

ENVIRONMENTAL REPORT

Site Address:	Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BP
Report Date:	November 2024
Project No.:	19241
Prepared for:	Westway Construction Ltd
Planning Application	Wokingham Council – No Current Applications.



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GENERAL NOTES

This report has been prepared based on the findings of investigations into the site's conditions using current available data which has been recovered from Envirocheck to provide environmental data in relation to the site and surrounding area. Where possible, local sources have been researched to gain a better understanding of the site's conditions. As part of this review, research has been undertaken with the Local Authority and the Environment Agency to the site's condition.

We can confirm that this report has been prepared based on the information gained and that this information is not exhaustive, and that subsequent research may reveal additional facts that may influence the reporting. Where possible, this information has been researched.

All geological information has been researched using the British Geological Society website, (the geology viewer). The disclaimer associated with this portal confirms 'The British Geological Society accept no responsibility for omissions or misinterpretations of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.

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The accuracy of map extracts cannot be guaranteed, and it should be recognized that different conditions on site may have existed between subsequent to the various map surveys.

We can confirm that within the assessment of the site, various websites have been visited and as such, we cannot confirm the validity of these sites and as such, this information is accepted de facto and without prejudice. Anyone relying on these sources does so at their own risk, however, Herts & Essex Site Investigations does undertake all reasonable care to ensure this data is relevant and correct.

It should be confirmed that the extent of review of this report has undertaken a broad review of on-site features which would promote a contamination ground risk, however, this does not include ecological features and in particular Japanese Knotweed which should be reviewed under separate cover.

A review of the site will be made to confirm the extent of obvious Asbestos products or sheet materials either on the surface of the site soil or evident above ground, however, does not constitute a full Asbestos Survey by any means. This should be sought under separate cover.

DOCUMENT INFORMATION AND CONTROL SHEET

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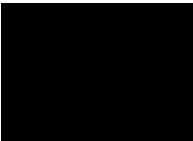
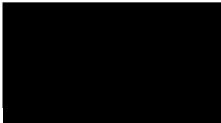
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1	Final	5 th November 2024		

SUMMARY

Client	Westway Construction Ltd	
Site Location	Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB	
Existing Development	Open Field	
Proposed Development	Development of residential houses, landscaping and access roads and pathways.	
Site Settings and Previous Uses	The site is identified as a field from the earliest map record until present day with Lane End House recorded in place from 1909. Surrounding the site, the house is generally undeveloped from the earliest map record. Some infrastructure is in place between 1872 and 1972, although, some distance away from the site. In 1972, a tank is in place 10 meters to the east with poultry houses 75 meters to the south. Some infrastructure extends away from the site. No other changes are recorded surrounding the site	
Geological Profile	Depth (m)	Hydrological Profile
Made Ground	Made Ground	Not Classified
Solid Geology	London Clay	Unproductive Stratum
Groundwater	No groundwater has been identified within the site	
Nearest Surface Water Feature	There are three (3no) records within 250m for inland rivers (non-tidally influenced), located 75m and 113m northwest, and 167m southwest.	
Groundwater Abstractions	There are no records within 1000m	
Source Protection Zone	There are no records within 250m.	
Potential Sources of Contamination	On Site - Unspecified Buildings. Off Site - Cuttings, Unspecified Pit, - Smithy, - Research Institute, - Farm, - Radioactive Substances, - Pollution Incident, - Waste / Waste Exemptions.	
Previous Investigations	No reports relating to contaminated land are known to us at the time of writing this report relating to the site.	
Human Health Risk	The site has identified Made Ground and potentially contaminated ground. These risks form the following layers and associated contamination: - FILL: - Isolated contamination from PAH to the areas of WS1 ONLY – Remediation works will be required to this area. Based on the above, remedial measures will likely be required areas where pathways to receptors are in place.	
Workforce	The above human health risk is in place within the site area, will promote a low risk on a short-term bases to any workforce within the areas. Appropriate PPE / RPE should be worn, and the soil contamination risk should be noted within any site inductions.	
Groundwater Risks	Due to the presence of a significant depth of clay across the site, risks to groundwater are generally considered low.	
Vapour Risks	Chemical testing of the soils show that low risks are in place. Vapour risk is not in place.	
Gas Risks	Ground gas risk has been identified as low.	
Construction Materials	Construction materials have been considered and no risk has been identified directly to any water main pipework developed at the site. Water main pipework can be laid in a conventional pipework system. Any water main pipework should be laid in clean corridors in order to prevent future risk to workforce used in the maintenance and repair of any water main system.	
Further Works	It is recommended that additional works will be required for the site in order to complete assessments which are detailed as follows: - Additional sampling to be completed across the site when full access to the site can be made. Submit reports to Local Authority and Environment Agency for review and confirm the risks identified in this report along with the further works proposed are suitable and acceptable. The exact details of remediation required for the site should be assessed and reported in a Remediation Strategy Report in order to comply with current best practice.	

ENVIRONMENTAL ASSESSMENT - PHASE 2

1 Context and Objectives of this report

1.1 Introduction

We have been asked by Westway Construction Ltd to undertake an investigation of the above site in order to assess the potential environmental impact of the historical use of the site on the proposed development. The development of this report has been completed utilising information and assessments completed by Your Environment Ltd developed from a desktop study completed in July 2021.

2 Report Objectives

The objectives of this report are to assess and define the extent of contamination within the site as a result of the investigation works undertaken to date.

The assessment of the site in this report have been prepared in accordance with key guidance documents as follows: -

- National Planning Policy Framework.
- BS 10175:2011+A2:2017, (Investigation of potentially contaminated sites. Code of practice - Code of practice).
- Land contamination risk management (LCRM).
- DEFRA: Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, (April 2012).
- Environment Agency, (2010) GPLC1 Guidance Principles for Land Contamination.

2.1 Limitations

The opinions expressed within this document and the comments and recommendations given, are based on the information gained, to date within a desktop study previously undertaken on the site. The interpretation of the data has been made by Herts & Essex Site Investigations.

