Phase II Interpretative Ground Assessment

At

Oakwood Lodge
Manchester

Client: John Southworth

Reference: 33266-SUT-ZZ-00-RP-G-7201

Date: May 2024

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Phase II Interpretative Ground Assessment

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Foreword (Geotechnical and Environmental Assessment)

This report has been prepared for the sole internal use and reliance of the Client named on page 1. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Sutcliffe Investigation; such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their risk and the authors owe them no duty of care and skill.

The report presents observations and factual data obtained during our site investigation and provides an assessment of Geotechnical and environmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Sutcliffe Investigation prior to significant revision of the development proposals. Primary aims of this exploratory phase of investigation were to identify salient geotechnical and environmental issues affecting the site to enable the client to obtain budget costs for the necessary site preparatory and remedial works.

The report should be read in its entirety, including all associated drawings and appendices. Sutcliffe Investigation cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Sutcliffe Investigation believes are reliable. All reasonable care and skill have been applied in examining the information obtained. Nevertheless, Sutcliffe Investigation cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced Geotechnical and environmental consultants. Sutcliffe Investigations does not provide legal advice and the advice of lawyers may also be required.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by Sutcliffe Investigation, whilst fully appropriate, may not have encountered all significant subsurface conditions. Any opinions expressed as to the possible configuration of strata between, or below exploratory holes are for guidance only and no responsibility is accepted as to its accuracy.

It should be borne in mind that the timescale over which the investigation was undertaken might not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during the wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report assumes that ground levels will not change significantly from those existing at present. If this is not to be the case, then some modification to this report may be required.

It should be noted that the banning of the co-disposal of hazardous and non-hazardous waste was introduced in 2011, as a result of the implementation within the UK of the Landfill Directive. This will considerably affect the current practices and procedures for the handling and disposal of wastes, in particular hazardous wastes. In addition, it will be a requirement for all wastes to be pre-treated and to comply with certain waste acceptance procedures prior to sending wastes to landfill. The full potential effects of these important changes are not known at this stage, but it is perceived that disposal costs will rise, particularly for hazardous wastes, and waste pre-treatment may, in some cases, become an 'additional' redevelopment cost with regard to the remediation of contaminated sites.

Should this report recommend materials could be excavated and removed off-site for landfill disposal, then it should be noted that the costs, timescales and implications of the pending changes to waste management legislation could not be predicted at this stage. Sutcliffe Investigation will not be responsible for changing practices, etc that may affect the viability of necessary remedial actions or of the implications of potential alternative treatment techniques.

Sutcliffe Investigation reserves the right to amend their conclusions and recommendations in the light of further information that may become available. General notes and limitations relevant to all Sutcliffe Investigations are described in the Foreword and should be read in conjunction with this report.

Executive Summary

INTRODUCTION	Sutcliffe Investigations was instructed by John Southworth (the "client") to undertake a Phase II ground assessment for the site at Oakwood Lodge, Wythenshawe, Manchester M22 4LA.
SITE LOCATION	The site is located at Oakwood Lodge, Wythenshawe, Manchester M22 4HY at National Grid Reference (NGR) 383410, 389477. The site is bounded to the north by playing fields, to the east and west by residential properties and to the south by a nursey.
DEVELOPMENT PROPOSAL	This report has been prepared in support of a planning application to develop the site for housing with associated private garden areas and infrastructure.
PREVIOUS WORKS	WML Consulting have completed a Phase I Desk Study and Preliminary Geoenvironmental Assessment (8928G-WML-00-XX-RP-G-0001) in August 2019 and a Phase 2 Geoenvironmental Investigation & Assessment (8928G-WML-00-XX-RP-G-0002) in December 2019, prior to demolition works. No other previous studies are known to have been undertaken to Sutcliffe's knowledge.
SITE INVESTIGATION	Following demolition works, field works were undertaken on the 13-14th November 2023 and comprised: - 6No. Trial Holes for site coverage and sampling (TP101-TP106) - 4No. Trial Holes for Percolation Testing and site coverage (PT101-PT104) - Contamination samples from various depth in the Made Ground. - Leachate samples.
GROUND CONDITIONS	Made Ground: Made Ground was encountered in all the exploratory holes across the site and was noted to a maximum depth of 1.00m. Made Ground generally consisted of dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (grass over topsoil), orange brown and dark brown, slightly gravelly fine to medium SAND, grey, sandy, fine to coarse, angular GRAVEL of concrete, brick and mixed lithologies with occasional cobbles of brick, concrete and mixed lithologies (compacted hardcore) and dark brown, slightly silty, slightly gravelly fine to medium SAND. Gravel is fine to coarse, subrounded to angular of brick, glass and mixed lithology. Natural Ground: Natural ground was encountered in all locations and comprised of orange / brown / grey, gravelly, fine to coarse SAND with occasional small cobbles of sandstone. Gravel is fine to coarse rounded to sub rounded to rounded of sandstone
GROUNDWATER	Multiple groundwater strikes were recorded during the investigation ranging from depth of 2.30 – 2.80m.
SOIL INFILTRATION	During site investigation works, 4No. Percolation tests were undertaken. All four tests were noted to fail.
ENVIRONMENTAL RISK ASSESSMENT	Long Term Human Health The statistical analysis for Lead contamination indicates that there is a very high probability that the true mean concentrations are below the critical concentrations and Sutcliffe are confident that these contaminants are unlikely to pose a site wide risk to human health. Although Sutcliffe acknowledge that there are contaminants that exceed their critical concentrations, we believe that based on the results of the statistical analysis, the risk to long term human health is within acceptable limits. Although no formal remedial works are recommended, it would be our recommendation that 300mm clean imported tested topsoil be placed in all garden and soft landscaped areas to facilitate a growing medium. Controlled Waters – Groundwater Resources The UK DWS Leachate screening identified concentrations of Lead that could pose a risk to the Principal Aquifer. However, these are only slightly elevated levels, therefore the risk is unlikely to be significant. Controlled Waters – Surface Water Resources The EQS Leachate screening identified concentrations of Copper, Lead, Zinc and Indeno(123cd)pyrene that could pose a risk to the local surface water features. However, the nearest surface water feature was noted as a drain 143m east of the site and as such the risk is unlikely to be significant.

ASBESTOS	Asbestos containing materials (ACM) were not observed within samples screened.
GROUND GAS RISK ASSESSMENT	Using the Pragmatic Approach to Ground Gas Risk Assessment (RB17) the TOC and forensic testing has given a site wide average TOC value of 1.0% with the levels of TOC ranging from 0.3% to 2.2%. This classifies the site as Characteristic Situation 1 and therefore indicates that no gas protection measures are required on this site. A Characterisation Situation 1 was also recommended in the Phase 2 Geoenvironmental Investigation & Assessment undertaken by WML Consulting due to a lack of flow being recorded in the position where elevated CO_2 was recorded. Additionally, the proposed development on site includes for a ventilated sub-floor void on the plots in the vicinity of WS5. With a standard distribution of vent blocks combined with the lack of flow recorded in the monitoring visits, this would provide an additional layer of protection to prevent the build up of potentially hazardous levels of CO2 within the void of the new properties. In this way the risk to the future occupiers of the plots is reduced due to these factors and a Characteristic Situation 1 classification is considered to be sufficient based on these mitigating factors.
RADON	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. No radon protective measures are necessary
WASTE CLASSIFICATION	The Waste Classification Report states that all soils sampled were classified as 'Non-Hazardous' waste. WAC analysis has not been undertaken but can be carried out to determine if the preliminary waste classification results can be downgraded. Notwithstanding, the final decision on waste classification is determined by the accepting landfill, and consultation with landfill operators be carried out during the development of the SMMP.
RECOMMENDATIONS	The following actions are recommended: - Design a Phase III Remediation & Validation Proposal for submission to planning department. - Design SMMP – management of material on and off site. - Good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior hand washing. If dust is encountered, dust masks should be worn, and dust suppression employed.

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1 Introduction

1.1 Terms of Reference

Sutcliffe Investigations was instructed by John Southworth (*the "client"*) to undertake a Phase II ground assessment for the site at Oakwood Lodge, Wythenshawe, Manchester M22 4LA.

This report assesses the ground based geotechnical and environmental risks, constraints and liabilities associated with the proposed development of the site. This is required in support of the discharge of contaminated land planning conditions assigned to the site and to allow the design of economic foundation solutions.

1.2 Development Proposal & Legislative Context

Development Proposal

This report has been prepared in support of a planning application to develop the site for housing with associated private garden areas and infrastructure. The proposed layout is shown on Drawing: 5415 C-09 REV A produced by Arcus Consulting.

Legislative Context

The presence of contaminants which may pose a risk to human health, or the environment is a material planning consideration. For planning it should be considered whether the site is suitable for its new use, and the responsibility for securing a safe development (including cumulative effects of pollution on health, and the potential sensitivity of the proposed development to adverse effects from pollution,) rests with the developer and/or landowner. Planning is concerned with the site's proposed use not its current use, where the amount of contamination is expected to be low relative to the level of risk. This is the opposite to Part 2A which considers high levels (significant harm) and the current use of the site.

Section 57 of the Environment Act 1995 adds Part 2A (ss.78A-18YC) to the Environmental Protection Act 1990 and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraph 120 to 122 considers pollution and remediation. This links the contaminated land regime within the development process.

For there to be an environmental liability associated with the site there must be a perceived source (a contaminant), a receptor (humans, living organisms or property) and a pathway between them. The potential presence of all of these aspects would result in a complete contaminant linkage.

In accordance with environmental legislation and the associated guidelines, assuming the site is to be redeveloped as housing, it should be noted that any redevelopment of the site could actually create new pathways that could increase the liabilities associated with the site. In addition, the basis of the intrusive ground assessment is to refine the preliminary conceptual model.

1.3 Site Location and Setting

The site is located at Oakwood Lodge, Wythenshawe, Manchester M22 4LA at National Grid Reference (NGR) 383410, 389477. The site is bounded to the north by playing fields, to the east and west by residential properties and to the south by a nursey.

1.4 Previous Studies

WML Consulting have completed a Phase I Desk Study and Preliminary Geoenvironmental Assessment (8928G-WML-00-XX-RP-G-0001) in August 2019 and a Phase 2 Geoenvironmental Investigation & Assessment (8928G-WML-00-XX-RP-G-0002) in December 2019, prior to demolition works. No other previous studies are known to have been undertaken to Sutcliffe's knowledge.

1.5 Objectives & Scope of Assessment

The aim of the intrusive ground investigation is to identify potential geotechnical & environmental liabilities and constraints, associated with the development of the site area following demolition and in support of the following:

- A planning application and the discharge of contaminated land conditions where reasonably practicable that may have been assigned to the site and to include the design of a remediation scheme, if required as part of the National Planning Policy Framework (NPPF).
- To assess the likelihood of reuse of materials that are site won or disposal options for surplus material.
- The preliminary design of detailed and economic foundations options inclusive of all information and specifications relating to foundation types, the location of underlying rock, (if encountered), preparation of ground, concrete grades, reuse of materials for both the proposed building, and the existing foundations.

2 Ground Investigation

2.1 Design Rationale

The aim and design of the ground assessment is to satisfy planning conditions assigned to the site by reference to the National Planning Policy Framework (NPPF). This will identify elevated concentrations of determinands with the aim of assessing long term human health risks to site users and groundwater resources. In addition, the works have been designed to allow the design of economic foundation solutions for the proposed new builds.

2.2 Fieldwork

Following demolition works, field works were undertaken on the 13-14th November 2023 and comprised:

- 6No. Trial Holes for site coverage and sampling (TP101-TP106)
- 4No. Trial Holes for Percolation Testing and site coverage (PT101-PT104)
- Contamination samples from various depth in the Made Ground.
- Leachate samples.
- UU Risk Assessment Samples
- Forensic Sampling

All works were supervised by a suitably qualified Sutcliffe engineer. The investigation was carried out in general accordance with the following standards:

- BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites – Code of Practice;
- R&D Technical Report P5-066/TR Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, 2001 (Environment Agency).
- BS 5930:2015 Code of practice for site investigations; and,
- BS EN ISO 22475-1:2006 Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution.

Site Investigation logs collated as part of the ground investigation completed by Sutcliffe are presented in *Appendix C.*

2.3 Health & Safety

Service plans for the development site have been obtained and are included as part of the Phase I PRA. Copies of these plans are maintained on site by the Sutcliffe engineer who is also responsible for clearing the areas to be investigated by use of a Cable Avoidance Tool (CAT) and signal generator (Genny).

2.4 Sampling Strategy

A non-targeted sampling strategy was used to obtain a site wide representation of any potential contamination issues following demolition of the on-site building.

The site area is 6000m^2 ÷ 7 sample positions = 857.14/m^2 ÷ 0.8 = 1071.43

$\sqrt{1071.43m^2}$ = a 32.73m grid.

