos Screen (S)	Presence/absence	-
pH	pH Units	-
Total Cyanide	mg/kg	-
Free Cyanide	mg/kg	-
Total Sulphate as SO4	mg/kg	-
Total Sulphate as SO4	%	-
W/S Sulphate as SO4 (2:1)	mg/kg	-
W/S Sulphate as SO4 (2:1)	%	-
Sulphide	mg/kg	-
TOC (Total Organic Carbon)	%	-
Antimony (Sb)	mg/kg	-
Arsenic (aqua regia extractable)	mg/kg	37
Barium (Ba)	mg/kg	-
Beryllium (Be)	mg/kg	-
Boron (water soluble)	mg/kg	290
Cadmium (aqua regia extractable)	mg/kg	11
Chromium (aqua regia extractable)	mg/kg	910
Chromium (hexavalent)	mg/kg	6
Copper (aqua regia extractable)	mg/kg	2400
Lead (aqua regia extractable)	mg/kg	200
Mercury (elemental)	mg/kg	1.2
Molybdenum (Mo)	mg/kg	-
Nickel (aqua regia extractable)	mg/kg	180
Selenium (aqua regia extractable)	mg/kg	250
Vanadium (V)	mg/kg	410
Zinc (aqua regia extractable)	mg/kg	3700
Total Phenols (monohydric)	mg/kg	-
Naphthalene	mg/kg	2.3
Acenaphthylene	mg/kg	170
Acenaphthene	mg/kg	210
Fluorene	mg/kg	170
Phenanthrene	mg/kg	95
Anthracene	mg/kg	2400
Fluoranthene	mg/kg	280
Pyrene	mg/kg	620
Benzo(a)anthracene	mg/kg	7.2
Chrysene	mg/kg	15
Benzo(b)fluoranthene	mg/kg	2.6

Determinand	Unit	Proposed GAC
Benzo(k)fluoranthene	mg/kg	77
Benzo(a)pyrene	mg/kg	2.2
Indeno(123cd)pyrene	mg/kg	27
Dibenzo(ah)anthracene	mg/kg	0.24
Benzo(ghi)perylene	mg/kg	320
Total EPA-16 PAHs	mg/kg	-
EPH (C10 - C40)	mg/kg	-
Aliphatic >C5 - C6	mg/kg	42
Aliphatic >C6 - C8	mg/kg	100
Aliphatic >C8 - C10	mg/kg	27
Aliphatic >C10 - C12	mg/kg	130
Aliphatic >C12 - C16	mg/kg	1100
Aliphatic >C16 - C21	mg/kg	-
Aliphatic >C21 - C34	mg/kg	-
Aliphatic (C5 - C34)	mg/kg	-
Aromatic >C5 - C7	mg/kg	70
Aromatic >C7 - C8	mg/kg	130
Aromatic >C8 - C10	mg/kg	34
Aromatic >C10 - C12	mg/kg	74
Aromatic >C12 - C16	mg/kg	140
Aromatic >C16 - C21	mg/kg	260
Aromatic >C21 - C35	mg/kg	1100
Aromatic (C5 - C35)	mg/kg	-
Total >C5 - C35	ug/kg	-
Benzene	ug/kg	87000
Toluene	ug/kg	130000
Ethylbenzene	ug/kg	56000
p & m-xylene	ug/kg	56000
o-xylene	ug/kg	60000
MTBE	ug/kg	-

9. SITE MANAGEMENT PROCEDURES

9.1 Introduction

In conjunction with the RS detailed in Section 9.0, we would recommend that a robust programme of site management procedures be implemented and documented to demonstrate the appropriate management of other environmental risks addressed as part of the development for inclusion in a verification report.

9.2 Personnel and Briefings

If employing a third party contractor: The site works should be implemented by a site manager, machine operators and banksmen supported by a geo-environmental engineer (where necessary). The contractor(s) will provide a written statement confirming that all operatives have attended a site induction, which will include a toolbox talk from the site/project manager prior to commencing works onsite.

During the toolbox talk a summary of the findings of the site investigation and RA, the requirements of the RS and the discovery strategy (see Section 9.3) will be presented. The discovery strategy describes and sets out the types of material that if encountered during the development would trigger the implementation of the discovery strategy.

9.3 Discovery Strategy for Unexpected Contamination

The investigations to date have provided a robust assessment of potential contamination across the site. There is however a risk of further contamination being present in small discrete areas (hotspots) that have not been previously identified and there can be no certainty that all such areas have been or will be located and/or sampled. The discovery strategy sets out the actions that must be taken if unexpected contamination (e.g., soil of an unusual appearance and/or odour) is encountered during the development and will be in force during the duration of groundwork at the site (e.g., enabling works etc.). Examples of the types of observations that would be considered significant and trigger the implementation of the discovery strategy are set out in the following table.

Evidence	Description
Visual	• Fuel or oil like substances mixed with or smeared on the soil or floating/perched groundwater or surface waters. • Organic rich soils/sludges (e.g., sewage contamination) with strong organic/sulphide odours. • Waste materials (refuse, barrels, industrial wastes, ash, tar, etc.) buried at a specific location or across the site. • Marked variation in colour. For example, red, orange, yellow, green, light, or dark blue, etc. may indicate contamination from a variety of contaminants. • Soils including large amounts of ash and clinker where such contamination of soils was notexpected. • Soils containing large proportions of deleterious materials (e.g., wood, paper, plant remains, plasticetc.).
Odours	• Fuel, oil, and chemical type odours. • Unusual odours such as sweet odours, ammonia, creosote, sulphide, mothballs, or fishy odours.
Wellbeing	• Light headedness and/or nausea when in excavations, at the working face of an excavation, when visual or olfactory evidence of contamination exists, etc. • Burning of nasal passages, throat, lungs, or skin • Blistering or reddening of skin due to contact with soil

The site manager should maintain a photographic record of the progress of the works. If during the works, contamination is encountered which was not previously identified (e.g., soils of an unusual appearance and/or odour etc.), either by visual or olfactory methods, the contractor(s) will implement the following procedures:

- Works will be halted, and the site manager will be contacted to inspect the area of concern. The contaminated land officer (CLO) will be informed.
- Photographs of the area will be taken.
- A geo-environmental engineer will attend site to inspect and sample the area of unexpected contamination at formation level.

- A risk assessment will be undertaken to determine if the Stage 2 OA and Stage 3 RS need to be updated.
- The RA will be submitted to the CLO for approval.
- If necessary, following approval of the risk assessment, the OA and RS will be revised and submitted to the CLO for approval prior to implementation.
- Following approval any additional remediation works will be implemented and validated in accordance with the approved RS with records retained for inclusion in the validation report.