Within any site investigation, materials sampled represent only a small proportion of the materials present on site. It is therefore possible that other conditions prevailing at the site which have not been revealed within the scope of this report, have not been considered. Where suspect materials are encountered during any further or future works within the site, additional specialist advice should be sought to assess whether any new information will materially affect the recommendations given within any physical ground investigation.

2.2 Planning Condition

A review of the online planning application with Wokingham Council has been completed and no current applications are in place.

3 Site Location and National Grid Reference

The site is located within a residential area of Shinfield, Wokingham, the details of which are summarised in Table 1 with the location plan of the site shown in Appendix 1, Sheet 1.

Table 1 **Site Detail**

Site Address:	Land Adjacent to Lane End House, Shinfield Road, Shinfield, RG2 9BB
Site assessed under	Site Owners Request - Aid as part of planning and warranties.
Current use of land:	Open land
Previous use of site, (if known)	As above
Grid Reference	NGR 473027 168707
Site Area	0.33 Hectares
Local Authority	Wokingham Council – No current Applications
Gradient of the site	The site forms a general level area of land which is laid to wild grasses. The site is entirely laid to soft landscaping.
Proximity of Controlled Waters, (if known)	There are three (3no) records within 250m for inland rivers (non-tidally influenced), located 75m and 113m northwest, and 167m southwest.

4 Review of Previous Reports or Documents Relating to the Site

4.1 Site Details

- The site is recorded as an existing open field.
- The proposals are to develop six new houses across the site with associated access and landscaping.
- The site is identified as a field from the earliest map record until present day with Lane End House recorded in place from 1909.
- Surrounding the site, the house is generally undeveloped from the earliest map record. Some infrastructure is in place between 1872 and 1972, although, some distance away from the site. In 1972, a tank is in place 10 meters to the east with poultry houses 75 meters to the south. Some infrastructure extends away from the site. No other changes are recorded surrounding the site
- The geology at the site is identified with a likely nominal depth of made ground which is seen to overlie London Clay.
- The site is identified as within an area which is defined as an Unproductive Stratum.
- No abstraction wells or licenses are recorded surrounding the site.
- The site does not lie within a Source Protection Zone.

4.2 Risks derived from DTS.

As a result of the works undertaken, the following have been confirmed as:

Source Risk

Off Site

On Site

- Unspecified Buildings.

- Cuttings, Unspecified Pit,
- Smithy,
- Research Institute,
- Farm,
- Radioactive Substances,
- Pollution Incident,
- Waste / Waste Exemptions.

Pathways

Potential pathways in place within the site area recorded as: -

- Dermal Contact.
- Inhalation of dust and fibres.
- Ingestion of dust and fibres via home-grown produce with plant uptake.
- Inhalation of vapours from soils.
- Inhalation of land Gases.
- Inhalation of vapours through contaminated groundwaters
- Ingestion of contaminated water through water main pipework.
- Leaching, lateral migration of shallow groundwater to a target receptor.
- Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.
- Plant Uptake.
- Inhalation Asbestos dust and fibres (from Asbestos within the building).
- Inhalation Asbestos dust and fibres (from asbestos within the soil).

Receptors

Potential receptors in place within the site area recorded as: -

- Human Health, (Site Development Personnel).
- Human Health, (Residents or staff).
- Adjoining Landowners, (unlikely).
- Flora.
- Groundwater.
- Abstraction wells.
- Surface water features.

5 Details of Preparatory Work

Preparatory works had been agreed with the client to gain access and undertake excavations within the site. This incorporates free access across the site area, the proposed investigation was not inhibited in any way and had free access across the site.

6 *Details of Investigation Objectives.*

Within the scope of this report, the objectives will form the following: -

- To anticipate regulatory action and provide sufficient data to overcome and answer any outstanding queries they may raise.
- Provide the relevant authorities sufficient information to satisfy any regulatory requirements set for the site.
- To ensure that the development, on completion, will be fit for the proposed use with all risk assessed and removed.
- It is proposed within this investigation to assess the suitability of the site for a new development which will incorporate residential structure and associated landscaping.
- In order to assess this suitability for development, it is proposed to use a source-pathway-receptor analogy, which, if broken, presents a reduced risk to the development.
- It is proposed to assess, where possible, sources of contamination within the site as a result of historical or ongoing use and whether these uses have pathways to receptors within the proposed development.

7 *Summery of Work Undertaken*

The scope of the works involved excavation of boreholes to gain a better and more visual understanding of the site conditions. This was undertaken at locations around the site and broadly confirmed the findings of the visual inspection of the site.

Samples were taken in containers dependent upon the proposed sampling regime required and placed in cool boxes where they were transported directly to the analytical chemist for assessment. These works included the following: -

7.1 *Investigation Works Completed*

The focus of the investigation was to confirm risks from the site which are detailed as follows: -

- Assessment of possible Asbestos in soils across the site area.
- Targeted sampling to access risk from Unspecified Buildings.
- Spatial sampling around the remainder of the site to provide a general assessment.

Initial Investigation – October 2024

- 6 No Competitor Rig Windowless Sampler borehole sunk to a maximum depth of 3.00 meters - Date of Works – October 2024.
- Chemical Sampling and Testing recovered from samples and sent to analytical chemist, (report date 23/10/2024).

7.2 *Historic Investigation*

Prior to our involvement in the development of the site, no historic investigations are known to us.

8 Location Plans for Exploratory Excavations

The plans which detail the location of the site, existing site use, proposed site use and identification of features on the site that may promote a risk are shown in Appendix 1. The plans also confirm the location of the excavations made on the site.

The areas of risk will be dictated by the risk classification given in this report and confirm where risk is in place relevant to the proposed end land use classification.

9 Description of Site Works and on/off Site Observations

In order to provide an easy understanding of the proposed development, we can confirm that the site will assess as a single section of land with the same proposed residential land use with potential for home grown produce.