Therefore, this gives an 80% probability of finding a circular area of interest of $1071.43m^2$.

A summary of exploratory hole detailing rationale is shown in *Table 2.1* below.

Table 2.1: Summary of Site Activities

Ref. No.	Location Rationale	Method	Completed Depth (mbgl)	Installation Details	Testing & Sampling details
PT101	Percolation Test / General Site Coverage	JCB	1.15	No installation	-
PT102	Percolation Test / General Site Coverage (HH)	JCB	1.40	No installation	Small bulk samples
PT103	Percolation Test / General Site Coverage	JCB	1.30	No installation	-
PT104	Percolation Test / General Site Coverage	JCB	1.30	No installation	-
TP101	General Site Coverage (HH, CW, FS, UU)	JCB	3.00	No installation	Small bulk samples
TP102	General Site Coverage (HH, UU)	JCB	2.55	No installation	Small bulk samples
TP103	General Site Coverage (HH, CW, UU)	JCB	2.35	No installation	Small bulk samples
TP104	General Site Coverage (HH, FS, UU)	JCB	2.80	No installation	Small bulk samples
TP105	General Site Coverage (HH, FS)	JCB	2.70	No installation	Small bulk samples
TP106	General Site Coverage (HH, UU)	JCB	2.90	No installation	Small bulk samples

HH – Human Health / CW – Controlled Water / FS – Forensic Samples / UU – UU Risk Assessment

A plan detailing the position of sampling locations on the proposed layout of the site is presented as *Drawing Ref. 33266-SUT-ZZ-00-DR-G-7251.*

2.5 Chemical Laboratory Testing

Selected soil samples (Made Ground) were collected at various depths and horizons and submitted for chemical analysis, details of which are presented in *Table 2.2.*

Table 2.2: Summary of Soils Analysis (Total & Leachate Concentrations)

Suite Reference	Analysis Suite
Soils Suite	Metals suite, speciated (16) polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons according to the Total Petroleum Hydrocarbon Working Group (TPHCWG), asbestos screen, total cyanide, phenols and soil organic matter.
Leachate	Metals suite, speciated (16) PAHs.
Pipeline RA Suite	EPH CWG, VOCs, SVOCs, VPH CWG, Ph, Electrical Conductivity and Redox Potential
Forensics	Total Organic Carbon (Fine Soil), Total Organic Carbon (Forensic), Sorting of Sample (Forensic Description) 1st kg, %Moisture at 40C, % of total sample inert >10mm, % of total sample Wood>10mm & % of total sample Vegetation >10mm

All samples were analysed by MCERTS accredited soil analysis laboratory Envirolab under UKAS accredited methods. All samples have been taken in accordance with current British Standards.

Envirolab are appropriately accredited for the works required and are an approved supplier under the Sutcliffe's Quality Management System.

Analytical test certificates are presented in *Appendix D.*

TPH Speciated aromatic and aliphatic bands with BTEX analysis have been carried out in line with the TPHCWG. The toxicity and migration risk associated with a TPH is dependent on the specific aliphatic aromatic carbon banding.

Of particular concern are the low molecular weight compounds, which are highly mobile and show a greater level of toxicity that the higher molecular weight compounds. Therefore, a low TPH consisting of low molecular weight aliphatic and aromatic carbon banding compounds may present more of a risk than a high TPH consisting of heavy weight aliphatic and aromatic carbon banding compounds.

Based on the TPHCWG the aromatic band C5 – C7 is considered to consist only of Benzene and the aromatic band C7 – C8 of Toluene. Therefore, the more specific BTEX analysis has been used for risk assessment rather than the aromatic bands.

2.6 Drainage

It is recommended that the client / developer contact United Utilities with respect to capacity in existing foul and surface water sewers in the vicinity of the development area.

2.7 Water Supply

Sutcliffe have carried out 5No. Pipeline Risk Assessment tests on soil samples collected at proposed pipeline depth. Results of this testing have indicated that standard PE Pipe is acceptable.

2.8 Services

It is recommended that the client / developer contact the relevant service provided to ascertain the requirements for power reinforcement and / or relocation / diversion of existing services.

3 Ground Model

3.1 General

The following section describes the ground conditions encountered during the intrusive ground assessment completed by Sutcliffe.

3.2 Made Ground

A summary of the strata depths and thicknesses for Made Ground is detailed in Table 3.1 and Table 3.2 below.

Table 3.1: Ground Conditions Encountered (Made Ground)

Strata	Depths encountered (mbgl)		Thickness (m)		
	Min	Max	Min	Max	Average
TOPSOIL / MADE GROUND	0.00	1.00	0.60	1.00	0.56
MADE GROUND	0.00	0.80	0.25	0.80	0.61

Table 3.2: Ground Conditions Encountered (Made Ground – Detailed)

Strata	Depths encountered (mbgl)		Thickness (m)		
	Min	Max	Min	Max	Average
Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (grass over topsoil). Gravel is fine to medium, angular of brick, glass and mixed lithology.[1]	0.00	1.00	0.60	1.00	0.68
Orange brown and dark brown, slightly gravelly fine to medium SAND. Gravel is fine to coarse, sub rounded to angular of brick and mixed lithology.[2]	0.70	1.00	0.30	0.30	0.30
Grey, sandy, fine to coarse, angular GRAVEL of concrete, brick and mixed lithologies with occasional cobbles of brick, concrete and mixed lithologies (compacted hardcore).[3]	0.00	0.80	0.15	0.80	0.59
Dark brown, slightly silty, slightly gravelly fine to medium SAND. Gravel is angular, fine to medium of brick and mixed lithologies.[4]	0.15	0.25	0.10	0.10	0.10

[1] Only encountered at PT101-104 and TP101
[2] Only encountered in PT102.
[3] Only encountered in TP102--6
[4] Only encountered in TP103.

3.3 Natural Ground

A summary of the strata depths and thicknesses for natural ground is detailed in *Table 3.3* and *3.4* below.

Table 3.3: Ground Conditions Encountered (Natural – General)

Strata	Depths encountered (mbgl)		Thickness (m)		
	Min	Max	Min	Max	Average
SAND	0.25	3.00	0.40	2.30	1.47

*** Final Depth of Strata not proven, average thickness on identified ground.*

Table 3.4: Ground Conditions Encountered (Natural – Detailed)

Strata	Depths encountered (mbgl)		Thickness (m)		
	Min	Max	Min	Max	Average
Orange / brown / grey, gravelly, fine to coarse SAND with occasional small cobbles of sandstone. Gravel is fine to coarse rounded to sub rounded to rounded of sandstone.[1]	0.25	3.00	0.40	2.30	1.47

[1] Encountered in all locations.
*** Final Depth of Strata not proven, average thickness on identified ground.*

3.4 Field Evidence of Contaminated Soils

No olfactory or visual evidence of contamination indicators were noted during the site investigation.

3.5 Groundwater

Multiple groundwater strikes were recorded during the investigation, as noted in *Table 3.5* below:

Table 3.5: Groundwater Observations

Ref. No.	Depth	Comment
TP101	2.80	No Rise
TP102	2.50	No Rise
TP103	2.30	No Rise
TP105	2.70	No Rise

4 Geotechnical Laboratory Testing and Assessment

4.1 Plate Load Testing

Plate load testing was undertaken in 5No. locations across the site, with the results presented in Table 4.1 below:

Table 4.1: Plate Load Results

Ref. No.	Depth (m bgl)	Maximum Applied Stress (kPa)	Maximum Settlement (mm)	Equivalent CBR Value (%)	Modulus of subgrade Reaction, k_{762} ($MN/m^2/m$)
Test 1	0.0	189	2.05	5	38
Test 2	0.0	137	2.00	4	32
Test 3	0.0	35	2.06	0	9
Test 4	0.0	188	2.00	6	41
Test 5	0.0	169	1.94	5	38

Testing was conducted from ground level, with the average CBR value recorded as 4%. It is plausible this value can be adopted however; localised ground stabilisation may be required due to the 0% value recorded on Test 3.

Copies of the testing certificates are included within Appendix F.

4.2 Soil Infiltration

During site investigation works, 4No. Percolation tests were undertaken. All four tests were noted to fail.

4.3 Stability

Evidence of instability was noted in TP101, TP102, TP104, TP105 and TP106. however, it is noted that these were only small diameter holes and that due to the amount of Made Ground noted on-site shoring would likely be required if any groundworks are to be left open during site works.

4.4 Geotechnical Uncertainty

The site has been subject to previous development and therefore, the potential for relic foundations and obstructions cannot be discounted.

5 Long Term Human Health Risk Assessment

5.1 Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Generic Quantitative Risk Assessment for human health has been undertaken in accordance with LCRM and SR (SC050021 series) (DEFRA) guidance as well as CL:AIRE Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (2020) and comprises the following:

- Selection of appropriate generic screening values for human health assessment.
- Creation of relevant datasets from which to undertake the assessment.
- Assessment of contamination distribution and comparison of site data to screening values using relevant statistical tests (in accordance with CIEH guidance).
- Assessment of risks to receptors.
- Determination of requirements for further investigation or remediation.

5.2 Selection of Soil Screening Values

Soil screening values appropriate for a *Residential with Plant Uptake end use* were selected.

5.3 Creation of Relevant Datasets

As sampling was taken for post demolition purposes, the top 1.00m of material was assessed.

5.4 Identification of Contaminants of Concern

The results of the soil analysis from the investigation are shown in *Appendix D.* These results were then compared against the relevant GACs for 1% soil organic matter (S.O.M.). The average percentage S.O.M. was 1.21% for 7No. samples.

An elevated level of Lead contamination was recorded in one sample taken from site when assessed against the *1%* S.O.M. *Residential with Plant Uptake* end use values.

Table 5.1: Chemical Analysis Results

Contaminant	Threshold Value (mg/kg)	Location	Depth (m bgl)	Recorded Concentration (mg/kg)
Lead	200	TP101	0.20-0.70	216

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5.5 Assessment

The soil analytical data has been assessed following CL:AIRE guidance, LCRM and NHBC R&D Publication 66 2008 *"Guidance for the Safe Development of Housing on Land Affected by Contamination".*

The purpose of human health risk assessment for planning is to decide whether the land is suitable for the proposed end use and does not pose a risk to human health.

Statistical analysis in accordance with CL:AIRE publication *Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (2020)* was used to assist in answering the key question raised above.

Utilising the 2-way confidence interval method, the likelihood of whether the true mean is less than the critical concentration can be calculated and aid with decision making in terms of further investigation or remediation.

This assessment will be using an 85% confidence interval to state that:

*Sutcliffe are **85%** confident that the true mean concentration (μ) for the contaminant lies between **x** mg/kg and **y** mg/kg.*

A 99% confidence interval will be used to state that:

*Sutcliffe are **99%** confident that the true mean concentration (μ) for the contaminant does not lie outside of **x** mg/kg and **y** mg/kg.*

Results of the Statistical analysis is presented in *Appendix D.*

5.6 Statistical Analysis

Lead

There was 1No. exceedance of the Lead screening value from a sample analysed at TP101. The critical concentration of this contaminant is **200mg/kg.**

Statistical Analysis of samples screened for the contaminant indicate that:

- Sutcliffe are 85% confident that the true mean concentration (μ) for Lead lies between 0.00mg/kg and 89.14mg/kg.
- Sutcliffe are 99% confident that the true mean concentration (μ) for Lead does not lie outside of 0.00mg/kg and 149.33mg/kg.

Based on the results of the statistical analysis, Sutcliffe are confident that the true mean concentration lies below the critical concentration.

5.7 Discussion

The statistical analysis for Lead contamination indicates that there is a very high probability that the true mean concentrations are below the critical concentrations and Sutcliffe are confident that these contaminants are unlikely to pose a site wide risk to human health.

Although Sutcliffe acknowledge that there are contaminants that exceed their critical concentrations, we believe that based on the results of the statistical analysis, the risk to long term human health is within acceptable limits.

5.8 Asbestos

Asbestos containing materials (ACM) were not observed within samples screened.

5.9 Conclusions

Based on the results and the statistical analysis, the site is considered unlikely to pose a risk to long term human health.

Although no formal remedial works are recommended, it would be our recommendation that 300mm clean imported tested topsoil be placed in all garden and soft landscaped areas to facilitate a growing medium.

6 Controlled Waters Risk Assessment

6.1 Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Level 1 Screening Assessment has been undertaken in general accordance with Environment Agency guidance Environment Agency Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination, 2006.

The methodology comprises:

- Identification of potential contaminant linkages.
  - Selection of appropriate generic screening values for controlled waters.
  - Screening measured concentrations of leachate against the generic screening values available for UK Drinking Water Standards (UK DWS) and Environmental Quality Standards (EQS).
- Assessment of contaminant distribution and risk to receptors.
  - Identification of contaminants of concern and relevant contaminant linkages.
  - Identification of potential contaminants and contaminant linkages which are no longer of concern.