10. VERIFICATION OF REMEDIATION

10.1 Verification Report

A verification report should be compiled to address the requirements of the planning permission demonstrating that the works outlined in Section 8.0 and Section 9.0 have been carried out satisfactorily. A verification plan detailing the information to be gathered during the works is presented in Section 10.2.

10.2 Verification Plan

The verification plan below lists the information that will be gathered and presented in the verification report:

- Formation level inspection records to include physical descriptions of the soils encountered at formation level, backed by a photographic record.
- If unexpected hotspots of contamination are identified, details (including laboratory test reports etc.) of validation testing undertaken from the sides and base of any remedial excavations to demonstrate that soils remaining in-situ level meet the site validation criteria.
- Duty of care records (e.g., waste carriers' licenses, consignment notes, waste transfer notes, environmental permits etc.) demonstrating that materials were transported and disposed of at appropriate waste management facilities.
- If, during development and the implementation of the discovery strategy, contamination not previously identified is found to be present, then work will cease at that location, the local authority will be informed immediately, a risk assessment undertaken and submitted to the local authority and if necessary, a revision to the RS will be issued for approval indicating the nature of the contamination and how it is to be dealt with.
- If unexpected contamination is not encountered, a statement to this effect by a suitably qualified and experienced individual will be provided.
- Photographs including scales to indicate the depth of material removed and depth of that imported/relocated once in-situ.
- Verification including approval from the local water supply company that water supply pipes were installed in appropriately constructed trenches. Information (e.g., product data sheets, photographic record etc.) will be included in the validation report.
- Supplier declarations/reports for any soil (topsoil and subsoil) imported onto site.
- Delivery notes for any soil (topsoil and subsoil) imported onto site.
- In-situ testing of any imported soil in accordance with the criteria detailed in this report.

11.REGULATORY APPROVAL

This report should be submitted to the local planning authority in support of Conditions 16 and 27 of the planning application for the scheme.

The compilation of a Verification Report in accordance with the verification plan outlined in this report should address anticipated future requirements, however formal approval should be sought from the regulators before proceeding with site works.

If, as a result of the implementation of the discovery strategy, unexpected contamination is encountered at any point in the future during the development, or the scheme alters, then it will be necessary to revise the RS accordingly.

Proposed Landscape Plan



HARD LANDSCAPE MATERIALS AND ELEMENTS

COURTYARD DRIVEWAY AND PARKING
TARMAC WITH ROLLED GRAVEL CHIPPINGS AND SINGLE GRANITE SETT AS EDGE RESTRAINT

PRIVATE PATIO AREAS
CONCRETE OR SAWN SANDSTONE / LIMESTONE PAVING SLABS LAID TO CREATE PATIO AREAS

CONCRETE OR SAWN SANDSTONE / LIMESTONE PAVING SLABS LAID AS INDIVIDUAL STEPPING STONE TILES

TIMBER POST AND RAIL FENCING AT 1M HEIGHT

CLOSEBOARD TIMBER FENCING 1.8M HEIGHT

SOLID TIMBER SLEEPER WALL TO EASTERN BOUNDARY

LOW LEVEL LIGHTING BOLLARD

SOFT LANDSCAPE ELEMENTS

MIXED FRONT 'NUT AND BERRY RICH' BOUNDARY HEDGE TO DEVELOPMENT FRONTAGE
BOOTBALLED OR BARE ROOT PLANTED AT MINIMUM 1M HEIGHT COMPRISING OF
FAGUS SYLVATICA (BEECH)
CORYLUS AVELLANA (HAZEL)
PRUNUS SPINOSA (BLACKTHORN)

TAXUS BACCATA (YEW) HEDGING
BOOTBALLED SPECIMENS PLANTED AT MINIMUM 1.5M HEIGHT

NATIVE FIELD HEDGEROW
NATIVE HEDGEROW PLANTED AS 1 M HEIGHT WHIPS PLANTED IN DOUBLE STAGGERED ROW COMPRISING OF;
TAXUS (YEW)
CRATAEGUS MONOGYNA(HAWTHORN)
BUCKTHORN (RHAMNUS FRANGULA)
PRUNUS SPINOSA (BLACKTHORN)
FAGUS SYLVATICA (BEECH)
EUONYMUS EUROPAEUS (SPINDLE)
ILEX AQUIFOLIUM (HOLLY)
VIBURNUM OPULUS (GUELDER ROSE)
VIBURNUM LANTANA (WAYFARING TREE)

AREA OF LOW LEVEL MIXED SHRUB PLANTING PLANTED AT A DENSITY OF 15-20 LITRES PER SQUARE METRE.
SPECIES MIX TO COMPRISE OF;

CORNUS SANGUINEA
CYTISUS SCOPARIUS
EUONYMUS EUROPAEUS
GERANIUM MACRORRHIZUM
HYDRANGEA MACROPHYLLA
JUNIPERUS COMMUNIS
LAVENDULA HIDCOTE
PRUNUS LUSITANICA
RHAMNUS CATHARTICA
ROSA CANINA
RUSCUS ACULEATUS
SALIX LANTANA
SALVIA CARADONNA

AREA OF EVERGREEN CLIMBING PLANTS
(PLANTED AGAINST TIMBER SLEEPER GARDEN WALL)

NATIVE SPECIMEN FEATURE TREES
T1 - QUERCUS ROBUR (ENGLISH OAK) PLANTED AT MIN 20-25CM GIRTH SIZE
T2 - ACER CAMPESTRE 'STREETWISE' (FIELD MAPLE) PLANTED AT MIN 18-20CM GIRTH SIZE
T3 - PRUNUS AVIUM 'PLENA' (WILD CHERRY) PLANTED AT MIN 18-20CM GIRTH SIZE
T4 - TILIA CORDATA (SMALL LEAVED LIME) PLANTED AT MIN 18-20CM GIRTH SIZE

TURFED LAWN AREA

HIBERNACULUM LOCATION IN ACCORDANCE WITH AHWC BIODIVERSITY ENHANCEMENT PLAN

WILDFLOWER GRASS AREA

LOG STACK LOCATION IN ACCORDANCE WITH AHWC BIODIVERSITY ENHANCEMENT PLAN

NOTE;
BIRD AND BAT BOX LOCATIONS TO ACCORD WITH AHWC BIODIVERSITY ENHANCEMENT PLAN

24.07.2023 FOR PLANNING
11.07.2023 FOR DISCUSSION
JUNE 2023 FOR COMMENTS

BENJEMIN REED PROJECTS
T: 01432 280089
E: office@benjreed.co.uk
W: www.benjreed.co.uk

Project	BROOMLANDS FARM		
Drawing	LANDSCAPE PROPOSALS		
Scale	1:100@A0	Job No.	F894
Date	JUNE 2023	Drawn	BB / Checked	BB

Do not scale from drawing
Contractors must verify all dimensions on site before commencing any work or shop drawings.
Figured dimensions are to be used in preference to scaled dimensions.
If this drawing contains the quantities taken in any way the software are to be informed before work is initiated.