The site has been reviewed and we can confirm that the geology within the site is as follows: -

Table 2 *Geological Profile*

Location	MADE GROUND	DEPTH	NATURAL GROUND	DEPTH
WS1	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.30m	Stiff becoming very stiff, brown, slightly silty, moderately sandy CLAY	3.00m+
WS2	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.20m	Very stiff, mottled brown, slightly silty, moderately sandy CLAY	3.00m+
WS3	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.30m	Stiff becoming very stiff, mottled brown, slightly silty, moderately sandy CLAY with rare gravel	3.00m+
WS4	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.20m	Very stiff, mottled brown, slightly silty, moderately sandy CLAY	3.00m+
WS5	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.40m	Very stiff, brown, slightly silty, slightly sandy CLAY	3.00m+
WS6	Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND	0.40m	Stiff becoming very stiff, brown, slightly silty, moderately sandy CLAY	3.00m+

Table 3 *Groundwater Summary*

Location	Depth Water Struck	Depth of Standing Water (m)	Rate of Inflow
WS1	DRY		
WS2	DRY		
WS3	DRY		
WS4	DRY		
WS5	DRY		
WS6	DRY		

Any comments in relation to groundwater is based on short term observations. Should groundwater monitoring be required, (which may impact on the development of the site), standpipes and inspections should be requested and completed. All current groundwater comments are based on limited information to date.

The various strata encountered within each test location recorded within the logs forming appendix 2.

At the time of logging the samples recovered from the site a further visual and olfactory inspection has been completed to note any potential sources of contamination or risk. No obvious risk was identified.

Based on the above, the risk assessment and sampling proposals set out within the Desktop Study a suite of chemical tests were completed from across the site area as noted in Table 6 completed was undertaken in line with.

10 Contamination Assessment

10.1 Contamination

In order to assess the site, the site will be considered based on the historic land use of the site which will depict the extent of testing undertaken to consider risk within the area and additionally, the site will consider the proposed land use for assessment of whether target values have been exceeded for that particular land use.

10.2 Human Health Risk

As part of a generic assessment of the subsoil conditions, a comparison has initially been made using Generic Quantitative Assessment Criteria, (GQRA), values for contaminants derived the Environment Agency in Soil Guideline Values released in LCRM, (Land Contamination Risk Management), for Human Health Risk Assessment. For the proposed land use of this site, we can confirm that Generic Quantitative Assessment Criteria have been identified for the site. This is the order in which the Health Criteria Values will be used.

We are aware that the CIEH have published a 'Position Statement' which confirms that they do not wish to be associated with Category 4 screening values under the planning regime and as such would revert back to their own values, although, we are also aware that Local Authorities recommend the use of these value, although this is dependent upon the council EHO. As detailed above, the order of progression will be EA - SGV's, LQM / CIEH Data and then C4SL data.

It is possible that where exceedance of these values are recorded, a more Detailed, Qualitative Risk Assessment, (DQRA), could be completed using site specific scenarios and toxicological properties of the subsoil and site conditions to derive Site Specific Assessment Criteria, (SSAC), for the site. The assessment of testing has been completed as follows and reports the initial risks considered in place compared to GQRA.

For ease of assessment, we can confirm that the site will be considered based on a single zone of development with the following land use: -

Zone 1

The Site

Residential Land Use with Homegrown Produce

A comparison of the data recovered from the sample analysis against the human health risk assessments for Residential Land Use with Homegrown Produce has been completed, the standards used are shown in the table below and where exceedance of the relevant generic guidance values have been identified, if any, these are detailed within Table 6. A complete copy of all the chemical data is recorded within the appendix of this report.

Table 4 **Generic Guidance Values Criteria - Residential Land Use with Home Grown Produce**

Pollutant	Allowable (mg/kg⁻¹)	Level	Source
Asbestos	Absent /Present		
Inorganic Arsenic	37		S4UL
Beryllium	1.7		S4UL
Cadmium	11		S4UL
Chromium, (III)	910		S4UL
Chromium, (VI)	6		S4UL
Copper	2400		S4UL
Lead	200		At Risk Soils
Mercury, (Elemental)	1.2		S4UL
Mercury, (Inorganic)	40		S4UL
Mercury, (Methyl)	11		S4UL
Nickel	180		S4UL
Selenium	250		S4UL
Vanadium	410		S4UL
Zinc	3700		S4UL
Boron	290		S4UL
TPH, (Total)	>20 required assessment	Speciated	

Pollutant	Allowable Level (mg/kg-1)			Source
	1% SOM	2.5% SOM	6% SOM	
Naphthalene	2.3	5.6	13	
Acenaphthylene	170	420	920	
Acenaphthene	210	510	1100	
Flourene	170	400	860	
Phenanthrene	95	220	440	
Anthracene	2400	5400	11000	
Flouranthene	280	560	890	
Pyrene	620	1200	2000	
Benzo(a)anthracene	7.2	11	13	S4UL
Chrysene	15	22	27	
Benzo(b)flouranthene	2.6	3.3	3.7	
Benzo(k)flouranthene	77	93	100	
Benzo(a)pyrene	2.2	2.7	3	
Indeno(1,2,3-cd)pyrene	27	36	41	
Dibenzo(ah)anthracene	0.24	0.28	0.3	
Benzo(g,h,i)perylene	320	340	350	
Phenols	280	550	1100	LQM/CIEH (S4UL)

Table 5 **TPHs - Generic Guidance Values Criteria - Residential Land Use with Home Grown Produce**

Pollutant	1% Soil Organic Matter	2.5% Soil Organic Matter	6% Soil Organic Matter	Source
Total Petroleum Hydrocarbons				
Aliphatic Fractions				
EC > 5-6	42	78	160	S4UL
EC > 6-8	100	230	530	
EC > 8-10	27	65	150	
EC > 10-12	130	330	760	
EC > 12-16	1100	2400	4300	
EC > 16-35	65000	92000	110000	
EC > 35-44	65000	92000	110000	
Aromatic Fractions				
EC > 5-7	70	140	300	S4UL
EC > 7-8	130	290	660	
EC > 8-10	34	83	190	
EC > 10-12	74	180	380	
EC > 12-16	140	330	660	
EC > 16-21	260	540	930	
EC > 21-35	1100	1500	1700	
EC > 33–44	1100	1500	1700	
Aliphatic & Aromatic				
EC > 44-70	1600	1800	1900	S4UL