6.2 Identification of Potential Contaminant Linkages

Contaminant linkages have been identified between the Made Ground and the underlying aquifer via infiltration and/or migration of dissolved phase contaminants.

6.3 Selection of Generic Screening Values

Screening values for Drinking Water Standards (DWS) have been used to assess leachability. DWS are relevant to potable receptors (Principal Aquifer).

Environmental Quality Standards (EQS) screening values have been used to assess risks to surface water resources. The nearest surface water feature is noted as a drain 143m south-east of the site.

6.4 Leachate Screening – UK DWS & EQS

Metals, TPHCWG and Speciated PAHs were assessed. Exceedances of relevant UK DWS and EQS screening criteria were encountered, details of which are identified in *Table 6.1 & 6.2.* It should be noted that several determinands have limits of detection greater than their respective screening values. Due to the level of uncertainty associated with such results, these exceedances are not considered significant and are excluded from the table below.

Table 6.1: Leachate Exceedances Summary - DWS

Determinant	DWS Threshold (µg/l)	Range of concentrations (µg/l)	Location	Depth (m bgl)	Recorded Concentration (µg/l)
Lead	10	26-29	TP101	0.20-0.70	29
			TP103	0.15-0.25	26

Table 6.2: Leachate Exceedances Summary - EQS

Determinant	EQS Threshold	Range of concentrations	Location	Depth (m bgl)	Recorded Concentration
Copper	1	17-94	TP101	0.20-0.70	94
			TP103	0.15-0.25	17
Lead	14	26-29	TP101	0.20-0.70	29
			TP103	0.15-0.25	26
Zinc	10.9	8-23	TP101	0.20-0.70	23
Indeno(123cd)pyrene	0.002	<0.01-0.01	TP101	0.20-0.70	0.01

Leachate screening tables are presented in *Appendix G.* Analytical certificates are presented in *Appendix D.*

6.5 Contaminant Distributions and Risk to Receptors

Several determinands exceeded the DWS and EQS screening values. However, the risk to controlled waters (groundwater & surface waters) is diminished as a result of the following:

- The concentrations recorded are only slightly elevated and therefore unlikely to have any significant impact on the underlying Principal Aquifer.

6.6 Conclusion

Exceedances of DWS and EQS screening criteria are not considered significant given the likely depth to groundwater, effects of natural attenuation, lack of nearby groundwater abstractions and the absence of any surface water courses that could be in continuity with ground water beneath the site.

7 Forensic Risk Assessment

7.1 CL:AIRE RB17 Pragmatic Approach

Sutcliffe have undertaken a ground gas risk assessment in accordance with "*A Pragmatic Approach to Ground Gas Risk Assessment (CL:AIRE RB17)*". This is based on the low risk attached to the site from potential sources of ground gas, with only on site Made Ground considered to be a major source.

Table 7.1: CL:AIRE RB17 Assessment Criteria

Characteristic Situation	Thickness of Made Ground	TOC (%)	
		<20 Years	>20 Years
CS1	Maximum 5m Average <3m	≤ 1.0	≤ 1.0
CS2	Maximum 5m Average <3m	≤ 1.5	≤ 3.0
CS3	Maximum 5m Average <3m	≤ 4.0	≤ 6.0
This method only can be used to define up to CS3	Gas monitoring required where TOC is greater than 4% (or 6% in old Made Ground). Gas monitoring results will show whether the high TOC is available and conditions are suitable to generate ground gas.		

Full laboratory results, forensic sample description and calculations can be found in the Appendices, a summary of the results from the testing are presented in *Table 7.3* below.

Our assessment comprises the following:

- Review of results.
- Assessment of risks from ground gas.
- Development options.

Review of Laboratory Data

3No. samples were collected from site for the purpose of undertaking forensic testing to obtain the Total Organic Carbon to allow the assessment of the potential for the Made Ground to generate ground gas. The forensic testing was undertaken by Envirolab laboratories in line with RB17 on three 1kg samples provided to them by Sutcliffe.

The findings are summarised below, and the results are presented in full in *Appendix E*.

Table 7.2: Sample Summary

Sample Details	Ref. No.		
	TP101	TP104	TP105
Sample Depth (m bgl)	0.20-0.70	0.00-0.70	0.00-0.60

Sample Details	Ref. No.		
	TP101	TP104	TP105
Thickness of Made Ground (m)	0.70	0.70	0.60

Table 7.3: RB17 Forensic Description Summary

Material Description (% of total sample)	Ref. No.		
	TP101	TP104	TP105
Inert (>10mm)	31.7%	72.8%	70.6%
Wood (>10mm)	3.1%	0%	0%
Vegetation (>10mm)	0%	0%	0%
Cloth (>10mm)	0%	0%	0%
Other Inert Material (>10mm)	0%	3.3%	0%
Paper (>10mm)	0%	0%	0%
Other Degradable Material (>10mm)	0%	0%	0%
Fine Soil and Gravel (<10mm)	65.2%	23.9%	29.4%
Total Organic Carbon (Fine Soil)	**2.2%**	**0.5%**	**0.3%**

Table 7.4: RB17 Gas Risk Summary

Average TOC	Made Ground		
	Age	Average Thickness (m)	Maximum Thickness (m)
1.0%	>20 Years	0.68	1.00
Characteristic Situation (BS 8485 and CIRIA C665)			CS1

Using the Pragmatic Approach to Ground Gas Risk Assessment (RB17) the TOC and forensic testing has given a site wide average TOC value of 1.0% with the levels of TOC ranging from 0.3% to 2.2%. This classifies the site as Characteristic Situation 1 and therefore indicates that no gas protection measures are required on this site.

7.2 Additional Ground Gas Risk Assessment

Ground Gas Conceptual Model

WML Consulting also carried out a Ground Gas Risk Assessment details of which are presented in their Phase 2 Geoenvironmental Investigation & Assessment (Report Reference: 8928G-WML-00-XX-RP-G-00023) dated November 2019.

This report indicated the following:

The site does not fall within a Coal Mining Area, therefore the potential risk of shallow mine workings which could contain hazardous gasses can be discounted.

No appreciable thickness of made ground or other soil with significant content was encountered beneath the site.

The historical landfill recorded approximately 120m to the south which accepted unknown waste types for an unknown time period, could be considered a plausible source of ground

gas, however the likelihood of continued generation of landfill gas in significant volumes is low.

Despite these above discounted linkages, the granular nature of the glaciofluvial soils could provide a pathway for lateral migration, and it was considered prudent to undertake ground gas monitoring, primarily for Methane and Carbon Dioxide, with associated flow rates.

Results and Recommendations

The results of WML Consulting's ground gas monitoring indicated concentrations of peak and steady state methane below detection limits of 0.1% by volume in air (V/V) with peak and steady state Carbon Dioxide concentrations generally ranging from 0.6 to 3.2% but locally up to 7.1% in WS5.

Carbon Dioxide concentrations were noted to exceed the 5% threshold in WS5 only, however consideration of these exceedances and the conceptual model indicates that they are not characteristics of the sites ground gas regime. Additionally, no detectable ground gas flows were recorded during the monitoring visits.

Therefore, the results give a maximum individual Qhg value of 0.007l/hr and indicate the site to classify as Characterisation Situation 1, very low risk resulting in no specific gas protection being required.

Although Carbon Dioxide concentrations in WS5 exceeded the 5% threshold, it is not considered typical for the site as a whole and WML Consulting did not believe this merited an increase to a Characterisation Situation 2.

Additionally, the proposed development on site includes for a ventilated sub-floor void on the plots in the vicinity of WS5. With a standard distribution of vent blocks combined with the lack of flow recorded in the monitoring visits, this would provide an additional layer of protection to prevent the build up of potentially hazardous levels of CO2 within the void of the new properties. In this way the risk to the future occupiers of the plots is reduced due to these factors and a Characteristic Situation 1 classification is considered to be sufficient based on these mitigating factors.

7.3 Radon

According to the Envirocheck Report, the site is not within a radon affected area, as <1% of homes are above the action level hence no radon protection measures are necessary.

7.4 Groundwater Protection Measures

Groundwater strikes were observed at 2.30-2.80m bgl during site investigation works.

Based on the Resting Groundwater Levels (RWLs) no discernible groundwater flow has been recorded.

There is no evidence at this stage of significant perched water either in the Made Ground or in the natural stratum encountered on site that would suggest special groundwater protection measures to the building foundations are required.

In light of these observations, contractors should allow for pumping to develop and maintain dry working conditions, in foundation and service trench excavations.

8 Land Contamination Risks and Remediation Requirements

8.1 Discounted Contaminant Linkages

Controlled Waters – Groundwater Resources

The UK DWS Leachate screening identified concentrations of Lead that could pose a risk to the Principal Aquifer. However, these are only slightly elevated levels, therefore the risk is unlikely to be significant.

Controlled Waters – Surface Water Resources

The EQS Leachate screening identified concentrations of Copper, Lead, Zinc and Indeno(123cd)pyrene that could pose a risk to the local surface water features. However, the nearest surface water feature was noted as a drain 143m east of the site and as such the risk is unlikely to be significant.

Ground Gas

Using the Pragmatic Approach to Ground Gas Risk Assessment (RB17) the TOC and forensic testing has given a site wide average TOC value of 1.0% with the levels of TOC ranging from 0.3% to 2.2%. This classifies the site as Characteristic Situation 1 and therefore indicates that no gas protection measures are required on this site.

A Characterisation Situation 1 was also recommended in the Phase 2 Geoenvironmental Investigation & Assessment undertaken by WML Consulting due to a lack of flow being recorded in the position where elevated CO_2 was recorded.

8.2 Remaining Potential Contaminant Linkages

Long Term Human Health

Based on the results and the statistical analysis, the site is considered unlikely to pose a risk to long term human health.

Although no formal remedial works are recommended, it would be our recommendation that 300mm clean imported tested topsoil be placed in all garden and soft landscaped areas to facilitate a growing medium.

8.3 Additional Works Required to Assess Outstanding Contaminant Linkages

Based on the proposed development plan, a remediation strategy will be required and will include validation of any imported material. Additionally, any site derived material scheduled for reuse would need to be designed to assess the risks to future site users.

8.4 Remediation Requirements

Human Health – Soils

Based on the results and the statistical analysis, the site is considered unlikely to pose a risk to long term human health.

Although no formal remedial works are recommended, it would be our recommendation that 300mm clean imported tested topsoil be placed in all garden and soft landscaped areas to facilitate a growing medium.

9 Waste Classification

9.1 Preliminary Waste Classification

A preliminary waste classification of the post demolition samples was carried out to determine the classification of soil contamination data using HazWasteOnline program, which creates the standard 'Hazardous / Non-Hazardous' classification of soils.

A summary of the preliminary waste classification is provided in *Table 9.1* below.

Table 9.1: Preliminary Waste Classification Summary

Ref. No.	Depth (m bgl)	Classification	Exceeded Contaminant	Value (mg/kg)
TP101	0.20 - 0.70	Non-Hazardous	-	-
TP102	0.00 - 0.70	Non-Hazardous	-	-
TP103	0.15 - 0.25	Non-Hazardous	-	-
TP104	0.00 - 0.70	Non-Hazardous	-	-
TP105	0.00 - 0.60	Non-Hazardous	-	-
TP106	0.40 - 0.80	Non-Hazardous	-	-
PT102	0.70 – 1.00	Non-Hazardous	-	-

The full Waste Classification Report is provided in Appendix H.

Notwithstanding, the final decision on waste classification is determined by the accepting landfill, and consultation with landfill operators be carried out during the development of the SMMP.

9.2 Asbestos

Asbestos containing material was not observed in any of the samples screened.

9.3 Waste Acceptance Criteria (WAC)

WAC analysis has not been undertaken but can be carried out to determine if the preliminary waste classification results can be downgraded.

9.4 Discussion

As discussed above, the Waste Classification Report states that all soils sampled were classified as 'Non-Hazardous' waste.

Notwithstanding, the final decision on waste classification is determined by the accepting landfill, and consultation with landfill operators be carried out during the development of the SMMP.

10 Recommendations

10.1 Further Works

The following actions are recommended:

- Design a Phase III Remediation & Validation Proposal for submission to planning department.
- Design SMMP – management of material on and off site.
- Good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior hand washing. If dust is encountered, dust masks should be worn, and dust suppression employed.