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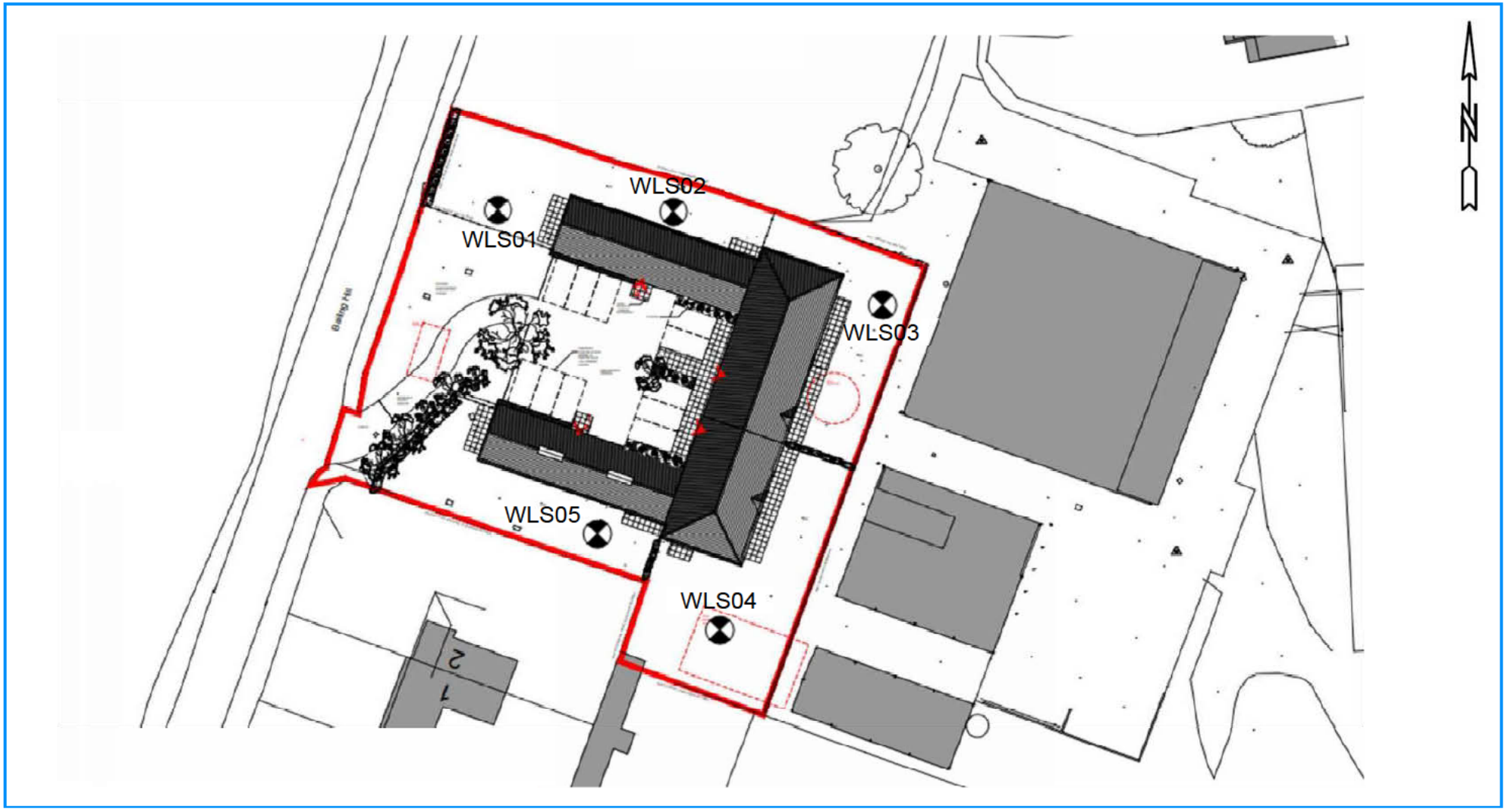
Drawing No.	F894 001
Revision No.	24.07.2023

Trial Pit Location Plan


WLS01
WLS02
WLS03
WLS04
WLS05
Ealing Rd
2
1
N

Appendix 01 – Report Limitations

Limitations and Use of this Report

IMPORTANT: This section should be read before reliance is placed on any of the opinions, advice, recommendations or conclusions set out in this report.

This report has been prepared for the purpose of providing advice to the client pursuant to its appointment of Kalex Limited (Kalex) to act as a consultant.

Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.

All work carried out in preparing this report has used, and is based upon, our professional knowledge and understanding of the current relevant English and European Community standards, approved codes of practice, technology and legislation.

Changes in the above may cause the opinion, advice, recommendations or conclusions set out in this report to become inappropriate or incorrect. However, in giving its opinions, advice, recommendations and conclusions, Kalex has considered pending changes to environmental legislation and regulations of which it is currently aware. Following delivery of this report, we will have no obligation to advise the client of any such changes, or of their repercussions.

Kalex acknowledges that it is being retained, in part, because of its knowledge and experience with respect to environmental matters. Kalex will consider and analyse all information provided to it in the context of our knowledge and experience and all other relevant information known to us. To the extent that the information provided to us is not inconsistent or incompatible therewith, Kalex shall be entitled to rely upon and assume, without independent verification, the accuracy and completeness of such information.

The content of this report represents the professional opinion of experienced environmental consultants. Kalex does not provide specialist legal advice and the advice of lawyers may be required.

In the summary and recommendations sections of this report, Kalex has set out our key findings and provided a summary and overview of our advice, opinions and recommendations. However, other parts of this report will often indicate the limitations of the information obtained by Kalex and therefore any advice, opinions or recommendations set out in the executive summary, summary and recommendations sections ought not to be relied upon unless they are considered in the context of the whole report.

The assessments made in this report are based on the ground conditions as revealed by walkover survey and/or intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination (hot spots) and there can be no certainty that any or all such areas have been located and/or sampled.