Table 6 **Sampling and Testing Schedule**

Existing Site Use	Proposed Site Use	Chemical Testing Date	stratum sampled	Depth Of Stratum (m b.g.l)	Sample Location	Sample Depth (m)			HESI Suite 1	PAHs, (Speciated)	TPHS, (TPHCWG)	Asbestos	WAC	Type Of Asbestos Identified	Asbestos Quantification %	Dibenz(a,h)Ant hracene (mg/kg)
OPEN LAND	RESIDENTIAL LAND USE	23 rd October 2024	FILL	0.30m	WS1	0.20	-	0.25	✓	✓	✓	✓		NONE	-	0.49
			FILL	0.20m	WS2	0.10	-	0.15	✓	✓	✓	✓		NONE	-	
			FILL	0.30m	WS3	0.15	-	0.20	✓	✓	✓	✓		NONE	-	
			NAT	3.00m	WS3	0.60	-	0.65	✓	✓	✓	✓		NONE	-	
			FILL	0.20m	WS4	0.05	-	0.10	✓	✓	✓	✓		NONE	-	
			FILL	0.40m	WS5	0.30	-	0.35	✓	✓	✓	✓	✓	NONE	-	
			FILL	0.40m	WS6	0.30	-	0.35	✓	✓	✓	✓		NONE	-	
* Indicates the value which forms the lowest trigger level.															1%	0.24
Where PAHs are additionally tested within the VOC List. the highest values have been taken.															2.5%	0.28
For the purposes of assessment where not stated otherwise Soil Organic Matter values of 2.5% has been used.															5%	0.30
All measurements are given in mg/kg																

10.3 Sources of Risk within Soils

Based on the information gained, we can confirm that areas of the site have recorded contamination in place above a human health risk level which can be confirmed as follows: -

- Isolated and very marginal levels of contamination from Dibenz(a,h)Anthracene, (identified value 0.49mg/kg, allowable level 0.28mg/kg).
 - PAHs, (which Dibenz(ah)Anthracene forms a pollutant), are derived from ash and clinker materials and burnt debris. As such, the presence of this isolated and marginal pollutant are likely small amounts of ash and clinker in the subsoil.

10.4 Human Health Source Conclusions

Risk based on assessments of the site confirm that risk is in place as follows: -

Table 7 Soil Contamination Risks – Human Health

Risk Factor		Risks in place	Remediation
Targeted Risks			Remediation action required.
		Dibenz(a,h)Anthracene	Assume as Widespread.
		Isolated to WS1	OR Additional sampling to comply with BS10175:2011, 5m grid and to confirm risk.
Spatial Risks		NONE	No Action Spatially

10.5 Ground and Surface Water Source

The nearest surface water feature is recorded as three (3no) records within 250m for inland rivers (non-tidally influenced), located 75m and 113m northwest, and 167m southwest.

No information with regards discharge consents and pollution incidents have been provided.

No regulatory features surround the site which would promote a risk.

Substantiated pollution incident registers are recorded surrounding the site but are too far from the site to cause risk.

Isolated risk from **PAHs promote low risk to groundwater.**

Considering the above, we can confirm that the likely current and historical impact of pollution on a groundwater system underlying the site will be minimal due to the presents of London clay and the absence of a groundwater system or controlled surface water features, and the EA consider the water environment at this site is of low environmental sensitivity.

10.6 Land Gas Assessments

In accordance with, BS 10175:2011, BS 8485:2007, CIRIA C665 and CIRIA R149, we do not consider significant ground gas risk likely to be in place. This is primarily due to heavy clay across the site which will restrict mobilisation of ground gases from or to the site.

We have considered a number of factors in the assessment and decision making in relation to ground gases which are detailed below which has broadly been derived from RB17, (A Pragmatic Approach to Ground Gas Risk Assessment – November 2012): -

- Conceptual Site Model.
- Soil Type, (made ground, clay, gravel, organic, peat, chalk) in relation to permeability.
- CO₂ and CH₄ concentration.
- O₂ concentration in conjunction with CO₂ and CH₄, (i.e. any other vapours present – hydrocarbons etc which reduce O₂ levels and see no CO₂ gases or methane, therefore what's utilizing the O₂).
- Source of ground gas.
- Distance from site.
- Atmospheric Pressure.
- Total Organic Carbon, (where available).
- Groundwater presence / absence.
- Response Zones.
- Variable Stratum.
- Proposed construction.

Based on the above, the following criteria should be considered: -

- The soil types in place have been identified as clays which will promote a low migratory potential of ground gases.
- The samples record relatively low organic matter within the samples tested.
- The response zones would promote an accurate depiction of the ground gas regime at the site as this is an entirely permeable stratum and would allow for ground gas movement if being generated.

Based on this information, we can confirm that the classification for ground gas regime is low and classified as CS1.

10.7 Water Main Pipework

New water main pipework can be laid in a conventional pipework system.

Any water main pipework should be laid in clean corridors in order to prevent future risk to workforce used in the maintenance and repair of any water main system.

10.9 Building Risks

Based on the information shown, we can confirm that the risk from explosive land gases is low based on the information identified. The justification for low ground gas risk has been identified and reviewed in Section 10.6.

Considering the risk from Sulphates to concrete we can confirm that the chemical testing has been completed.

Based on the information gained, we can confirm that a classification of DS1-AC1s should be adopted for the site. This would suggest that a conventional cement mix can be used for the development, although testing of the deeper soils should be completed.

10.10 General Source Risk Conclusions

Table 8 **Source Risk Conclusions**

Receptor	Source	Pollutant	Location	Action
Human Health Risks				
	Soils	PAHs.	Isolated risk in the location of WS1	Remediation required.
	Land Gases	NONE		Clay restricts mobilization of ground gases.
	Workforce	PAHs.	Isolated risk in the location of WS1	PPE, RPE and training required.
Groundwater Risk				
	Groundwater	NONE		Limited risk due to clay.
Building Materials				
	Soils	NONE		

Additional testing is recommended to further assess the risks found within the location of WS1, to aid in isolating the extent of the targeted risks identified within the site.

11 Risk Assessment Based on Source Risk

Considering the presence of contamination which has been identified above, we confirm the following outlines the assessment of the site completed and way forward for the site.