11 References

- BRE Special Digest (1991) 'Sulphate and acidic resistance of concrete in the ground' 363
- BRE Special Digest (2001) 'Aggressive Chemical Environment for Concrete (ACEC) Site Classification.
- CIRIA (1995) Report 149. 'Protecting development from methane. Methane and associated Hazards to Construction.' London
- CIRIA (2007) C665. 'Assessing risks posed by hazardous ground gases to buildings.' London
- DETR/Partners in Technology (1997) Passive venting of soil gases beneath buildings research report-guide for design.
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- Environment Agency (2000) 'Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination. Research and Development. Technical Report. P5-066/TR', Bristol.
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- Environment Agency (2002) 'Department for Environment, Food and Rural Affairs and The Environment Agency. The Contaminated Land Exposure Assessment (CLEA) Model: Technical Basis and Algorithms', Environment Agency, Bristol. CLR report No. 1

Appendix A – General Notes

Generic Notes – Sutcliffe Investigations

Environmental Setting

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the Correspondence Appendix of the Geoenvironmental Report.

Geology, Mining & Quarrying

In order to establish the geological setting of a site, Sutcliffe Investigations refer to BGS maps for the area and the relevant geological memoir.

A coal mining report is obtained from the Coal Authority. Further information is sourced from the Local Authority and by reference to current and historical OS plans.

Landfills

Sutcliffe Investigations obtain data from the Landmark Information Group, the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site. Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite) and can move through fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Sutcliffe Investigations refer to BRE Report BR211, 1999: *"Radon: guidance on protective measures for new dwellings".*

BR211 provides a preliminary indication of the measures required for a particular site, but it is also often necessary to request a Stage 2 Protective Measures Site Report from the BGS.

The level of protection needed is site-specific and is determined by reference to the radon potential map for the area followed by a geological assessment of the site. This information is contained in the Annexes of BR211.

Annex A – derived from statistical analysis of radon measurements in existing houses carried out by the NRPB and grouped on 5km grid.

Annex B – based on an assessment of the same radon measurements grouped by geological units. The maps show the 5km grid squares underlain completely or in part, by geological units which potentially exceed the action levels for radon protective measures. The grid squares are coded according to highest potential within the square. In many cases the actual geological radon potential varies considerably within a grid square.

Sutcliffe Investigations adopt the following procedure when assessing risk associated with radon.

Firstly, Annex A maps are reviewed to see whether the site requires full, basic or no measures. If the site is in a dark brown square, full radon protection measures are required. If the site is in a light brown square, reference should be made to Annex B.

Secondly, Annex B maps are reviewed to see whether a further geological assessment is required which may result in upgrading the result from Annex A. If a site lies within a shaded square, it may require radon protection and Sutcliffe Investigations request a Stage 2 Protective Measures Site Report from the BGS.

If the site is in a square that is not coloured or shaded in either set of maps then no radon protection is needed and therefore a BGS Report is not normally necessary.

The BGS geological assessment involves checking whether the site is on or close to a geological unit that has statistically been found to have elevated radon potential. The geological assessment is based on either 1:50,000 or the 1:250,000 scale data. The search area specified as part of the request is increased by 50m in areas where 1:50,000 data is available and by 500m in areas with 1:250,000 scale data to allow for potential inaccuracies in the position of boundaries. The BGS report indicates the highest level of protection required within the search area and its buffer zone.

When requesting a BGS report, Sutcliffe Projects select the search radius carefully, since too large a search radius may result in the inclusion of areas underlain by geological units of a higher radon potential, thereby giving rise to recommending too high a level of protection.

The report also includes (where available), a list of the geological units included in the assessment. Sutcliffe Investigations check that these actually underlie the site, rather than the buffer zone only.

On the basis of radon measurements in dwellings and on their geological interpretation, the BGS report stipulates the level of protective measures required for the proposed development site, and this could be:

1. no measures
2. basic measures or
3. full measures

Details of these measures are provided in the Hazardous Gas section of this Geoenvironmental Report.

Hydrogeology

Sutcliffe Investigations obtain information from the Environment Agency (EA) and the Landmark Information Group with respect to:

- groundwater quality
- recorded pollution incidents
- licensed groundwater abstractions

Reference is also made to the EA document “Policy and Practice for the Protection of Groundwater” (1998) and the relevant Groundwater Vulnerability Map.

Bedrock and any overlying granular Drift deposits are classified by the EA.

Major aquifers: “*Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public water supply and other purposes*”.

Minor aquifers: “*Fractured or potentially fractured rocks which do not have a high primary permeability, or other formations or variable permeability. Although these acquifers will seldom produce large quantities of water for abstractions, they are important both for local supplies and in supplying base flow to rivers*”.

Non-aquifers: “*Formations which are generally regarded as containing insignificant quantities of groundwater. However groundwater flow through such rocks, although imperceptible, does take place and needs to be considered in assessing the risk associated with persistent pollutants. Some non-acquifers can yield water in sufficient quantities for domestic use*”.

Groundwater vulnerability is determined by 4 variables:

1. The presence and nature of overlying soil (the weathered zone affected by living organisms; soil in the UK can extend up to 2m in depth). Physical properties of the soil affect the downward passage of water and its ability to attenuate pollutants. The EA make reference to a three-fold classification of soil types:-

   - Soils of **low** leaching potential are defined as "*soils in which the pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants*".

   - Soils of **intermediate** leaching potential are defined as "*soils which have a moderate ability to attenuate diffuse source pollutants or in which it is possible that some non-absorbed diffuse source pollutants and liquid discharges could penetrate the soil layer*".

   - Soils of high leaching potential are defined as "*soils with little ability to attenuate diffuse source pollutants and in which non-absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater*".

   In urban areas and restored mineral workings the soil information is based on fewer observations than elsewhere. A worst-case vulnerability (H) is therefore assumed for these areas and for current mineral workings by the EA. All are given a designation of **HU** unless proved otherwise.

2. The presence and nature of Drift, which often overlies bedrock. Where Drift is of substantial thickness and low permeability, it can provide an effective barrier to surface pollutant migration. Permeability Drift is classified as a Minor Aquifer except where it is in probable hydraulic continuity with a Major Aquifer, where it is regarded as part of the Major Aquifer unless proven otherwise by site investigation.

3. The nature of the geological strata (bedrock). Rocks that contain groundwater in exploitable quantities are called aquifers.

4. The depth of the unsaturated zone; i.e. that part of the aquifer which lies above the water table.

The EA have also designated Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone may vary from tens to several thousand hectares.

Hydrology

Sutcliffes obtain information from the Environment Agency and the Landmark Information Group with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are six GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps provides show natural floodplains – areas potentially at risk of flooding it a river rises above its banks or high tides and stormy seas cause flooding in coastal areas.

There are different kinds of area shown on the Flood Map:

1. Dark blue areas could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 200) or greater chance of happening each year.

2. Light blue areas show the additional extend of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance or occurring each year.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year (or 1 in 200 year as appropriate) areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist consultant who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc.

COMAH & Explosive Sites

Sutcliffe Investigations obtain information from the Landmark Information Group with respect to COMAH or explosive sites within 1km of the proposed development site. Sutcliffe Investigations' report refers to any that are present and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say and they are likely to place more weight on advice from the HSE).

Preliminary Conceptual Ground Model

The site's environmental setting (and proposed end use) is used by Sutcliffe Investigations to assess the significance of any contamination encountered during the subsequent ground investigation.

Generic Notes – Sutcliffes Geoenvironmental Investigations

2. Ground Investigation Fieldwork

General

Sutcliffe Ground Investigations are undertaken in accordance with current UK guidance including:

- BS5930:1999 "*Code of practice for site investigation*"
- BS10175:2001 "Code of practice for the identification of potentially contaminated sites"
- Contaminated Land Reports 1 to 6, most notably CLR Report No. 4 "*Sampling strategies for contaminated land*"
- "*Guidance on the protection soil sampling strategies for land contamination*" – EA R&D Technical report P5-066/TR (2001)
- AGS: 1996 "*Guide to the selection of Geotechnical Soil Laboratory Testing*"

Exploratory hole logs are represented in Appendices to this Geoenvironmental Report. These logs include details of the:

- Investigation technique adopted
- Samples taken
- Descriptions of the solid strata and any groundwater encountered
- Results of any insitu testing
- Any gas/groundwater monitoring well installed

Exploratory Hole Locations

Exploratory hole locations are selected by Sutcliffe Investigations, prior to commencement of fieldwork, to provide a representative view of the strata beneath the site and to target potential contaminant sources identified during the preliminary investigation (desk study). Additional exploratory locations are often determined by the site engineer in light of the ground conditions actually encountered; this enables better delineation of the depth and lateral extent of organic contamination, poor ground, relict structures etc.

Investigation Techniques

Ground conditions can be investigated by a number of techniques; the procedures used are in general accordance with BS5930: 1999 and BS1377: 1990. Techniques most commonly used by Sutcliffe Investigations include:

- Machine excavated trial pits, usually equipped with a backactor and a 0.6m wide bucket
- Cable percussive (Shell & Auger) boreholes, typically using 150mm diameter tools and casing
- Window or windowless sampling boreholes. Constraints associated with existing buildings, operations and underground service runs can render some sites partly or wholly inaccessible to a mechanical excavator. In such circumstances, window sampling is often the most appropriate technique. A window sampling drilling rig can be manoeuvred in areas of restricted access and results in minimal disturbance of the ground (a 150mm diameter tarmac/concrete core can be lifted and put to one side). However, it should be noted that window sampling allows only a limited inspection of the ground (especially made ground with a significant proportion of coarse material).
- Rotary percussive open-hole probeholes are typically drilled using a tricone rock roller bit with air as the flushing medium. Probeholes are generally lined through made ground with temporary steel casing to prevent hole collapse.

Where installed, gas/groundwater monitoring wells typically comprise a lower slotted section, surrounded by a filter pack of 10mm non-calcareous gravel and an upper plain section surrounded in part by a bentonite seal and in part by gravel or arisings. The top of the plain pipe is cut off below ground level and the monitoring well protected by a square, stopcock type manhole cover set in concrete, or the plain pipe is cut off just above ground level and the well protected by 100mm diameter steel borehole helmet set in concrete.

Monitoring well details, including the location of the response zone and bentonite seal are presented on the relevant exploratory hole logs.

Insitu Testing

Where relative densities of granular materials given on the trial pit and window sample logs are based on visual inspection only, they do not relate to any specific bearing capacities. However, wherever possible, Sutcliffe Investigations employ a mackintosh probe to assess relative density. Mackintosh probe results can be related to approximate allowable bearing capacities.

The relative densities of granular materials encountered in cable percussive boreholes are based on Standard Penetration Test (SPT) results. SPTs are carried out boreholes, in accordance with BS 1377 1990, Part 9 Section 3.3. Where full penetration (600mm) is not possible, N values are calculated by linear extrapolation and are shown on the logs as N* = x.

The strength of cohesive deposits is determined using a hand shear vane.

Shear strength test results reported on trial pit logs are considered to be more reliable than those reported on window sample logs. Significant sample disturbance occurs during window sampling and consequently shear strength results on disturbed window samples are generally lower than results obtained during trial pitting, in-situ or in large excavated blocks.

Sampling

Representative soil/fill samples are taken at regular intervals from the exploratory holes to assist in description of the ground and to allow selected laboratory testing to be performed. The type of sample taken is dependent on the nature of the stratum and the purpose of the analysis.

Where the soils encountered contain a significant proportion of coarse grained material, truly representative samples are not typically obtained – only the finer fraction is placed in sample containers. However, a visual estimate of the amount of coarse material is made on site.

NB: Coarse constituents not sampled are defined as: coarse gravel, cobble and boulder (i.e. any ‘particles’ with an average diameter greater than 20mm).

Occasionally, unrepresentative ‘spot’ samples are also taken from some exploratory locations for contaminant analysis, typically where unusual, localised pockets of materials are encountered.

Samples of soil for chemical testing are placed into 1 litre plastic tubs prior to delivery to the selected laboratory. Samples of water are taken in one litre brown glass bottles and stored in cool boxes, at a temperature of approximately 4°C, until delivery to the selected laboratory. Soil/fill samples for organic analysis are also stored in cool boxes.

Groundwater

Where encountered during fieldwork, groundwater is recorded on exploratory hole logs. If monitoring wells are installed, groundwater levels are also recorded on one or more occasions after completion of the fieldwork.

It should be borne in mind that the rapid excavation rates used during a ground investigation may not allow the establishment of equilibrium water levels. Water levels are likely to fluctuate with season/rainfall and could be substantially higher at wetter times of the year than those found during this investigation.

Long term monitoring of standpipes of piezometers is always recommended if water levels are likely to have a significant effect on earthworks or foundation design.

Description of Strata

The soils encountered during an Sutcliffes ground investigation are described (logged) in general accordance with BS 5930. The descriptions and depth of strata encountered are presented on the exploratory hole logs and summarised in the Ground Conditions section within the main body of text.

The materials encountered in the trial pits are logged, samples taken and tests performed on the in-situ materials in the excavation faces, to depths of up to 1.2m; below this depth these operations are conducted at the surface on disturbed samples recovered from the excavation.

Key to Exploratory Hole Logs

Keys to logs are presented in the Appendix(ces) containing the logs. These are two keys – Symbols and Legends and Terms and Definitions.