There may be special conditions appertaining to the site which have not been taken into account in the report. The assessment may be subject to amendment in light of additional information becoming available.

Where any data supplied by the client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by Kalex for inaccuracies within the data supplied by other parties.

Whilst the report may express an opinion on possible ground conditions between or beyond trial pit or borehole locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy thereof.

Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.

This report is prepared and written in the context of the agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a reinterpretation of the report in whole or part after its original submission.

The copyright in the written materials shall remain the property of Kalex but with a royalty-free perpetual license to the client deemed to be granted on payment in full to Kalex by the client of the outstanding amounts.

These terms apply in addition to the Kalex standard terms of engagement (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing (In the event of a conflict between these terms and the said standard terms of engagement the said standard terms of engagement shall prevail). In the absence of such a written contract the standard terms of engagement will apply.

Kalex maintains adequate insurance cover for public liability and professional indemnity. However, we are unable to accept liability for asbestos related matters. Our work must not be taken as sufficient to identify the presence or absence of asbestos in or on the ground. In placing a contract with us the client accepts the restriction on asbestos. If we find or strongly suspect asbestos is or may be present in or on the ground we will inform the client and advise specialist investigation. The client agrees that they shall not bring any claim personally against any director / employee or consultant to us in respect of loss or damage suffered by the client arising out of this contract.

Appendix 02 -Trial Pit Logs

ENVIRONMENTAL TESTPIT TP1

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
							MADE GROUND: Concrete Hardstanding	
							MADE GROUND: Grey black sandy GRAVEL of fine to coarse subangular to subrounded flint., concrete, brick, asphalt, frequent roots.	
			Soil Sample				MADE GROUND: Yellow brown with grey mottling silty sandy gravelly CLAY with low cobble content. Gravel is fine to coarse brick, flint, concrete	
0.5			Soil Sample	Y			Yellow Brown silty sandy CLAY.	
1							End of Trial Pit	
1.5								

ENVIRONMENTAL TESTPIT TP2

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
			Soil Sample				MADE GROUND: Grey white sandy gravelly CLAY with medium cobble content. Cobbles are chalk and brick. Gravel is flint, chalk, brick, concrete.	
0.5			Soil Sample	Y			Yellow Brown silty sandy CLAY.	
1							End of Trial Pit	
1.5								

ENVIRONMENTAL TESTPIT TP3

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
							MADE GROUND: Concrete Hardstanding.	
							MADE GROUND: Grey sandy GRAVEL of coarse subangular to subrounded concrete, flint.	
			Soil Sample	Y				
0.5							Yellow Brown silty sandy CLAY.	
			Soil Sample	Y				
							End of Trial Pit	
1								
1.5								

ENVIRONMENTAL TESTPIT TP4

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
			Soil Sample	Y			MADE GROUND: Asphalt Hardstanding.	
							MADE GROUND: Grey black sandy GRAVEL of fine to coarse subangular to subrounded flint., concrete, brick, asphalt, frequent roots.	
0.5			Soil Sample	Y			COBBLES AND BOULDERS of red brick.	
			Soil Sample				Yellow Brown silty sandy CLAY.	
1							End of Trial Pit	
1.5								

ENVIRONMENTAL TESTPIT TP5

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
							MADE GROUND: Concrete Hardstanding	
			Soil Sample	Y			MADE GROUND: Multicoloured sandy coarse GRAVEL with low cobble content. Gravel is fine to coarse subrounded to subangular concrete, flint, brick, asphalt. Cobbles are flint and brick.	
0.5			Soil Sample	Y			MADE GROUND: Yellow Brown silty sandy CLAY (Re-worked natural ground).	
1							Yellow Brown silty sandy CLAY.	
1.5			Soil Sample				Dark red extremely weak MUDSTONE.	
							End of Trial Pit	

ENVIRONMENTAL TESTPIT TP6

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
							MADE GROUND: Asphalt Hardstanding.	
							MADE GROUND: Multicoloured sandy medium to coarse GRAVEL with low cobble content. Gravel is fine to coarse subrounded to subangular concrete, flint, brick, asphalt. Cobbles are flint and brick.	
			Soil Sample					
							MADE GROUND: Red sandy medium to coarse GRAVEL with low cobble content. Gravel is fine to coarse subrounded to subangular brick, asphalt. Cobbles are brick.	
0.5							Yellow brown silty sandy CLAY.	
			Soil Sample	Y				
1							End of Trial Pit	
1.5								

ENVIRONMENTAL TESTPIT TP7

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
			Soil Sample				MADE GROUND: COBBLES AND BOULDERS of brick with a little finer material. Finer materials is red brown silty sandy gravel of brick.	
0.5			Soil Sample	Y			Yellow brown silty CLAY.	
1							End of Trial Pit	
1.5								

ENVIRONMENTAL TESTPIT TP8

PROJECT NUMBER LQ1146
PROJECT NAME Broomlands Farm
CLIENT Cordial Investments Ltd
ADDRESS Robin Hood Lane, Warnham, West Sussex, RH12 3RR

DATE 15/09/2023
METHOD Trial Pit Sampling
PLANT 5 tonne Mechanical Excavator

COORDINATES Not taken
COORD SYS -
SURFACE ELEVATION Not taken
LOGGED BY JH
CHECKED BY IB

COMMENTS

Depth (m)	PID	Penetration Resistance	Samples	Is Analysed?	Graphic Log	USCS	Material Description	Additional Observations
							MADE GROUND: Asphalt hardstanding.	
			Soil Sample	Y			MADE GROUND: Multicoloured sandy medium to coarse GRAVEL with medium cobble content. Gravel is fine to coarse subrounded to subangular concrete, flint, brick, asphalt. Cobbles are flint and brick.	
0.5							MADE GROUND: Multicoloured clayey sandy medium to coarse GRAVEL with medium cobble content. Gravel is fine to coarse subrounded to subangular concrete, flint, brick, asphalt. Cobbles are flint and brick.	
			Soil Sample	Y			Yellow Brown silty sandy CLAY.	
1							End of Trial Pit	
1.5								

Appendix 03 - Photographs



TP1



TP1 MADE GROUND



TP1 MADE GROUND (2)



TP1 NATURAL GROUND



TP2



TP2 MADE GROUND



TP2 MADE GROUND (2)