Table 9 Risk Assessment A

Contaminant	Receptors	Pathways	Mitigation / Discussion
PAHs Isolated to WS1	Site Users Construction Workers.	Direct contact. Inhalation dust and fibers. Dermal contact	Remediation required. Appropriate PPE. Appropriate RAMs and MMP.
		Ingestion of home-grown produce	Remediation required.
		Ingestion of contaminated water through water main pipework	Remediation required OR Mitigation measure to be installed.
		Inhalation of vapours	No vapour risk from PAH contamination identified.
		Inhalation of vapours through contaminated ground waters	No vapour risk from PAH contamination identified.
	Adjoining Landowners	Direct contact. Inhalation dust and fibers. Dermal contact	These contaminants are unlikely to be highly mobile and as such are unlikely to impact on the adjoining land.
		Ingestion of home-grown produce	
		Ingestion of contaminated water through water main pipework	
		Inhalation of vapours	
		Inhalation of vapours through contaminated ground waters	
	Controlled Surface Water;	Leaching, lateral migration of shallow groundwater to a target receptor.	The distance from the site to the surface water feature will reduce the likelihood of risk.
	Ground Water. Abstraction Well.	Leaching, migration through fissures / cracks which may migrate to a groundwater receptor.	Based on the levels in place risk to the groundwater is low based on the information gained.
	Flora	Plant Uptake Direct Contact	Based on BS 3882: 2015 there are no allowable levels for Lead although the levels are not significant as such are unlikely to form a phytotoxic risk.

12 Implications of the End Use of the Site

Within the assessment of the site completed within this report, we can confirm that existing source – pathway – receptor risk assessments are now in place based on actual site data. Based on the change in use of the site through this proposed development, it is possible that pathways to receptors will be either be removed or enhanced such that risk may be in place / removed.

The end use risks based on pathways are discussed below and relate to the site as a whole: -

Hard Landscaping - will effectively cap off any contamination and remove risk, although, the placement of hard surfaces across the site should be confirmed as part of the planning application and not form a system of remediation that homeowners could remove as part of the ongoing habitation.

- **Maintain a watching brief.**

Soft Landscaping - will form an area where risk is in place and as such, remedial measures are likely to be required.

Under Buildings - will effectively cap off any contamination and remove risk.

Services - By examination of the UKWIR, (Guidance for the selection of water supply pipes to be used in brownfield sites) we can confirm the risks associated with human health from water main feeds have been considered not in place, as such, preventative measures **are unlikely to** be required for the site.

13 Outline Remediation Measures

Considering the above, we would suggest that the following outline remediation measures could be employed in order to develop the site based on the existing data. This will be based on the assumption that there is isolated risk within the site area. although further testing is needed to confirm this.

13.1 Cover Systems - NHBC

The remedial measures are likely to include one of the following cover systems for the site: -

Engineered cover systems – designed to provide the complete separation of the receptor from the hazard and to perform a number of functions including limiting upward migration of contaminants due to capillary rise and controlling the downward infiltration of water.

Simple cover systems – to provide a reduction of the hazard to human health and to provide a suitable medium for plant growth.

Consultation within NHBC guidance documents, (Cover Systems for Land Regeneration), confirm that maximum depths of cover will be required for residential sites and overcome the inherent issues with earthworm activity, burrowing animals, effects of trees and plants, digging during garden activities and intermixing of leaf fall. Justification of this is included within the NHBC guidance document.

It is also recorded that as part of the review, a questionnaire was sent out to various Developers, Consultants and Regulators who all confirmed variable degrees of cover system based on the level of contamination which ranged

from 0.30 meters to 3.00 meters, although, the report by NHBC removes these as conservative and the suggestion of a 0.60 meter cover system adopted by the report as a maximum depth of cover required to be sufficient.

It should be noted that these cover systems do not overcome the risks from soil gases, hydrocarbons, highly elevated Mercury or Arsenic, the groundwater or any controlled waters, significant contamination, deep excavations, services, slopes or areas where rabbit or badger populations are significant.

Table 10 **Outline Remediation Measures for end use of the site**

Land Use	Mitigation Measure	Any Additional Works	Depth to remove risk	Confirmation required.
Communal Areas & Shrub Planting Areas.	Isolated risk from PAHs in WS1	Remediation Required.	Excavate a maximum of 0.60 meters of the contaminated layer, (defined within this report as the Made Ground) and confirm the geology at depth.	Validation works will be required. Validation of the base of excavation and validation of any soils brought onto the site.
	Excavate and remove soils which are assessed to form a risk and placement of clean inert soils to a minimum depth of 0.60 meters. (See Cover Systems above for justification).		If the contaminated layer is still in place, recover validation samples from the base of the excavation to confirm the contamination status of the soils for future assessment and record. Lay Geo-textile over this contaminated layer to warn future excavators that risk is present below.	
Hard Landscaping.	Hard landscaping will remove any risks through pathway removal. Must be a permanent feature, (not patio's).	confirmation will be required from the Local or relevant Authority that hard landscaping areas will require specific permission to remove any and / or all hard surfaces which may expose contamination to human receptors.	If clean soils are encountered, recover validation samples from the base to confirm that risk has been removed for validation purposes. This can be at any depth provided that clean soils are identified and recorded.	
	Patio's should assume a soft landscape finish.			
Under Buildings.	No Action			Complete validation testing to the sides (if pre validation is not completed) and base of the remediation cell.
Water Main.	Any new water main installations can be installed using Conventional pipework.	None.	None.	To be confirmed with the relevant statutory authority.
	Any new water main pipework should be laid in clean corridors.			
Controlled Waters – Surface Water & Ground Water.	Groundwater risks removed based on the current site condition.			
	Consider possible future development and pathway creation for contamination to impact on the underlying Secondary Aquifer.			

14 Waste Disposal

The Landfill Directive sets rigorous standards to reduce both our reliance on landfill and the environmental impact of wastes disposed of by landfill. Tighter operational and infrastructure standards limit the types and nature of waste that we can send to landfill and place greater restrictions on the location of landfill sites.

The key points are:

- Certain kinds of waste cannot be landfilled.
- Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes you must follow before wastes can be accepted at a landfill site.