Health and Safety

All work was carried out in accordance with the procedures detailed in the DGEL Health and Safety Manuel and SUKD health and Safety Procedures.

Generic Notes – Sutcliffes Geoenvironmental Investigations

3. Geotechnical Laboratory Tests

General

Soil Samples are delivered to the laboratory for testing along with a schedule of testing drawn up by Sutcliffe Investigations. All tests are carried out in accordance with BS 1377:1990.

The test results are presented as received in an Appendix to this Geoenvironmental Report.

The following laboratory testing are routinely carried out on a selection of samples:

- Atterberg limits & moisture contents
- Soluble sulphate & pH

The additional tests are typically only scheduled where significant earthworks regrade is anticipated:

- Grading
- Compaction tests
- Particle density

Attenberg Limits & Moisture Content

The Liquid and Plastic Limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average Plasticity Index (PI) for each "type" of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth. Sutcliffe Investigations typically only consider a soil to be shrinkable if the proportion finer than 63μm is > 35%.

PI results are compared against guidance given in the NHBC Standards, Chapter 4.2 (revised April 2003) which advocates the use of modified Plasticity Index (I'p) defined as:

I'p = Ip * (% < 425μm/100)

ie if PI is 30%, but the soil contains 80% < 425μm, then I'p = 30 * 80/100 = 24%

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425μm sieve is routinely reported by testing labs.

Sutcliffe Investigations apply engineering judgement where PI results are spread over a range of classifications. Consideration is given to:

- The average values for each particular soil type (ie differentiate between residual soil and alluvium)
- The number of results in each class and
- The actual values

Unless the judgement strongly indicates otherwise, Sutcliffe Investigations typically adopt a conservative approach and recommend assumption of the higher classification.

Soluble Sulphate and pH

Sulphates in soil and groundwater are the chemical agents most likely to attack sub-surface concrete, resulting in expansion and softening of the concrete to a mush. Another common cause of concrete deterioration is groundwater acidity.

The rate of chemical attack depends on the concentration of aggressive ions and their replenishment at the reaction surface. The rate of replenishment is related to the presence and mobility of groundwater.

Sutcliffe Investigations refer to BRE Special Digest 1 (SD1) “Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment” (2001). SD 1 provides definitions of:

- The nature of the site (Greenfield, brownfield or pyretic)
- The groundwater regime (static, mobile or highly mobile)
- The Design Sulphate Class (DC Class) and
- The Aggressive Chemical Environment for Concrete (ACEC Class)

Sutcliffe reports clearly state each of the above for the site being considered.

The concentrations of sulphate in aqueous soil/fill extracts are determined in the laboratory using the gravimetric method. The results are expressed in terms of SO_4 for direct comparison with BS 5328:1997. The pH value of each sample was determined by the electrometric method.

SD1 also discusses determination of “representative” sulphate concentration from a number of tests. Essentially if <10 samples of a given soil-type have been tested, the highest measured sulphate concentration should be taken. If >10 samples have been tested, the mean of the highest 20% of the sulphate test can be taken. With respect to groundwater, the highest sulphate concentration should always be taken.

With respect to pH (soil & groundwater) the value used is the lowest value if <10 samples have been tested and the mean of the lowest 20% if >10 samples have been tested.

Generic Notes – Sutcliffe Investigations Geoenvironmental Investigations

4. Contamination Laboratory Analysis & Interpretation (including WAC)

General

An assessment of potential contaminants associated with the former usages of the site is undertaken with reference to CLR 8 "*Potential contaminants for the assessment of land*" and the relevant DETR Industry Profile(s).

Common Inorganic Contaminants

These include:

- Metals, most notably cadmium, copper, chromium, mercury, lead, nickel and zinc
- Semi-metals, most notably arsenic, selenium and (water soluble) boron
- Non-metals, most notably sulphur
- Inorganic anions, most notably cyanides (free & complex), sulphates, sulphides and nitrates

With respect to the terminology used by most analytical laboratories:

Total cyanide = Free cyanide + Complex cyanide

Total cyanide (CN) is determined by acid extraction; whereas free cyanide is the water soluble fraction.

Complex cyanide is "bound" in compounds and is hard to breakdown. Laboratory determination of complex CN involves subjecting the sample to uv digestion for determination of both free and total CN.

Thiocyanate (SCN) is a different species combined with sulphur.

Elemental sulphur (S) and free sulphur are the same. Total sulphur is all forms, including that present in sulphates (SO_4) sulphates etc.

There are 2 forms of chromium (Cr), chromium VI and chromium III. Chromium VI is the more toxic of these. In soils, total chromium is determined by a strong aqua regia acid digestion. Chromium VI is an empirical method based on a water extract test.

Common Organic Contaminants

Petroleum hydrocarbons are a mixture of hydrocarbons produced from the distillation of crude oil. They include aliphatics (alkanes, alkenes and cycloalkanes), aromatics (single or multi benzene ringed compounds) and hydrocarbon-like compounds containing minor amounts of oxygen, sulphur or nitrogen.

Petroleum hydrocarbons can be grouped based on the carbon number range:-

GRO – Gasoline Range Organics (typically C_6 to C_{10}). Also referred to as PRO – Petroleum Range Organics
DRO – Diesel Range Organics (typically C_{10} to C_{28})
LRO – Lubricating Oil Range Organics (typically C_{28} to C_{40})
MRO – Mineral Oil Range Organics (typically C_{18} to C_{44})

However, it should be borne in mind that the terms "GRO" and "DRO" analysis are purely descriptive terms, the exact definition of which varies.

Total Petroleum Hydrocarbons (TPH) is also a poorly defined term; some testing laboratories regard TPH as hydrocarbons ranging from C_5 – C_{40}, whereas other define TPH as C_{10} – C_{30}.

The composition of a TPH plume migrating through the ground can vary significantly; this is primarily dictated by the nature of the source (eg petrol, diesel, engine oil etc). Furthermore, different hydrocarbons are affected differently by weathering processes and this can result in further variation in the chemical composition of the TPH.

Gasoline contains light aliphatic hydrocarbons rapidly (especially within the C4 to C5 range) that will evaporate. The aromatic hydrocarbons in gasoline are primarily benzene, toluene, ethylbenzene and xylenes, referred to as BTEX. Small amounts of polyaromatic hydrocarbons (PAHs) such as benzo(a)pyrene may also be present.

Diesel and light fuel oils have higher molecular weights than gasoline. Consequently, they are less volatile and less water soluble. About 25 to 35% is composed of aromatic hydrocarbons. BTEX concentrations are generally low.

Heavy Fuel Oils are typically dark in colour and considerably more viscous than water. They contain 15 to 40% aromatic hydrocarbons. Polar NSO compounds are also present.

Lubricating Oils are relatively viscous and insoluble in groundwater. They may contain 10 to 30% aromatics, including the heavier PAHs. NSO compounds are also common.

Polycyclic Aromatic Hydrocarbons (PAHs) have more than two fused benzene rings as a structural characteristic. PAH compounds are present in both petrol and diesel, although insignificantly lower concentrations than in coal tars. Certain PAH compounds are carcinogenic (Benzo(a)pyrene) and/or mobile in the environment (naphthalene).

Polychlorinated Biphenyls (PCBs)

Volatile Organic Compounds (VOCs) The volatile organic compound (VOC) headspace concentration of all soil samples was made with a photoionization detector (PID) fitted with a 10.2 eV lamp. This gives a semi-quantitative VOC concentration record as parts per million (ppm) (Vol/Vol). Prior to the VOC headspace reading, the background levels of VOCs were recorded. The PID was recalibrated with standard isobutylene in zero air after every 10 headspace readings.

Semi-Volatile Organic Compounds (sVOCs)

Phenols

Solvents, pesticides, herbicides

Dioxins & furans

Methods of Analysis (Organic Compounds)

Toluene Extractable Matter (TEM) results provide a screening test for organic contamination. The sample is air dried a 30°C and ground prior to addition of the solvent (toluene). The solvent extraction is aggressive and most organic compounds (fuels, oils, tars, humic material, animal fats and vegetable oil) are dissolved, as are some other inorganic contaminants such as sulphur. However, the volatiles (lighter fuel fraction etc) are lost during evaporation of the solvent.

Total Petroleum Hydrocarbon (TPH) by IR (also known as mineral oil by some testing laboratories) is undertaken on "as received" samples. Tetrachloroethylene is the solvent, and fluoroscil is used to removed humic material, animal fats and vegetable oil. Consequently this analysis detects a wide range of "mineral" organics from volatiles (BTEX and gasoline) through diesel and oils to tars (including the very heavy, stable tars such as asphalt and bitumen).

TPH by GC-FID is more refined analytical technique which only detects hydrocarbons (aliphatic and aromatic) in the range C_{10} to C_{40} (volatiles, heavy tars, humic material and sulphur are not detected). The laboratory can provide a breakdown of the TPH results into diesel range organics (**DRO**) and heavier lubricating oil range organics (**LRO**).

GRO (PRO) by GC-FID analysis detects the more volatile C_6 – C_9 hydrocarbons (aliphatic and aromatic) including those organic compounds present in petrol.

Speciated VOC (by GC-MS) analysis quantifies the concentrations of 30 USA-EPA priority compounds. These include chlorinated alkanes and alkenes (in the molecular weight range chloroethane to tetrachloroethane); trimethlybenzenes; and the 4 BTEX compounds (benzene, ethyl-benzene, toluene & xylene).

Speciated sVOC by (GC-MS) analysis quantifies the concentration of a variety of organic compounds, including the 16 USA-EPA priority PAHs, phenols, 7 USA EPA priority PCB congeners, herbicides & pesticides.

Note: PAHs are hydrocarbons and consequently (where present) will be picked up when scheduling TPH by GC-FID. Napthalene (the lightest PAH) is also one of the 58 US EPA VOCs.

Speciated TPH by GC-FID provides a "banded "TPH", initially split into aromatic and aliphatic fractions and then further divided into fraction specific carbon bandings based upon behavioural characteristics.

Note: Risk assessment models require physiochemical properties (solubilities, toxicitities etc) of compounds in order to model their behaviour in the environment. These physiochermical properties cannot be derived from a single "TPH", "GRO" or "DRO" value. However, the carbon banded fractions can be used in risk assessment models.

If the relative proportion of each carbon banding within the "TPH" impact at a site is known, the risks posed by each individual fraction can be assessed and a simple back calculation applied to calculate an overall "TPH" screening value based upon the percentage weight fraction of each banding present in the "TPH". Specialised analytical techniques and data interpretation skills are required to identify each carbon banding.

Current Guidance

The UK approach to the consideration of contaminated land is based upon the principles of risk assessment. This in turn is founded upon the use of so called source⇒ pathway⇒ target principles in order to establish the presence or potential presence of a pollutant linkage.

Sutcliffe Investigations adopt a tiered approach to risk assessment, consistent with UK guidance and best practice. The initial step of such a risk assessment (or Tier 1) is the comparison of site data with appropriate guidance levels, intervention levels or remedial targets.

In March 2002 DEFRA and the Environment Agency published a series of technical research papers (R & D Publications CLR 7, 8, 9 and 10) introducing the UK approach to the assessment of risk to **human health** from land contamination. This methodology and approach represents current scientific knowledge and thinking. The overall methodology also included the Contaminated Land Exposure Model (CLEA) and some Soil Guidance Values (SGV's).

At the time of writing this report, these guidelines only address seven contaminants and the development of both the CLEA model and additional SGV's in ongoing. Where published, SGV's have been utilised as intervention values for the purpose of an initial Tier 1 assessment.

Where SGV's were not published at the time of writing this report, appropriate Tier 1 human health related assessment have been based upon information that was best available at the time of the study.

With respect to the assessment of potential **phytotoxic effects** of contaminants, Sutcliffe Investigations refer to "The Soil Code" (Maff, 1998) for copper and zinc. The CLEA SGV is adopted for nickel.

The potential risk to **building materials** is considered through reference to relevant BRE Digests, with particular emphasis on BRE Special Digest 1, 'Sulphate and Acid Resistance of Concrete in the Ground', 2001.

With respect to the interpretation of the calorific values, at present there are no accepted methods to assess whether a sample is combustible and under what circumstances it might smoulder. Some guidance is given in ICRCL Note 61/84 "Notes on the fire hazards of contaminated land" which states that:

"In general ……. it seems likely that materials whose CV's exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn".