TP2 NATURAL GROUND



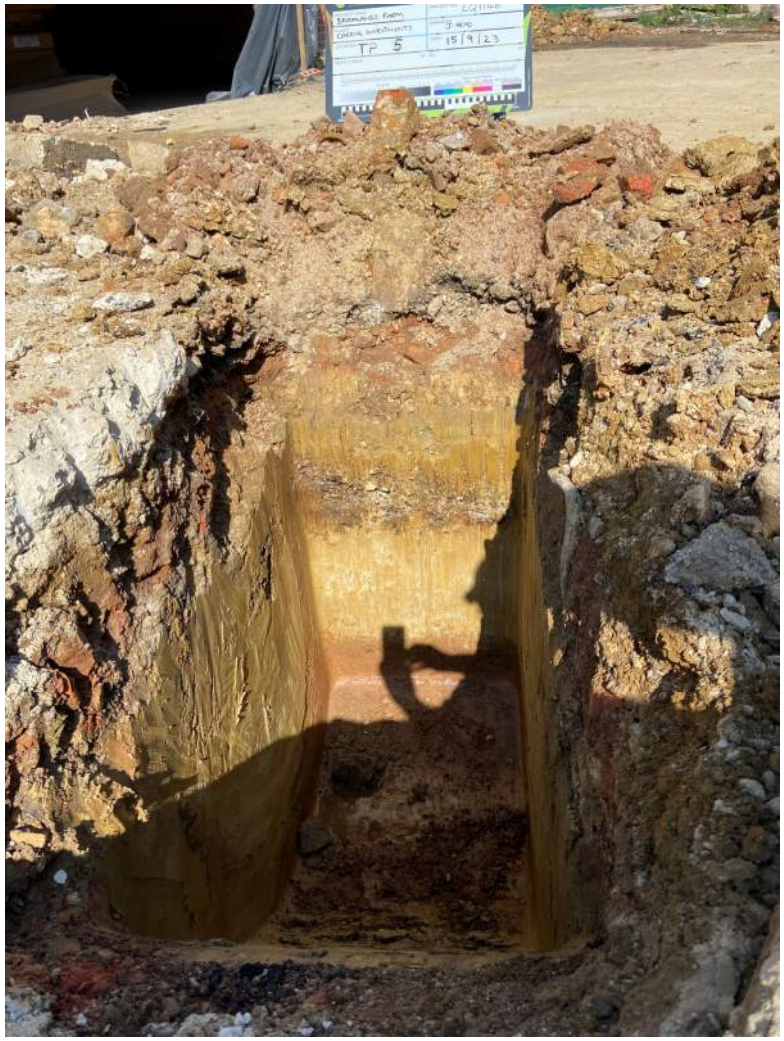
TP4



TP4 MADE GROUND



TP5



TP5 (2)



TP5 MADE GROUND



TP5 NATURAL GROUND



TP5 NATURAL GROUND (2)



TP6



TP6 MADE GROUND



TP6 MADE GROUND AND NATURAL GROUND



TP6 NATURAL GROUND



TP7



TP7 (2)



TP7 MADE GROUND



TP7 NATURAL GROUND



TP8



TP8 (2)



TP8 MADE GROUND



TP8 NATURAL GROUND

Appendix 04 – Laboratory Data Certificates

Jeremy Head
Kalex Ltd
Bridge House
The Ash
Little Hadham
Ware
SG11 2DG

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

DETS Report No: 23-11777

Site Reference:	Broomlands Farm, Warnham
Project / Job Ref:	LQ1146
Order No:	None Supplied
Sample Receipt Date:	19/09/2023
Sample Scheduled Date:	19/09/2023
Report Issue Number:	1
Reporting Date:	27/09/2023

[redacted]
Dave Ashworth
Technical Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23	15/09/23	15/09/23	15/09/23
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP1	TP2	TP3	TP3	TP4
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.60	0.80	0.40	0.80	0.20
Reporting Date: 27/09/2023	**DETS Sample No**	675551	675552	675553	675554	675555

Determinand	**Unit**	**RL**	**Accreditation**	(n)	(n)			(n)
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**	8.0	7.7	7.8	7.6	8.2
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	380	315	263	< 200	464
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	0.04	0.03	0.03	< 0.02	0.05
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	26	18	24	14	53
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.03	0.02	0.02	0.01	0.05
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
TOC (Total Organic Carbon)	%	< 0.1	**MCERTS**	1.4	2.2	0.9	0.8	2.7
Antimony (Sb)	mg/kg	< 1	NONE	1.7	2.4	2.1	2.8	1
Arsenic (As)	mg/kg	< 2	**MCERTS**	10	10	13	15	12
Barium (Ba)	mg/kg	< 2.5	**MCERTS**	66	52	61	62	125
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.8	0.9	0.8	1.1	1.1
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**	17	18	20	28	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**	15	20	16	18	15
Lead (Pb)	mg/kg	< 3	**MCERTS**	50	39	87	27	18
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	11	10	10	12	8
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	**MCERTS**	29	31	34	45	17
Zinc (Zn)	mg/kg	< 3	**MCERTS**	55	112	44	32	34
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

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23	15/09/23	15/09/23	15/09/23
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP4	TP5	TP5	TP6	TP7
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	0.30	0.50	1.30	0.70
Reporting Date: 27/09/2023	**DETS Sample No**	675556	675557	675558	675559	675560

Determinand	**Unit**	**RL**	**Accreditation**	(n)				
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**	8.1	11.0	7.6	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
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	499	2512	< 200	< 200	462
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	0.05	0.25	< 0.02	< 0.02	0.05
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	22	362	64	43	159
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.02	0.36	0.06	0.04	0.16
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
TOC (Total Organic Carbon)	%	< 0.1	**MCERTS**	0.7	1.2	0.5	0.4	1.9
Antimony (Sb)	mg/kg	< 1	NONE	2	1.6	3.5	2.4	2.9
Arsenic (As)	mg/kg	< 2	**MCERTS**	28	20	12	7	14
Barium (Ba)	mg/kg	< 2.5	**MCERTS**	89	115	52	50	92
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.8	0.7	1	0.7	1
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	0.4	< 0.2	< 0.2	0.2
Chromium (Cr)	mg/kg	< 2	**MCERTS**	14	17	25	29	19
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**	39	21	15	21	24
Lead (Pb)	mg/kg	< 3	**MCERTS**	171	666	44	18	43
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	**MCERTS**	1.2	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	11	14	11	12	14
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	**MCERTS**	31	29	41	41	33
Zinc (Zn)	mg/kg	< 3	**MCERTS**	39	161	33	25	146
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)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23			
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP8	TP8			
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.30	0.70			
Reporting Date: 27/09/2023	**DETS Sample No**	675561	675562			