The Council Decision lays down waste acceptance procedures (WAP). From this foundation landfill operators should build their own site-specific WAP. The Council Decision WAP must be used to determine whether a waste is suitable to go to landfill, and if so, to which class of landfill. The WAP consist of three steps to identify and periodically check the main characteristics of the waste (see Section 9):

- **Level 1:** basic characterisation. Before you can send a load of waste to landfill, you need to know its composition and properties so you can determine whether it is suitable for acceptance and at which class of site (see the Council Decision Annex, paragraph 1.1).
- **Level 2:** compliance testing. If you produce waste that is 'regularly arising', e.g. from an industrial process, you must periodically check the waste to ensure that those properties have not changed (see the Council Decision Annex, paragraph 1.2).
- **Level 3:** on-site verification. The operator must check each delivery at the landfill to verify that it is the expected waste and that it has not been contaminated in storage or transport (see the Council Decision Annex, paragraph 1.3).

Before a waste producer can take waste to a landfill site for disposal, they need to check the landfill site has the appropriate permit and must have completed the following:

- Duty of care transfer note/Hazardous Waste consignment note.
- Pre-treatment declaration form.
- Basic characterisation of the waste, to include:
 - Description of the waste.
 - Waste code (using List of Wastes).
 - Composition of the waste (by testing, if necessary).
 - WAC testing (if required).

14.1 WAC Testing

No WAC Testing has been completed at the site. For full classification of the materials for muck away purposes. In line with best practice, we can confirm that the classification and correct disposal of waste should be adhered to in line with Waste Framework Directive. This will include the classification of the waste, appropriate paperwork to be recorded for disposal routes, confirmation of waste classification upon excavation of the waste and validation of its removal.

15 Source Risk Conclusions

HUMAN HEALTH RISK

The site has identified Made Ground and potentially contaminated ground. These risks form the following layers and associated contamination: -

FILL: - Isolated risk from **PAHs in WS1 within the made ground only to a shallow depth, (0.30m).**

Based on the above, **remedial measures will likely be required areas where pathways to receptors are in place.**

WORKFORCE

The above human health risk is in place within the site area, will promote a low risk on a short-term bases to any workforce within the areas. **Appropriate PPE / RPE should be worn and the soil contamination risk should be noted within any site inductions. This is particularly relevant to the Asbestos risks.**

GROUNDWATER RISKS

Risks to groundwater is considered low, although if groundwater is in place within the standpipe, testing for the elevated risks within the site is recommended.

VAPOUR RISKS

Chemical testing of the soils show that low risks are in place. Vapour risk is not in place.

GAS RISKS

Land Gas risk is low.

CONSTRUCTION MATERIALS

Water main pipework has been considered and with no risk.

Any water main pipework should be laid in clean corridors.

FURTHER WORKS

It is recommended that additional works will be required for the site in order to complete assessments which are detailed as follows: -

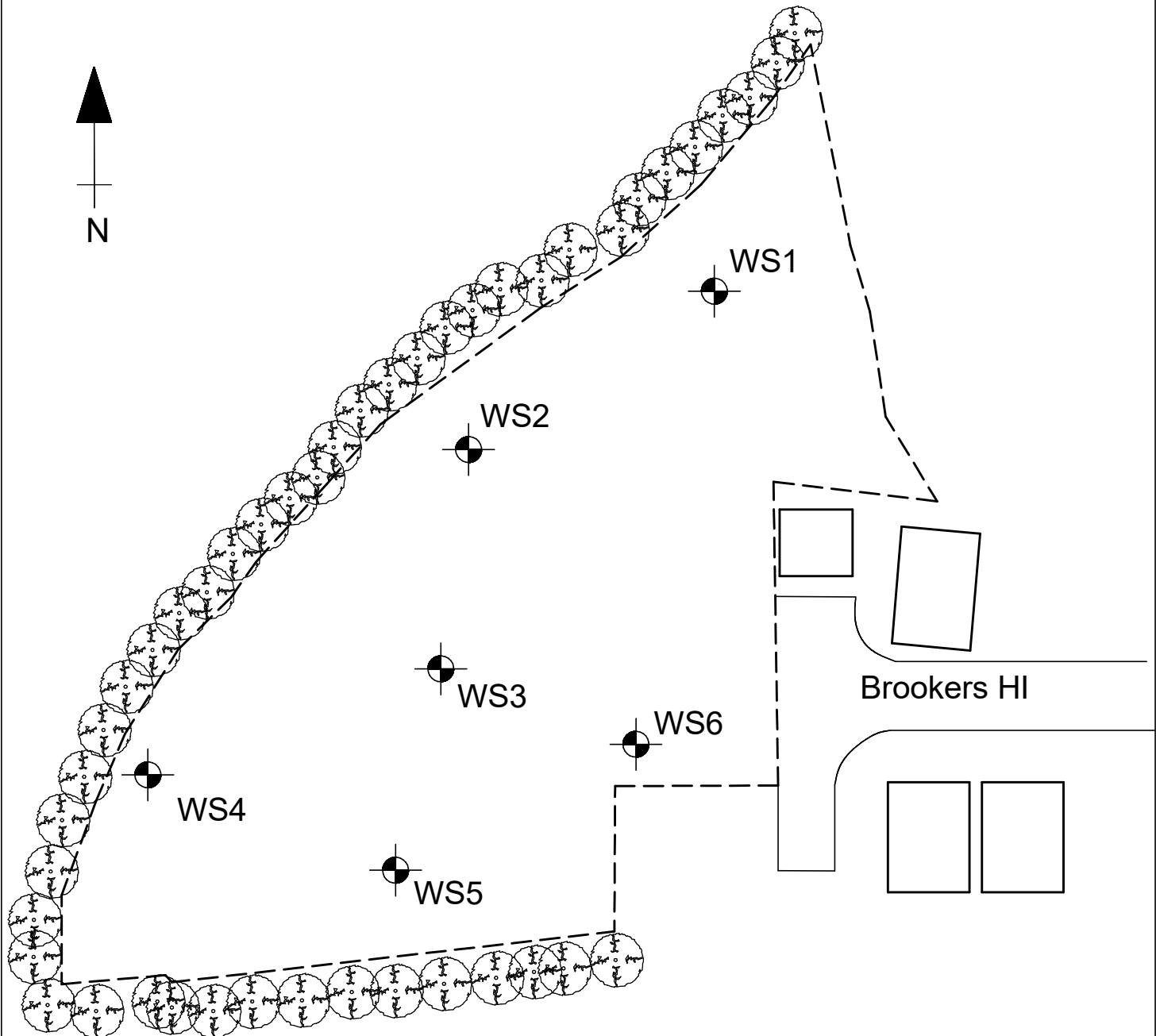
- Additional testing around WS1 to further isolate contamination from Dibenz(a,h)Anthracene. We would suggest that an additional six samples are recovered and tested. .