Tier 1 **groundwater** risk assessments are undertaken by comparing leachate concentrations with the appropriate water quality standard. Depending upon the specific characteristics and environmental setting of the site the appropriate standard is likely to be one of the following:

- Water Supply (Water Quality) Regulations 1989
- Environmental Quality Standards (for Freshwater)
- The Surface Waters (Abstraction for Drinking Water) Regulations

The tier 1 risk assessment of **landfill gas** is undertaken through reference to the following documents:

- Approved Document C, Building Regulations 1991
- CIRIA Report 149, “Protecting Development from Methane”, 1995

Should any Tier 1 criteria be exceeded, then three potential courses of action are available. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

- Undertake further statistical following the approach set out in Appendix A of CLR 7 in order to determine whether contaminant concentrations of inorganic contaminants within soil/fill actually present a risk (only applicable to assessing the risk to human health).
- Based on a qualitative risk assessment, advocate an appropriate level of remediation to “break” the pollutant linkage – for example the removal of the contaminated materials or the provision of a clean cover.
- Carry out a more detailed quantitative risk assessment in order to determine whether contamination risks actually exist.

However, the issue of **averaging area** requires further consideration. CLR 7 is ambiguous and could be interpreted as advocating the concept of a single garden as an appropriate averaging area.

This concept has massive implications with respect to ground investigation design and cost. To comply, investigations for residential development on brownfield sites would need to recover and analyse about 6 samples from each garden; this implies exploratory locations on a very tight grid, perhaps 5m to 10m spacings, with a huge increase in the number of samples analysed (cf test schedules currently issued by most practitioners).

In any case, Sutcliffe Investigations consider the concept of a single garden as an averaging area to be inappropriate. Statistical analysis of sample results by fill type, and/or by former use in a given sub-area of the site (i.e. with reference to the Conceptual Site Model), is considered a more appropriate methodology.

Analysis by soil/fill type is appropriate for essentially immobile contaminants associated with a particular fill type, for example arsenic in colliery spoil, metals in ash & clinker, sulphate in plaster-rich demolition rubble etc.

Analysis by former use is appropriate where more mobile contaminants have entered the ground, for example diesel associated with leakage from a former fuel tank, downward migration of leachable metals through granular materials, various soluble contaminants present in a wastewater leaking into the ground via a fractured sewer etc. In these circumstances, it may be appropriate to undertake statistical analysis of sample results from a variety of different soil/fill types. However, consideration would have to be given to factors such as porosity which might influence impregnation of a mobile contaminant into the soil mass; ie contamination would be normally be more pervasive and significant in granular soils than cohesive soils.

There is a suggestion in para 4.7 of CLR 7 that the approach outlined above was intended and the Environment Agency have confirmed that an averaging area can be larger than a single garden, if:

- Contaminant concentrations are within the same statistical population as determined using the maximum value test. The sample data being representative of the averaging area and the mean concentration of the averaging area.
- “Hot spots” are treated as separate zones or averaging areas (as defined by the maximum value test).
- The sampling strategy takes into account uncertainty (spatial heterogeneity) in contaminant concentration

Waste Classification & WAC

In the context of waste soils generated by remediation and/or groundworks activities on brownfield sites, the following definitions (from the Landfill Regulations 2002) apply:

- Inert (e.g. uncontaminated ‘natural soil, bricks, concrete, tiles & ceramics)
- Non-Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances, but at concentrations below prescribed thresholds).
- Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances at concentrations above prescribed thresholds).

Dangerous substances include compounds containing a variety of determinants commonly found in contaminated soils on brownfield sites, for example arsenic, lead, chromium, benzene etc.

From 16th July 2005, landfill operators will require Waste Acceptance Citeria (WAC) laboratory data, if soil is classified as **hazardous** and such waste must have been subjected to pre-treatment. However, subject to WAC testing it may be possible to classify it as stable, non-reactive hazardous waste, which can be placed within a dedicated cell within the non-hazardous landfill.

Sutcliffe Investigations typically only include WAC analysis in site investigation proposals and reports, if significant off-site disposal (of soil classified as hazardous waste) is anticipated for example where redevelopment proposals include basement construction etc.

If off-site disposal of soils classified as hazardous waste were undertaken during redevelopment, then WAC analysis should be scheduled at an early stage in the remediation programme.

However, organic compounds (BTEX, TPH, PAH etc) are the most common contaminants that result in soils being classed as hazardous. These contaminants can often be dealt with by alternative technologies (eg by bioremediation or stabilisation) and consequently retention on site is often possible.

It should be noted that **non-hazardous** soil waste can go to a non-hazardous landfill facility; no further testing (eg WAC) is required.

Generic Notes – Sutcliffe Investigations

5. Hazardous Gas

General

Hazardous gas is considered to be any mixture of potentially explosive, toxic or asphyxiating gases, most notably methane, carbon dioxide and oxygen (deficiency).

In addition, radon, a naturally occurring radioactive gas is also considered. Further information about radon is included in Notes 1 – Environmental Setting.

Assessment of potential risks associated with hazardous gas are based on a review of data obtained from the Landmark information Group, the Environment Agency and the Local Authority and the British Geological Survey.

Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Where landfilling has occurred within 250m of the site boundary, the Local Planning Authority may request a landfill gas investigation in accordance with the Town and Country Planning General Development Order, 1988.

Sources

Potential sources of hazardous gas are:

- Landfill sites
- Made ground, especially where significant depths are present
- Shallow mineworks associated with coal extraction
- Geological strata, including peat, organic silts, coal-bearing strata and limestone (reaction with acidic waters), granite (radon)
- Groundwater can sometimes act as a “carrier” for hazardous gas
- Leakages from pipelines or storage tanks
- Sewers, septic tanks and cess pits

Generation

Wherever biodegradable material is deposited, landfill gas (principally a mixture of methane and carbon dioxide) is likely to be generated by microbial activity. Carbon dioxide is an asphyxiant and toxic; methane is flammable and a mixture containing between 5% and 15% methane by volume in air is explosive. Landfill gas in the ground is unlikely in itself to pose a significant risk, though it may damage vegetation. However, infiltration of landfill gas into confined spaces (e.g. cellars, services, etc) may give rise to considerable risk.

There is no typical figure for the length of time that landfill gas will be evolved, but at many sites significant gas generation continues for at least 15 years after the last deposit of waste.

Migration

Gas migration from a landfill site may occur in several ways. It may migrate through adjacent strata; the distance of migration being dependent on the pressure gradients, volume of gas and permeability of the strata. Where there are faults, cavities and fissures within the strata, gas may move considerable distances. Other migration pathways for gas include man-made features such as mine shafts, roadways and underground services.

Gas migration is influenced by a number of climatic factors, such as atmospheric pressure variations, water table level variations and the influence of a covering of snow or ice over the surface of the site and surrounding area.

Current Guidance

Guidance on landfill gas monitoring control at landfill sites is given two technical memoranda, Waste Management Paper Nos. 26 and 27 published by the Department of the Environment.

Waste Management Paper 27, 1991 recommends that no dwellings should be constructed within 50m of any landfill that has the capacity to produce large volumes of landfill gas. No garden should extend to within 10m of the landfilled waste. However, development closer to landfill has been permitted where a comprehensive gas risk assessment has been completed (typically based on a minimum of 6 to 12 month monitoring programme) and appropriate gas exclusion measures designed.

The current advice with regard to monitoring for landfill gas is that if the trigger value of 1% volume (20% LEL) for methane and 1.5% volume for carbon dioxide is exceeded then remedial/control measures will be required.

It should be noted that the guideline limit for carbon dioxide of 1.5% volume recommended in Waste Management paper No. 27 is the short term (10 minute) occupational exposure limit for carbon dioxide quoted by the Health and Safety Executive in their publication EH40. The long term (8 hour) occupational exposure limit for carbon dioxide is 0.5% volume.

Approved Document C to the Department of the Environment's Building Regulations 1992 requires what where there may be gaseous contamination of the ground but the level of methane is unlikely to exceed 1% by volume, the ground floor of any house or similar small building shall be constructed of suspended concrete and ventilated as described in BRE Digest Report "Construction of New Buildings on Gas Contaminated Land". The document also requires specific design measures to be taken if a level of 5% volume carbon dioxide exists or is exceeded within the ground.

Although the above guidance is still relevant it has been more recently updated within the following documents published by the Construction Industry Research and Information Association (CIRIA).

CIRIA Report 149 'Protecting Development from Methane' (1995)
CIRIA Report 150 'Methane Investigation Strategies' (1995)
CIRIA Report 151 'Interpreting Measurement of Gas in the Ground' (1995)
CIRIA Report 152 'Risk Assessment for Methane and other gases from the ground' (1995)

The above documents are intended to provide advice on how to investigate and deal with the gas contaminated ground with respect to development.

CIRIA Report 149 characterised sites based on the recorded methane/carbon dioxide concentration and emission rates recorded during a suitable gas investigation. Characteristic situation 1 is deemed to be the lowest risk scenario with the risk rating increasing up to 6. The characteristic situations are classified as follows:

Gassing regime in ground			
Methane (% by volume in air)	Carbon dioxide (% by volume in air)	Emission rate [1] (m/s)	Characteristic situation [2]
< 0.1	< 1.5	not detected	1
> 0.1 – 1	> 1.5 – 5	not detected	2
> 1 - 5	< 5	not detected	3
> 5 – 20	< 20	< 0.01	4
> 20	> 20	> 0.01 – 0.05	5
> 20	> 20	> 0.05	6

Notes:
1. Emission rate values measures as equivalent total gas flow velocity from a 50mm diameter borehole: for methods of measurement see Crowhurst and Manchester (1992).
2. Highest measures parameter used as determining factor.

CIRIA Report 151 (1995) identified that there is currently inadequate guidance on trigger concentrations for ground gases. The current emphasis on using gas concentrations for trigger values particularly in Waste Management Paper 27 and the Building Regulations, should be revised to consider gas pressures, borehole flow rates and estimated surface emission rates.

It was concluded that the most important aspect of relating the gas regime below or adjacent to a site, to the risk it poses to any development, is the surface emission rate i.e. how quickly the gas is coming out of the ground. The lower the surface emission rate the lower the risk. This is considered further in the DETR Partners in Technology Report 'Passive venting of soil gases beaneath buildings' (September 1997).

CIRIA Report 149 (1995), reference Table 28, reviewed over 100 case studies of development affeceted by gas to establish current UK practices for gas control. The report classified the gassing regimes fround within 6 Characteristic Situations. The highest measures parameter, either methane or carbon dioxide concentration and/or emission rate were used to define the Characteristic Situation for each case history site. The report then related the typical range of mitigation measures that has been adopted at each study site to the characteristic gas situation.

To achieve a more consistent design of protection measures Table 28 of CIRIA 149 was rewritten (Wilson and Card, 1999) in terms of borehole gas volume flow rate and gas concentrations, as reproduced in the table below. This was done to reflect the importance of recognising the gas surface emission rate.

Characteristic situations based on Gas Flux

Characteristic Situation	Limiting CH_4 Concentration (% v/v)	Limiting CO_2 Concentrations (% v/v)	Limiting Borehole Flow Velocity (m/s)	Limiting Borehole Gas Volume Flow (litre/hour)	
				CH_4	CO_2
1	< 0.1	< 0.1	< 0.005	< 0.035	< 0.035
2	< 1.0	< 1.5	< 0.005	< 0.35	< 0.5
3	< 5.0	< 5.0	< 0.005	< 1.75	< 1.75
4	< 20	< 20	< 0.01	< 14	< 14
5	> 20	> 20	< 0.05	< 70	< 70
6	> 20	> 20	< 0.05	> 70	> 70

Gas Monitoring Procedure

Sutcliffe Investigations adopt a standard gas monitoring procedure, in accordance with CIRIA guidance. This procedure involves the measurement, in the following order of:

- Atmospheric temperature, pressure and ambient oxygen concentration on site immediately prior to and on completion of monitoring.
- Gas emission rate.
- Methane, oxygen and carbon dioxide concentrations using and infra-red gas analyser.
- Standing water level using a dipmeter.

In addition, ground conditions at each sampling location are recorded together with prevailing weather conditions and any other observations such as any vandalism.

Where samples of gas are required for laboratory analysis, Gresham Tubes are used. Gas concentrations in the well are typically recorded immediately before and after retrieval of a sample.

Appendix B – CIRIA Guidance Document C552 2001

RISK ASSESSMENT FOR THE WATER ENVIRONMENT

The risk assessment has been developed to provide a greater level of standardisation. It includes relevant elements from TAG (Transport Analysis Guidance) Table 1 relating to the features described as river, floodplain, groundwater and stillwaters, including their attributes/services and selected/modified indicators of quality and possible measures. Two additional columns have been added for 'grading' and 'importance level'. These columns expand on the limited number of examples provided in TAG Table 2. Table 1 has been developed with reference to TAG, Highways Agency's 'New Approach to Appraisal' (NATA), the Water Framework Directive and other sources as referenced in the table.

Table 1 here relies on easily available data to avoid unnecessary data collection. Should inadequate data be available a 'worst case' should be assumed. The table is designed to act as a guide to determining importance and to raise the level of compatibility in predicting the significance of impacts on the water environment.