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected			
pH	pH Units	N/a	**MCERTS**	7.8	7.8			
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1			
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	215	< 200			
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	0.02	< 0.02			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	37	43			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.04	0.04			
Sulphide	mg/kg	< 5	NONE	< 5	< 5			
TOC (Total Organic Carbon)	%	< 0.1	**MCERTS**	1.3	0.8			
Antimony (Sb)	mg/kg	< 1	NONE	2.3	2.9			
Arsenic (As)	mg/kg	< 2	**MCERTS**	10	13			
Barium (Ba)	mg/kg	< 2.5	**MCERTS**	99	100			
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	1.1	1.3			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2			
Chromium (Cr)	mg/kg	< 2	**MCERTS**	19	26			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	**MCERTS**	15	12			
Lead (Pb)	mg/kg	< 3	**MCERTS**	26	16			
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1			
Molybdenum (Mo)	mg/kg	< 1	**MCERTS**	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	**MCERTS**	14	15			
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2			
Vanadium (V)	mg/kg	< 1	**MCERTS**	34	42			
Zinc (Zn)	mg/kg	< 3	**MCERTS**	55	43			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 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)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23	15/09/23	15/09/23	15/09/23
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP1	TP2	TP3	TP3	TP4
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.60	0.80	0.40	0.80	0.20
Reporting Date: 27/09/2023	**DETS Sample No**	675551	675552	675553	675554	675555

Determinand	Unit	RL	Accreditation					
				(n)	(n)			(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	1.59
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	3.67
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	2.39
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	2.04
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.72	20.20
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.13	10.10
Fluoranthene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	2.51	69.40
Pyrene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	2.19	69.20
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.11	< 0.1	< 0.1	1.36	51.10
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.21	7.77
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.15	< 0.1	< 0.1	1.61	74.10
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.43	5.52
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.13	< 0.1	< 0.1	1.32	60.70
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.91	36.70
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.21	9.03
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.87	31.80
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	13.5	455

(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

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23	15/09/23	15/09/23	15/09/23
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP4	TP5	TP5	TP6	TP7
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	0.30	0.50	1.30	0.70
Reporting Date: 27/09/2023	**DETS Sample No**	675556	675557	675558	675559	675560

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	0.17	0.17	< 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	0.61	0.33	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.59	0.31	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.53	0.25	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.41	0.20	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.74	0.33	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.25	0.13	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.74	0.33	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.50	0.28	< 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	0.50	0.29	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5	2.6	< 1.6	< 1.6	< 1.6

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-11777	**Date Sampled**	15/09/23	15/09/23			
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP8	TP8			
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.30	0.70			
Reporting Date: 27/09/2023	**DETS Sample No**	675561	675562			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	0.16	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	0.16	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.13	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.19	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.18	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.17	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.19	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

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Soil Analysis Certificate - Sample Descriptions
DETS Report No: 23-11777
Kalex Ltd
Site Reference: Broomlands Farm, Warnham
Project / Job Ref: LQ1146
Order No: None Supplied
Reporting Date: 27/09/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
675551	TP1	None Supplied	0.60	9.1	Brown sandy gravel with stones and concrete
675552	TP2	None Supplied	0.80	15.5	Brown sandy gravel with stones and concrete
675553	TP3	None Supplied	0.40	12	Brown sandy clay with stones and concrete
675554	TP3	None Supplied	0.80	17.9	Brown sandy clay
675555	TP4	None Supplied	0.20	6.2	Brown sandy gravel with stones and concrete
675556	TP4	None Supplied	0.50	15.3	Light brown sandy gravel with stones and concrete
675557	TP5	None Supplied	0.30	10.3	Brown gravelly sand with stones and concrete
675558	TP5	None Supplied	0.50	17.7	Brown sandy clay
675559	TP6	None Supplied	1.30	21.1	Light brown clay
675560	TP7	None Supplied	0.70	15	Brown sandy clay with stones and brick
675561	TP8	None Supplied	0.30	16.3	Brown sandy clay with stones
675562	TP8	None Supplied	0.70	15.6	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-11777
Kalex Ltd
Site Reference: Broomlands Farm, Warnham
Project / Job Ref: LQ1146
Order No: None Supplied
Reporting Date: 27/09/2023

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

Jeremy Head
Kalex Ltd
Bridge House
The Ash
Little Hadham
Ware
SG11 2DG

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

DETS Report No: 23-12389

Site Reference:	Broomlands Farm, Warnham
Project / Job Ref:	LO1146
Order No:	None Supplied
Sample Receipt Date:	05/10/2023
Sample Scheduled Date:	05/10/2023
Report Issue Number:	1
Reporting Date:	11/10/2023

Authorised by:

[redacted]
Ela Mysiara
Quality Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-12389	**Date Sampled**	15/09/23	15/09/23	15/09/23		
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP3	TP4	TP5		
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.80	0.20	0.30		
Reporting Date: 11/10/2023	**DETS Sample No**	678455	678456	678457		

Determinand	Unit	RL	Accreditation	(n)		(n)		
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	8	< 3		
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	17	< 3		
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	48	< 10		
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	72	< 21		
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	4	< 2		
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	20	< 2		
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	272	< 3		
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	628	< 10		
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	925	< 21		
Total >C5 - C35	mg/kg	< 42	NONE	< 42	997	< 42		

(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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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-12389	**Date Sampled**	15/09/23	15/09/23	15/09/23		
Kalex Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Broomlands Farm, Warnham	**TP / BH No**	TP3	TP4	TP5		
Project / Job Ref: LQ1146	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.80	0.20	0.30		
Reporting Date: 11/10/2023	**DETS Sample No**	678455	678456	678457		