Submit reports to Local Authority and Environment Agency for review and confirm the risks identified in this report along with the further works proposed are suitable and acceptable.

The exact details of remediation required for the site should be assessed and reported in a Remediation Strategy Report in order to comply with current best practice.

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Existing Site Plan



Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler One

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.30	0.30	DRY	1	U	G.L. - 1.00				
Stiff becoming very stiff, brown, slightly silty, moderately sandy CLAY					2	U	1.00 - 2.00				1.00
			2.70		3	U	2.00 - 3.00				
		3.00									
Window Sampler Closed at 3.00m bgl Roots present to 2.00m bgl											

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
- Water Struck

D - Disturbed Sample
- Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler Two

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.20	0.20	DRY	1	U	G.L. - 1.00				
Very stiff, mottled brown, slightly silty, moderately sandy CLAY					2	U	1.00 - 2.00				1.00
			2.80		3	U	2.00 - 3.00				
		0.20									
Window Sampler Closed at 3.00m bgl Roots present to 1.20m bgl											

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
- Water Struck

D - Disturbed Sample
- Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler Three

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.30	0.30	DRY	1	U	G.L. - 1.00				
Stiff becoming very stiff, mottled brown, slightly silty, moderately sandy CLAY with rare gravel					2	U	1.00 - 2.00				1.00
			2.70		3	U	2.00 - 3.00				
Window Sampler Closed at 3.00m bgl Roots present to 1.10m bgl		3.00									

Remarks

Scale 1 : 25

 Key : U - Undisturbed Sample
 (100mm diameter)

 B - Bulk Sample
 - Water Struck

 D - Disturbed Sample
 - Water Standing

 W - Water Sample
 T - Chemical Tub

 N - SPT N-Value
 V - Vane Test, (kN.m²)

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler Four

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.20	0.20	DRY	1	U	G.L. - 1.00				1.00
Very stiff, mottled brown, slightly silty, moderately sandy CLAY					2	U	1.00 - 2.00				
			2.80		3	U	2.00 - 3.00				
		3.00									
Window Sampler Closed at 3.00m bgl Roots present to 1.00m bgl											

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
- Water Struck

D - Disturbed Sample
- Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler Five

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.40	0.40	DRY	1	U	G.L. - 1.00				
Very stiff, brown, slightly silty, slightly sandy CLAY					2	U	1.00 - 2.00				1.00
			2.60		3	U	2.00 - 3.00				
Window Sampler Closed at 3.00m bgl Roots present to 1.00m bgl		3.00									

Remarks

Scale 1 : 25

Key : U - Undisturbed Sample
(100mm diameter)

B - Bulk Sample
 - Water Struck

D - Disturbed Sample
 - Water Standing

W - Water Sample
T - Chemical Tub

N - SPT N-Value
V - Vane Test, (kN.m²)

Land Adjacent To Lane End House, Shinfield Road, Shinfield, RG2 9BB

Window Sampler Six

Description Of Stratum	Legend	Depth	Thickness (m)	Water Level	Samples			S.P.T N-Value or Vane Strength	VOC's (ppm)	Installations	Casing Depth, (m)
					No	Type	Depth (m)				
Medium dense/compact, brown, slightly silty, slightly sandy TOPSOIL - MADE GROUND		0.40	0.40	DRY	1	U	G.L. - 1.00				
Stiff becoming very stiff, brown, slightly silty, moderately sandy CLAY			2.60		2	U	1.00 - 2.00				1.00
					3	U	2.00 - 3.00				
Window Sampler Closed at 3.00m bgl Roots present to 0.90m bgl		3.00									

Remarks

Scale 1 : 25

 Key : U - Undisturbed Sample
 (100mm diameter)

 B - Bulk Sample
 - Water Struck

 D - Disturbed Sample
 - Water Standing

 W - Water Sample
 T - Chemical Tub

 N - SPT N-Value
 V - Vane Test, (kN.m²)

Please note that any testing scheduled where a matrix option is not selected may be subject to Non-Conformance.
Failure to complete all sections of this form may delay analysis.

[illegible]



Final Report

Report No.: 24-34783-1

Initial Date of Issue: 03-Nov-2024

Re-Issue Details:

Client Herts & Essex Site Investigations

Client Address: Unit J8
Peek Business Park
Woodside
Bishops Stortford
Hertfordshire
CM23 5RG

Contact(s): Chris Gray
Dafydd Hudd
Rebecca Chamberlain

Project 19241 Lane End House

Quotation No.: **Date Received:** 28-Oct-2024

Order No.: 19241 **Date Instructed:** 28-Oct-2024

No. of Samples: 7

Turnaround (Wkdays): 5 **Results Due:** 01-Nov-2024

Date Approved: 03-Nov-2024

Approved By:



Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: 19241 Lane End House

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-34783	24-34783	24-34783	24-34783	24-34783	24-34783	24-34783
Quotation No.:		Chemtest Sample ID.:				1886150	1886151	1886152	1886153	1886154	1886155	1886156
		Sample Location:				WS1	WS2	WS3	WS3	WS4	WS5	WS6
		Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.20	0.10	0.15	0.60	0.05	0.30	0.30
		Date Sampled:				23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
ACM Type		U	2192		N/A	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	15	15	13	21	20	10	14
Stones and Removed Materials		N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones and Roots	Stones and Roots	Roots	Roots	Stones and Roots	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Clay	Clay
pH at 20C		M	2010		4.0	6.9	7.0	6.7	7.4	6.1	7.8	7.1
Electrical Conductivity (2:1)		N	2020	µS/cm	1.0	140	100	180	78	120	98	320
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	0.51
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (Free)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)		U	2430	%	0.010	0.075	0.084	0.065	0.012	0.077	0.025	0.071
Arsenic		M	2455	mg/kg	0.5	18	10	16	18	9.6	18	24
Barium		M	2455	mg/kg	0.5						43	
Cadmium		M	2455	mg/kg	0.10	0.22	0.14	0.19	< 0.10	0.22	< 0.10	0.17
Chromium		M	2455	mg/kg	0.5						42	
Molybdenum		M	2455	mg/kg	0.5						0.7	
Antimony		N	2455	mg/kg	2.0						< 2.0	
Copper		M	2455	mg/kg	0.50	22	29	26	19	18	15	33
Mercury		M	2455	mg/kg	0.05	0.27	0.45	0.27	0.06	1.4	0.06	0.37
Nickel		M	2455	mg/kg	0.50	16	14	17	20	10	18	24
Lead		M	2455	mg/kg	0.50	69	58	57	16	110	19	69
Selenium		M	2455	mg/kg	0.25	0.88	0.59	0.75	0.82	1.3	0.86	1.1
Zinc		M	2455	mg/kg	0.50	79	62	61	45	66	48	91
Chromium (Trivalent)		N	2490	mg/kg	1.0	29	19	30	48	19	42	46
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.13	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.3	1.3

Results - Soil

Project: 19241 Lane End House

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-34783	24-34783	24-34783	24-34783	24-34783	24-34783	24-34783
Quotation No.:		Chemtest Sample ID.:				1886150	1886151	1886152	1886153	1886154	1886155	1886156
		Sample Location:				WS1	WS2	WS3	WS3	WS4	WS5	WS6
		Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.20	0.10	0.15	0.60	0.05	0.30	0.30
		Date Sampled:				23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	< 3.0	< 3.0	< 3.0	< 3.0	5.0	< 3.0	< 3.0
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	5.2	4.5	5.7	5.8	4.1	3.7
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	< 1.0	15	< 1.0	< 1.0	2.2	11	< 1.0
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	< 5.0	5.2	< 5.0	5.7	5.8	< 5.0	< 5.0
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	< 10	20	< 10	< 10	< 10	11	< 10
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	< 10	< 10	< 10	< 10	11	< 10	< 10
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	< 10	15	< 10	< 10	13	11	< 10
Organic Matter		M	2625	%	0.40	2.0	3.0	1.3	< 0.40	4.0	< 0.40	1.5
Naphthalene		M	2700	mg/kg	0.10	0.28	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		M	2700	mg/kg	0.10	0.36	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		M	2700	mg/kg	0.10	0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2700	mg/kg	0.10	0.23	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2700	mg/kg	0.10	2.4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		M	2700	mg/kg	0.10	0.82	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2700	mg/kg	0.10	3.7	1.3	0.93	< 0.10	0.75	< 0.10	< 0.10
Pyrene		M	2700	mg/kg	0.10	3.3	1.1	0.64	< 0.10	0.67	< 0.10	< 0.10
Benzo[a]anthracene		M	2700	mg/kg	0.10	1.3	0.93	< 0.10	< 0.10	0.34	< 0.10	< 0.10
Chrysene		M	2700	mg/kg	0.10	1.3	1.6	< 0.10	< 0.10	1.1	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	2.3	1.4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	0.77	0.47	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2700	mg/kg	0.10	2.2	0.89	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	1.6	0.60	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	0.49	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	2.1	1.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		M	2700	mg/kg	2.0	23	9.5	< 2.0	< 2.0	2.9	< 2.0	< 2.0
Benzene		M	2760	µg/kg	1.0						< 1.0	

Results - Soil

Project: 19241 Lane End House

Client: Herts & Essex Site Investigations		Chemtest Job No.:				24-34783	24-34783	24-34783	24-34783	24-34783	24-34783	24-34783
Quotation No.:		Chemtest Sample ID.:				1886150	1886151	1886152	1886153	1886154	1886155	1886156
		Sample Location:				WS1	WS2	WS3	WS3	WS4	WS5	WS6
		Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.20	0.10	0.15	0.60	0.05	0.30	0.30
		Date Sampled:				23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024	23-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
Toluene		M	2760	µg/kg	1.0						< 1.0	
Ethylbenzene		M	2760	µg/kg	1.0						< 1.0	
m & p-Xylene		M	2760	µg/kg	1.0						< 1.0	
o-Xylene		M	2760	µg/kg	1.0						< 1.0	
Naphthalene		M	2800	mg/kg	0.10						< 0.10	
Acenaphthylene		N	2800	mg/kg	0.10						< 0.10	
Acenaphthene		M	2800	mg/kg	0.10						< 0.10	
Fluorene		M	2800	mg/kg	0.10						< 0.10	
Phenanthrene		M	2800	mg/kg	0.10						< 0.10	
Anthracene		M	2800	mg/kg	0.10						< 0.10	
Fluoranthene		M	2800	mg/kg	0.10						< 0.10	
Pyrene		M	2800	mg/kg	0.10						< 0.10	
Benzo[a]anthracene		M	2800	mg/kg	0.10						< 0.10	
Chrysene		M	2800	mg/kg	0.10						< 0.10	
Benzo[b]fluoranthene		M	2800	mg/kg	0.10						< 0.10	
Benzo[k]fluoranthene		M	2800	mg/kg	0.10						< 0.10	
Benzo[a]pyrene		M	2800	mg/kg	0.10						< 0.10	
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10						< 0.10	
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10						< 0.10	
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10						< 0.10	
Total Of 16 PAH's		N	2800	mg/kg	2.0						< 2.0	
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2020	Electrical Conductivity	Electrical conductivity (EC) of aqueous extract or calcium sulphate solution for topsoil	Measurement of the electrical resistance of a 2:1 water/soil extract.	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7–C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

- DW - Drinking Water
- GW - Ground Water
- LE - Land Leachate
- NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com