Once Table 1 has been used to determine the importance of the environmental attributes that may be affected by a particular development project, Tables 3 and 4 of TAG Unit 3.3.11 can be used to estimate the significance of potential impacts. These tables are reproduced here as Tables 2 and 3 respectively. Table 2 provides a methodology for determining impact magnitude. Table 3 is a matrix that allows the significance of the impact to be calculated based on the impact magnitude and the importance of the attribute. The significance of impacts can range from 'insignificant' to 'very significant'.

Table 1: Water features, their attributes, indicators of quality, grading and importance (adapted from Table 1 of TAG unit 3.3.11)

Feature	Attribute / Service	Indicator of Quality	Measure	Grading	Importance Level
River	Water Supply	Chemical water quality	Environment Agency's Chemical General Quality Assessment (GQA)	A B C-D E-F	Very High High Medium Low
		Industrial / agricultural abstractions	Location and volume of abstraction	All abstractions within 2km downstream: >1000m3/day 500-1000m3/day 50-499m3/day <50m3/day	 Very High High Medium Low
		Drinking water supply	Classification defined within The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996. No 3001[2]	Classification: DW1 or DW2 within critical travel time for pollution downstream DW3 within critical time downstream Not designated	 Very High High Medium - Low
	Biodiversity[3]	Biological Water Quality	Environment Agency's Biological GQA[1]	A B C-D E-F	Very High High Medium Low
		Fisheries Quality	Fisheries status as defined within the Freshwater Fish Directive 78/659/EEC	Designated salmonid fishery Designated cyprinid fishery Undesignated fishery Not a fishery	Very High High Medium Low

Feature	Attribute / Service	Indicator of Quality	Measure	Grading	Importance Level
River	Transport and dilution of waste product	Surface Water / effluent discharges	Type of discharges with reference to the EC Dangerous Substances Directive (76/464/EEC and Daughter Directives)	All discharges within 2km up or downstream: List I List II Other discharge / no discharge	 Very High - High Medium Medium - Low
	Recreation	Riverside access	Presence / absence of route and importance	National trail / cycleway Regional trail Definitive footpath / bridleway No route	Very High High Medium Low
		Presence of clubs/ recreation use	Presence / absence	Club recreation use present No club / recreation use	Very High - High - Medium Low
	Conveyance of flow and material	Presence of water courses	Size of watercourses[5]	Main River > 10m wide Main River < 10m wide Ordinary watercourse >5m wide Other	Very High High Medium Low
Floodplain	Flood defence	Importance in relation to flood defence	Status of flood plain area	Designated washland Active floodplain Existing defended area Does not flood	Very High High Medium Low
			Return period	> (ie more frequent then) 1 in 25 years < 1 in 25 years <1 in 100 years (urban) <1 in 50 years <1 in 200 years	Very High High Medium Medium Low
Groundwater	Water supply	Industrial / agricultural abstractions	Location and volume of abstraction	All abstraction points within zone of influence of development: >1000m3/day >500-1000m3/day 50-499m3/day <50m3/day	 Very High High Medium Low
		Drinking water supply	Presence of potable public supply or private water supply within zone of influence of development	Public supply Private water supply >10m3/day or serves >50 people[6] Other private water supply No supply	Very High High Medium Low
		Groundwater vulnerability	Source protection status	Within zone 1,2 or 3 of a source protection zone Not within a source protection zone	Very High High Medium Low
			Classification of aquifer vulnerability	Major aquifer with H soils or I soils or U soils. Minor aquifer with H soils or U soils Major aquifer with L soils. Minor aquifer with L soils or non aquifer	Very High High Medium Low
	Conveyance of flood flows	Acceptance potential of flood flows	Soil type / groundwater table levels[8]	Gravels with low water table (>1m below infiltration point) Sands with low water table All soil types with high water table Clay	Very High High Medium Low
Stillwaters (lakes and ponds)	Biodiversity[3]	Biological water quality	Classification system to be developed under the Water Framework Directive for ecological status / potential		
		Fisheries quality	Fisheries status as defined within the Freshwater Fish Directive 78/659/EEC	Designated salmonid fishery Designated cyprinid fishery Undesignated fishery Not a fishery	Very High-high High - medium Medium - low Low
	Water supply	Use for abstraction	Presence / absence	Abstraction No abstraction	Very High - High – Medium[9] Low
	Recreation	Presence of clubs / recreation use	Presence / absence	Club recreation use present No club / recreation use	Very High - High - Medium[4] Low

Notes to Table 1

1 If the river is unclassified and hence has no GQA grade, the quality can be measured or assumptions can be made based on the grade of the nearest classified stretch.

2 An importance level of high or very high must also be awarded if the water feature provides more than 10m3/day of drinking water, or serves more than 50 people, which is the definition used in the Water Framework Directive to define drinking water protected areas.

3 Conservation value is not included, as this should be included within an ecology/nature conservation assessment.

4 This required judgement on a case by case basis because the importance of use by people is being assessed, and they are sensitive to being categorised as unimportant. Careful assessment is thus required, using as much data as possible eg on the facilities, their scale and frequency of use, membership levels and economic value.

5 An importance level of 'Medium' or greater must also be awarded if a river has a catchment greater than 10km2, as this means that it will be classified as a water body under the Water Framework Directive. Other measures are available for describing the ability of watercourses to convey flow and material (such as the carrying capacity of the channel for flood flows) and could if necessary be substituted.

6 Based on criteria given within the Water Frame Work Directive for features to be designated as drinking water protected areas.

7 Adapted from NRA Policy and Practice for the Protection of Groundwater, Groundwater Vulnerability Sheets, NRA 1994. Because soil information in urban areas is less reliable and based on fewer observations than in rural areas, the worst case is assumed and such land is classified as being high of leaching potential. H = high, I = Intermediate, L = Low and U = Unclassified leaching potential.

8 This uses a coarse basis of permeability together with the ability of the existing ground conditions to accept additional flows. For example, gravels in a river floodplain are unlikely to have a high acceptance potential because of raised water table due to river flows. Sands above a relatively dry substrata would have a high potential, however caution is required in areas such as chalk with highly fluctuating groundwater levels.

9 Depends on use of water, volume abstracted etc. An importance level of 'High' or 'Very high' mus be awarded if the water feature provides more than 10m3/day of drinking water, or serves more than 50 people, which is the definition used in the Water Framework Directive to define drinking water protected areas.

Table 2: Criteria for determining impact magnitude (reproduced from Table 3 of TAG unit 3.3.11)

Magnitude	Criteria	Example
Major	Results in loss of attribute	• Loss of EC designated Salmonid fishery • Compromise employment source • Pollution of potable source of abstraction • Change in GQA grade of river reach • Loss of flood storage / increased flood risk
Moderate	Results in impact on integrity of attribute or loss of art of attribute	• Loss in productivity of a fishery • Contribution of a significant proportion of the effluent in the receiving river, but insufficient to change its GQA grade • Reduction in the economic value of the feature
Minor	Results in minor impact on attribute	• Measurable change in attribute, but of limited size and/or proportion
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use / integrity	• Discharges to watercourse but no significant loss in quality, fishery productivity or biodiversity • No significant impact on the economic value of the feature • No increase in flood risk

Table 3: Significance Criteria of Potential Impacts
(Reproduced from Table 4 of TAG unit 3.3.11)

Magnitude of Potential impact	Importance of Attribute			
	Very High	**High**	**Medium**	**Low**
Major	Very Significant	Very Significant	Significant	Low Significant
Moderate	Very Significant	Significant	Low Significant	Insignificant
Minor	Significant	Low Significant	Insignificant	Insignificant
Negligible	Low Significant	Insignificant	Insignificant	Insignificant

Table 4: Proposed impact assessment summary table

Feature	Attribute / Service	Importance Level	Magnitude of Impact	Significance of Impact
River	Water Supply	Very High	Minor	Significant

References

1 The Highways Agency et al, Design Manual for Roads and Bridges, Vol 11. Environmental Assessment, 1993.
2 DETR 'Guidance on the New Approach to Appraisal, 1998.
3 Department for Transport, Transport Analysis Guidance (TAG) 2003

RISK ASSESSMENT METHODOLOGY

GENERAL

The purpose of this appendix is to describe in detail the concepts underlying the risk based approach to assessing potentially contaminated land, introduce the roles of key legislation and describe the qualitative methodology adopted for evaluating and characterising risk.

Current best practice in the UK promotes a risk-based approach to dealing with both soil and groundwater contamination. The principal aim of the approach is to ensure protection of human health and the environment in a thorough, transparent and cost-effective manner.

Fundamental to the risk-based approach is the concept that for 'Contaminated Land' to be designated, as a consequence of historic activities, a pathway for contamination must be shown to exist between a source of contamination and a receptor. The combined presence of a source, pathway and a receptor is described as a 'pollutant linkage'.

The concepts associated with a contaminant source, pathway and receptor are defined in DETR Circular 02/2000 'Contaminated Land Environmental Protection Act 1990: Part II A'. A ***source*** of contamination may be considered as a 'substance, which is in, on or under land that has the potential to cause harm or to cause pollution of controlled waters'. A ***receptor*** can be considered as either 'a living organism, a group of living organisms, an ecological system or a piece of property which is being, or could be harmed, by a contaminant or controlled waters which are being, or could be, polluted by a contaminant'. A ***pathway*** may be considered as one or more routes by, or through, which a receptor is being, or could be, exposed to or affected, by a contaminant. Typical pathways may include migration in groundwater, surface water run-off or infiltration, inhalation, dermal contact and ingestion.

The risks posed by an identified pollutant linkage can often be mitigated by removing the source of contamination, treating the source of contamination, blocking the relevant pathway(s) or by protecting the receptor.

PRINCIPLES OF RISK EVALUATION

The risk evaluation methodology presented below is qualitative in nature, and is therefore a subjective method. It is based upon guidance presented in CIRIA publication referenced C552, 'Contaminated land risk assessment - A guide to good practice', 2001 and involves the classification of the following.

The magnitude of the potential **consequence** (severity) of risks occurring (Table 1).

The magnitude of the **probability** (likelihood) of the risk occurring (Table 2).

These are then considered in conjunction to give a risk matrix (Table 3)

Table 1 - Classification of consequence

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (Note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentrations of a contaminant from site exceed the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the *Draft Circular on Contaminated Land,* DETR, 2000). Damage to sensitive buildings/structures/ services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

Table 2 - Classification of probability

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Table 3 - Comparison of consequence against probability

		Consequence			
		Severe	*Medium*	*Mild*	*Minor*
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table 4 - Description of the classified risks and likely action required

Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Table 5 - Response action likely to be required in relation to estimated risk

KEY

- Mitigation and remedial measures required
- Mitigation and remedial measures likely
- Remedial measures unlikely
- Remedial measures not required

Appendix C – Site Investigation Logs

Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	PT101

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (Grass over topsoil). Gravel is fine to medium, angular of brick and glass and mixed lithology.		
					0.70			
					(0.45)	Orangish brown, gravelly, fine to medium SAND. Gravel is fine to coarse, sub rounded to rounded of sandstone.		
					1.15	Complete at 1.15m		



Remarks

Trial pit dry.

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.PT101

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	PT102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 14/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70-1.00	ES				(0.70) 0.70	MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (Grass over topsoil). Gravel is fine to medium, angular of brick and glass and mixed lithology.		
					(0.30) 1.00	MADE GROUND: Orangish brown and dark brown, slightly gravelly, fine to medium SAND. Gravel is fine to coarse, sub rounded to angular of brick and mixed lithology.		
					(0.40) 1.40	Light brownish grey, gravelly, fine to coarse, SAND. Gravel is fine to coarse, rounded to sub rounded of sandstone.		
						Complete at 1.40m		



Remarks

Trial pit dry

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.PT102

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	PT103

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 14/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.60) 0.60	MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (Grass over topsoil). Gravel is fine to medium, angular of brick and glass and mixed lithology.		
					(0.70) 1.30	Orangish brown mottled grey, gravelly, fine to coarse, SAND with occasional small cobbles of sandstone. Gravel is rounded to sub rounded, fine to coarse of sandstone.		
						Complete at 1.30m		



Remarks

Trial pit dry

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.PT103

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	PT104

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 14/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (Grass over topsoil). Gravel is fine to medium, angular of brick and glass and mixed lithology.		
					0.70			
					(0.60)	Orangish brown, gravelly, fine to medium SAND. Gravel is fine to coarse, sub rounded to rounded of sandstone.		
					1.30	Complete at 1.30m		



Remarks

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.PT104

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP101

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-0.70 0.20-0.70 0.75-1.00	ES ES ES		Water strike(1) at 2.80m.		(0.70) 0.70 (1.30) 2.00 (1.00) 3.00	MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND with abundant roots and rootlets (Grass over topsoil). Gravel is fine to medium, angular of brick and glass and mixed lithology. Orangish brown, gravelly, fine to medium SAND. Gravel is fine to coarse, sub rounded to rounded of sandstone. Orangish brown, fine to coarse, SAND with occasional sub rounded to rounded, small cobbles of fine to coarse sandstone. Complete at 3.00m		▽1



Remarks

Sides collapsing in.