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

(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

DETS Ltd
I, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 23-12389		Date Sampled	15/09/23				Landfill Waste Acceptance Criteria Limits		
Kalex Ltd		Time Sampled	None Supplied				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Site Reference: Broomlands Farm, Warnham		TP / BH No	TP4						
Project / Job Ref: LQ1146		Additional Refs	None Supplied						
Order No: None Supplied		Depth (m)	0.20						
Reporting Date: 11/10/2023		DETS Sample No	678456						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	1				3%	5%	6%
Loss on Ignition[MU]	%	< 0.01	1.66				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	80				500	--	--
Total PAH[MU]	mg/kg	< 1.7	312				100	--	--
pH[MU]	pH Units	N/a	7.9				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.3				--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01			< 0.1	0.5	2	25
Barium[U]			0.03			0.3	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			< 0.005			< 0.05	0.5	10	70
Copper[U]			< 0.01			< 0.1	2	50	100
Mercury[U]			< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]			< 0.001			< 0.01	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			< 0.005			< 0.05	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7
Zinc[U]			< 0.005			< 0.05	4	50	200
Chloride[U]			2.5			< 10	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			8.2			< 10	1000	20000	50000
TDS			77			770	4000	60000	100000
Phenol Index[U]			< 0.01			< 0.1	1	-	-
DOC[U]			13.7			137	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.09						
Dry Matter (%)			94.8						
Moisture (%)			5.4						
Stage 1									
Volume Eluate L10 (litres)			0.89						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-12389	
Kalex Ltd	
Site Reference: Broomlands Farm, Warnham	
Project / Job Ref: LQ1146	
Order No: None Supplied	
Reporting Date: 11/10/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 678455	TP3	None Supplied	0.80	15.5	Light brown clay with stones
$ 678456	TP4	None Supplied	0.20	5.2	Brown clayey sand with stones and gravel
$ 678457	TP5	None Supplied	0.30	10.8	Light brown sand with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

$ samples exceeded recommended holding times

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Kent ME17 2JN
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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-12389
Kalex Ltd
Site Reference: Broomlands Farm, Warnham
Project / Job Ref: LQ1146
Order No: None Supplied
Reporting Date: 11/10/2023

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

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING 4480

Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-12389
Kalex Ltd
Site Reference: Broomlands Farm, Warnham
Project / Job Ref: LQ1146
Order No: None Supplied
Reporting Date: 11/10/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	10.4	%
Loss on Ignition	Soil	BS EN 12457	16.9	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	17.9	%
pH	Soil	BS EN 12457	0.282	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	19.5	%
Barium	Leachate	BS EN 12457	12.2	%
Cadmium	Leachate	BS EN 12457	17.2	%
Chromium	Leachate	BS EN 12457	20.7	%
Copper	Leachate	BS EN 12457	14.1	%
Mercury	Leachate	BS EN 12457	16.7	%
Molybdenum	Leachate	BS EN 12457	13.3	%
Nickel	Leachate	BS EN 12457	14.0	%
Lead	Leachate	BS EN 12457	12.1	%
Antimony	Leachate	BS EN 12457	16.1	%
Selenium	Leachate	BS EN 12457	15.5	%
Zinc	Leachate	BS EN 12457	14.0	%
Chloride	Leachate	BS EN 12457	15.7	%
Fluoride	Leachate	BS EN 12457	19.1	%
Sulphate	Leachate	BS EN 12457	27.6	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	20.4	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	16.9	%
pH	Soil	BS 3882: 2015	0.282	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	19.8	%
Copper	Soil	BS 3882: 2015	23.2	%
Nickel	Soil	BS 3882: 2015	32.6	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%

Appendix 05 – Soil Data Summary

Summary of Soil Quality Data

Client			**Cordial Investments Ltd**
Site			**Broomlands Farm**
Job Reference			**LQ1146**
Date			**20/10/2023**
Site Use			**Residential**
Key:			
Not analysed/no GAC	-		
Exceeds GAC	888		
Above detection limi	888		

Lab Report Number				23-11777	23-11777	23-11777	23-11777 23-12389	23-11777 23-12389	23-11777	23-11777 23-12389	23-11777	23-11777	23-11777	23-11777	23-11777
Date Sampled				15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023
TP / BH No				TP1	TP2	TP3	TP3	TP4	TP4	TP5	TP5	TP6	TP7	TP8	TP8
Additional Refs				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.80	0.40	0.80	0.20	0.50	0.30	0.50	1.30	0.70	0.30	0.70
DETS Sample No				675551	675552	675553	675554	675555	675556	675557	675558	675559	675560	675561	675562
Strata Type	**Units**	**Limit of detectio**	**GAC Residential with plant uptake @ 1% SOM**	Natural Soil	Natural Soil	Made Ground	Natural Soil	Made Ground	Made Ground	Made Ground	Made Ground	Natural Soil	Natural Soil	Made Ground	Natural Soil
Asbestos Screen (S)	N/a	N/a	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	-	8	7.7	7.8	7.6	8.2	8.1	11	7.6	7.5	7.8	7.8	7.8
Total Cyanide	mg/kg	< 1	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	< 200	-	380	315	263	< 200	464	499	2512	< 200	< 200	462	215	< 200
Total Sulphate as SO4	%	< 0.02	-	0.04	0.03	0.03	< 0.02	0.05	0.05	0.25	< 0.02	< 0.02	0.05	0.02	< 0.02
W/S Sulphate as SO4 (2:1)	mg/kg	< 200	-	26	18	24	14	53	22	362	64	43	159	37	43
W/S Sulphate as SO4 (2:1)	%	< 0.02	-	0.03	0.02	0.02	0.01	0.05	0.02	0.36	0.06	0.04	0.16	0.04	0.04
Sulphide	mg/kg	< 5	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
TOC (Total Organic Carbon)	%	< 0.1	-	1.4	2.2	0.9	0.8	2.7	0.7	1.2	0.5	0.4	1.9	1.3	0.8
Antimony (Sb)	mg/kg	< 1	-	1.7	2.4	2.1	2.8	1	2	1.6	3.5	2.4	2.9	2.3	2.9
Arsenic (aqua regia extractable)	mg/kg	< 2	37	10	10	13	15	12	28	20	12	7	14	10	13
Barium (Ba)	mg/kg	< 2.5	-	66	52	61	62	125	89	115	52	50	92	99	100
Beryllium (Be)	mg/kg	< 0.5	-	0.8	0.9	0.8	1.1	1.1	0.8	0.7	1	0.7	1	1.1	1.3
Boron (water soluble)	mg/kg	< 1	290	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium (aqua regia extractable)	mg/kg	< 0.2	11	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.4	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	< 2	910	17	18	20	28	8	14	17	25	29	19	19	26
Chromium (hexavalent)	mg/kg	< 2	6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Copper (aqua regia extractable)	mg/kg	< 4	2400	15	20	16	18	15	39	21	15	21	24	15	12
Lead (aqua regia extractable)	mg/kg	< 3	200	50	39	87	27	18	171	666	44	18	43	26	16
Mercury (elemental)	mg/kg	< 1	1.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	-	< 1	< 1	< 1	< 1	< 1	1.2	< 1	< 1	< 1	< 1	< 1	< 1
Nickel (aqua regia extractable)	mg/kg	< 3	180	11	10	10	12	8	11	14	11	12	14	14	15
Selenium (aqua regia extractable)	mg/kg	< 2	250	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	410	29	31	34	45	17	31	29	41	41	33	34	42
Zinc (aqua regia extractable)	mg/kg	< 3	3700	55	112	44	32	34	39	161	33	25	146	55	43
Total Phenols (monohydric)	mg/kg	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	mg/kg	0.1	2.3	< 0.1	< 0.1	< 0.1	< 0.1	1.59	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.1	170	< 0.1	< 0.1	< 0.1	< 0.1	3.67	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	0.1	210	< 0.1	< 0.1	< 0.1	< 0.1	2.39	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	0.1	170	< 0.1	< 0.1	< 0.1	< 0.1	2.04	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	0.1	95	< 0.1	< 0.1	< 0.1	0.72	20.2	0.17	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	0.1	2400	< 0.1	< 0.1	< 0.1	0.13	10.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	0.1	280	0.17	< 0.1	< 0.1	2.51	69.4	0.61	0.33	< 0.1	< 0.1	< 0.1	0.16	< 0.1
Pyrene	mg/kg	0.1	620	0.14	< 0.1	< 0.1	2.19	69.2	0.59	0.31	< 0.1	< 0.1	< 0.1	0.16	< 0.1
Benzo(a)anthracene	mg/kg	0.1	7.2	0.11	< 0.1	< 0.1	1.36	51.1	0.53	0.25	< 0.1	< 0.1	< 0.1	0.13	< 0.1
Chrysene	mg/kg	0.1	15	< 0.1	< 0.1	< 0.1	1.21	7.77	0.41	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	0.1	2.6	0.15	< 0.1	< 0.1	1.61	74.1	0.74	0.33	< 0.1	< 0.1	< 0.1	0.19	< 0.1
Benzo(k)fluoranthene	mg/kg	0.1	77	< 0.1	< 0.1	< 0.1	0.43	5.52	0.25	0.13	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	0.1	2.2	0.13	< 0.1	< 0.1	1.32	60.7	0.74	0.33	< 0.1	< 0.1	< 0.1	0.18	< 0.1
Indeno(123cd)pyrene	mg/kg	0.1	27	< 0.1	< 0.1	< 0.1	0.91	36.7	0.5	0.28	< 0.1	< 0.1	< 0.1	0.17	< 0.1
Dibenzo(ah)anthracene	mg/kg	0.1	0.24	< 0.1	< 0.1	< 0.1	0.21	9.03	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	0.1	320	< 0.1	< 0.1	< 0.1	0.87	31.8	0.5	0.29	< 0.1	< 0.1	< 0.1	0.19	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	-												

Summary of Soil Quality Data

Client			**Cordial Investments Ltd**
Site			**Broomlands Farm**
Job Reference			**LQ1146**
Date			**20/10/2023**
Site Use			**Residential**
Key:			
Not analysed/no GAC	-		
Exceeds GAC	888		
Above detection limi	888		

Lab Report Number				23-11777	23-11777	23-11777	23-11777 23-12389	23-11777 23-12389	23-11777	23-11777 23-12389	23-11777	23-11777	23-11777	23-11777	23-11777
Date Sampled				15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023	15/09/2023
TP / BH No				TP1	TP2	TP3	TP3	TP4	TP4	TP5	TP5	TP6	TP7	TP8	TP8
Additional Refs				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)			**GAC Residential**	0.60	0.80	0.40	0.80	0.20	0.50	0.30	0.50	1.30	0.70	0.30	0.70
DETS Sample No	**Units**	**Limit of detectio**	**with plant uptake @**	675551	675552	675553	675554	675555	675556	675557	675558	675559	675560	675561	675562
Strata Type			**1% SOM**	Natural Soil	Natural Soil	Made Ground	Natural Soil	Made Ground	Made Ground	Made Ground	Made Ground	Natural Soil	Natural Soil	Made Ground	Natural Soil
EPH (C10 - C40)	mg/kg	6	-	-	-	-		-	-			-	-	-	-
Aliphatic >C5 - C6	mg/kg	0.01	42	-	-	-	< 0.01	-	-	< 0.01	< 0.01	-	-	-	-
Aliphatic >C6 - C8	mg/kg	0.01	100	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	-	-
Aliphatic >C8 - C10	mg/kg	0.01	27	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
Aliphatic >C10 - C12	mg/kg	0.01	130	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
Aliphatic >C12 - C16	mg/kg	0.01	1100	-	-	-	< 3	-	-	8	< 3	-	-	-	-
Aliphatic >C16 - C21	mg/kg	0.01	-	-	-	-	< 3	-	-	17	< 3	-	-	-	-
Aliphatic >C21 - C34	mg/kg	0.01	-	-	-	-	< 10	-	-	48	< 10	-	-	-	-
Aliphatic (C5 - C34)	mg/kg	0.01	-	-	-	-	< 21	-	-	72	< 21	-	-	-	-
Aromatic >C5 - C7	mg/kg	0.01	70	-	-	-	< 0.01	-	-	< 0.01	< 0.01	-	-	-	-
Aromatic >C7 - C8	mg/kg	0.01	130	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	-	-
Aromatic >C8 - C10	mg/kg	0.01	34	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
Aromatic >C10 - C12	mg/kg	0.01	74	-	-	-	< 2	-	-	4	< 2	-	-	-	-
Aromatic >C12 - C16	mg/kg	0.01	140	-	-	-	< 2	-	-	20	< 2	-	-	-	-
Aromatic >C16 - C21	mg/kg	0.01	260	-	-	-	< 3	-	-	272	< 3	-	-	-	-
Aromatic >C21 - C35	mg/kg	0.01	1100	-	-	-	< 10	-	-	628	< 10	-	-	-	-
Aromatic (C5 - C35)	mg/kg		-	-	-	-	< 21	-	-	925	< 21	-	-	-	-
Total >C5 - C35	ug/kg	< 2	-	-	-	-	< 42	-	-	997	< 42	-	-	-	-
Benzene	ug/kg	< 2	87000	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
Toluene	ug/kg	< 5	130000	-	-	-	< 5	-	-	< 5	< 5	-	-	-	-
Ethylbenzene	ug/kg	< 2	56000	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
p & m-xylene	ug/kg	< 2	56000	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
o-xylene	ug/kg	< 2	60000	-	-	-	< 2	-	-	< 2	< 2	-	-	-	-
MTBE	ug/kg	< 5	-	-	-	-	< 5	-	-	< 5	< 5	-	-	-	-