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP101

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	ES				(0.70) 0.70	MADE GROUND: Grey, sandy, fine to coarse, angular, GRAVEL of concrete, brick and mixed lithology with occasional cobbles of brick, concrete, and mixed lithology (compacted hardcore)		
1.00-1.35	ES		Water strike(1) at 2.50m.		(1.85) 2.55	Orangish brown, gravelly, fine to coarse, SAND. Gravel is fine to coarse, rounded to sub-rounded of sandstone.		▽1
						Complete at 2.55m		



Remarks

Sides collapsing in.

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP102

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP103

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.15-0.25	ES				(0.15) 0.15	MADE GROUND: Grey, sandy, fine to coarse, angular, GRAVEL of concrete, brick and mixed lithology with occasional cobbles of brick, concrete, and mixed lithology (compacted hardcore)		
					0.25			
0.90-1.20	ES					MADE GROUND: Dark brown, slightly silty, slightly gravelly, fine to medium SAND. Gravel is angular, fine to medium of brick and mixed lithology.		
					(2.10)	Orangish brown, mottled grey, gravelly, fine to coarse SAND. Gravel is fine to coarse, rounded to sub rounded of sandstone.		
			Water strike(1) at 2.30m.					▽1
					2.35	Complete at 2.35m		



Remarks

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP103

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP104

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70 0.00-0.70	ES ES				(0.70)	MADE GROUND: Grey, sandy, fine to coarse, angular, GRAVEL of concrete, brick and mixed lithology with occasional cobbles of brick, concrete, and mixed lithology (compacted hardcore)		
0.75-1.00	ES				0.70 (2.10)	Orangish brown mottled grey, gravelly, fine to medium SAND. Gravel is rounded to sub rounded, fine to coarse, of sandstone.		
					2.80	Complete at 2.80m		



Remarks

Trial pit dry.
Sides collapsing in

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP104

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP105

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60 0.00-0.60	ES ES				(0.60) 0.60	MADE GROUND: Grey, sandy, fine to coarse, angular, GRAVEL of concrete, brick and mixed lithology with occasional cobbles of brick, concrete, and mixed lithology (compacted hardcore)		
					(2.10)	Orangish brown, mottled grey, gravelly, fine to coarse, SAND with occasional small cobbles. Gravel is rounded to sub rounded, fine to coarse of sandstone.		
			Water strike(1) at 2.70m.		2.70	Complete at 2.70m		▽1



Remarks

Sides collapsing in.

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP105

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Sutcliffe

Site	Trial Pit Number
Oakwood Lodge, Wythenshawe	TP106

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			John Southworth	33266LG
	Location	**Dates** 13/11/2023	**Engineer** Michael Wiggins	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-0.80	ES				(0.80)	MADE GROUND: Grey, sandy, fine to coarse, angular, GRAVEL of concrete, brick and mixed lithology with occasional cobbles of brick, concrete, and mixed lithology (compacted hardcore)		
0.75-1.00	ES				0.80	Orangish brown, mottled grey, gravelly, fine to coarse, SAND with occasional small cobbles. Gravel is rounded to sub rounded, fine to coarse of sandstone.		
					(2.10)			
					2.90	Complete at 2.90m		



Remarks

Trial pit dry.
Sides collapsing in.

Scale (approx)	Logged By	Figure No.
1:50	MW	33266LG.TP106

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Appendix D – Analytical Certificates

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/11268
Issue Number: 1 **Date:** 29 November, 2023

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

Project Manager: (Use) D Evans; D Bowen; A Tosh; W Baldwin/(Use) Sa
Project Name: Oakwood Lodge, Wythenshawe
Project Ref: 33266LG
Order No: 10058
Date Samples Received: 14/11/23
Date Instructions Received: 15/11/23
Date Analysis Completed: 29/11/23

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
% Moisture at <40C$_A$	18.6	9.5	12.5	13.8	9.6	5.9	-	% w/w	0.1	A-T-044
% Stones >10mm$_A$	<0.1	26.3	3.2	<0.1	<0.1	21.2	28.7	% w/w	0.1	A-T-044
pH$_D$[M#]	7.17	8.66	7.63	7.90	8.44	9.94	7.76	pH	0.01	A-T-031s
Electrical conductivity @ 20degC$_D$	-	-	-	-	-	-	56	µs/cm	10	A-T-037s
Sulphate (water sol 2:1)$_D$[M#]	0.02	0.45	0.09	0.33	0.68	0.58	-	g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$[M#]	470	1600	420	1100	2800	3800	-	mg/kg	200	A-T-028s
Cyanide (total)$_A$[M#]	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide$_A$	230	46	81	32	50	16	-	mg/kg	5	A-T-043-s
Sulphur (elemental)$_D$[M#]	20	<5	230	<5	<5	<5	-	mg/kg	5	A-T-029s
Organic Matter$_D$[M#]	4.4	0.5	0.9	0.9	0.7	0.8	-	% w/w	0.1	A-T-032s
Arsenic$_D$[M#]	8	1	4	2	4	2	-	mg/kg	1	A-T-024s
Boron (water soluble)$_D$[M#]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	mg/kg	1	A-T-027s
Cadmium$_D$[M#]	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-	mg/kg	0.5	A-T-024s
Copper$_D$[M#]	54	7	39	9	14	7	-	mg/kg	1	A-T-024s
Chromium$_D$[M#]	24	11	19	15	18	12	-	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-040s
Chromium (trivalent)	24	11	19	15	18	12	-	mg/kg	1	Calc
Lead$_D$[M#]	216	12	15	16	17	8	-	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	-	mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	23	9	11	12	23	9	-	mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-024s
Zinc$_D$[M#]	201	24	25	30	35	32	-	mg/kg	5	A-T-024s
Redox Potential (water soluble)$_D$	-	-	-	-	-	-	263	mV		Redox
Leachate Prep NRA (10:1)$_A$	*	-	*	-	-	-	-			A-T-001
pH (leachable)$_A$	6.59	-	6.94	-	-	-	-	pH	0.01	A-T-031w
Sulphate (leachable)$_A$	8.77	-	15.65	-	-	-	-	mg/l	1	A-T-026w
Cyanide (total) (leachable)$_A$	<0.005	-	<0.005	-	-	-	-	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	mg/l	0.01	A-T-050w
Sulphide (leachable)$_A$	<0.1	-	<0.1	-	-	-	-	mg/l	0.1	A-T-043-w
DOC (leachable)$_A$	6.4	-	11.9	-	-	-	-	mg/l	2	A-T-032w
Arsenic (leachable)$_A$	1	-	3	-	-	-	-	µg/l	1	A-T-025w
Boron (leachable)$_A$	11	-	27	-	-	-	-	µg/l	10	A-T-025w

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
Cadmium (leachable)$_A$	<1	-	<1	-	-	-	-	µg/l	1	A-T-025w
Copper (leachable)$_A$	94	-	17	-	-	-	-	µg/l	4	A-T-025w
Chromium (leachable)$_A$	<1	-	3	-	-	-	-	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_A$	<0.05	-	<0.05	-	-	-	-	mg/l	0.05	A-T-040w
Chromium (trivalent)	<0.05	-	<0.05	-	-	-	-	mg/l	0.05	Calc
Lead (leachable)$_A$	29	-	26	-	-	-	-	µg/l	1	A-T-025w
Mercury (leachable)$_A$	<0.1	-	<0.1	-	-	-	-	µg/l	0.1	A-T-025w
Nickel (leachable)$_A$	<2	-	<2	-	-	-	-	µg/l	2	A-T-025w
Selenium (leachable)$_A$	<1	-	1	-	-	-	-	µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable)$_A$	<0.1	-	<0.1	-	-	-	-	mg/l	0.1	A-T-029w
Zinc (leachable)$_A$	23	-	8	-	-	-	-	µg/l	2	A-T-025w
TPH total (>C6-C40) (leachable)$_A$	<80	-	<80	-	-	-	-	µg/l	80	A-T-007w

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	N/A	N/A	N/A	N/A	-			A-T-045

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.04	<0.01	0.02	<0.01	<0.01	0.18	-	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.10	<0.02	0.07	<0.02	<0.02	0.49	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.26	<0.04	0.09	<0.04	<0.04	0.21	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.27	<0.04	0.06	<0.04	<0.04	0.15	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.34	<0.05	0.07	<0.05	<0.05	0.18	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.15	<0.05	<0.05	<0.05	<0.05	0.09	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.12	<0.07	<0.07	<0.07	<0.07	0.08	-	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	0.39	<0.06	0.09	<0.06	<0.06	0.32	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	0.87	<0.08	0.35	<0.08	<0.08	0.73	-	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.04	<0.01	0.04	<0.01	<0.01	0.21	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.17	<0.03	<0.03	<0.03	<0.03	0.08	-	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03^U	<0.03^U	<0.03^U	<0.03^U	<0.03^U	<0.03^U	-	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.48	<0.03	0.43	<0.03	<0.03	1.46	-	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	0.77	<0.07	0.27	<0.07	<0.07	0.68	-	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A$	4.00	<0.08	1.50	<0.08	<0.08	4.86	-	mg/kg	0.01	A-T-019s

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Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
PAH-16MS (leachable)										
Acenaphthene (leachable)$_A$	0.01	-	0.03	-	-	-	-	µg/l	0.01	A-T-019w
Acenaphthylene (leachable)$_A$	0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Anthracene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Chrysene (leachable)$_A$	<0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Fluoranthene (leachable)$_A$	<0.01	-	0.01	-	-	-	-	µg/l	0.01	A-T-019w
Fluorene (leachable)$_A$	<0.01	-	0.02	-	-	-	-	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	0.01	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Naphthalene (leachable)$_A$	0.03	-	<0.01	-	-	-	-	µg/l	0.01	A-T-019w
Phenanthrene (leachable)$_A$	0.01	-	0.03	-	-	-	-	µg/l	0.01	A-T-019w
Pyrene (leachable)$_A$	0.01	-	0.01	-	-	-	-	µg/l	0.01	A-T-019w
Total PAH-16MS (leachable)$_A$	0.09	-	0.10	-	-	-	-	µg/l	0.01	A-T-019w

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
SVOC										
4-Bromophenyl phenyl ether$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Hexachlorobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Diethyl phthalate$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Dimethyl phthalate$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Dibenzofuran$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Carbazole$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Butylbenzyl phthalate$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate$_A$	-	-	-	-	-	-	<500	µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
4-Nitrophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
3+4-Methylphenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
4-Chloro-3-methylphenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Nitrophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Methylphenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
1,2,4-Trichlorobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Chlorophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,6-Dinitrotoluene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dinitrotoluene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dimethylphenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dichlorophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4,6-Trichlorophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4,5-Trichlorophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
1,4-Dichlorobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
1,3-Dichlorobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
1,2-Dichlorobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Chloronaphthalene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Methylnaphthalene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Acenaphthylene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Acenaphthene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Anthracene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Benzo(a)anthracene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
Benzo(b)fluoranthene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Benzo(k)fluoranthene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Benzo(a)pyrene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Benzo(ghi)perylene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Chrysene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Fluoranthene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Fluorene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Indeno(1,2,3-cd)pyrene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Phenanthrene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Pyrene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Naphthalene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Dibenzo(ah)anthracene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Phenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Pentachlorophenol$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
n-Dioctylphthalate$_A$	-	-	-	-	-	-	<500	µg/kg	500	A-T-052s
n-Dibutylphthalate$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Nitrobenzene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Isophorone$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Hexachloroethane$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Hexachlorobutadiene$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
SVOC Total (excl. PAH/Phenols/Cresols)$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Phenol Total$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Cresol & Chlorinated Phenol Total$_A$	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s

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Client Project Name: Oakwood Lodge, Wythenshawe

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Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
VOC										
Dichlorodifluoromethane$_A$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloromethane$_A$	-	-	-	-	-	-	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromomethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloroethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dichloromethane$_A$	-	-	-	-	-	-	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	-	-	-	-	-	-	<5	µg/kg	5	A-T-006s
Chloroform$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
Benzene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	-	-	-	-	-	-	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Toluene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
Chlorobenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Isopropylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s
VOC Total$_{A}$	-	-	-	-	-	-	<10	µg/kg	10	A-T-006s

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
TPH CWG with Clean Up										
Ali >C5-C6$_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	<1	<1	<1	<10	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<10	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1	<1	<10	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	1	<1	3	<1	<1	<10	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	16	2	41	<1	14	167	<1	mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	-	-	-	-	-	<1	mg/kg	1	Calc-As Recd
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<2	<2	<2	<2	<2	<10	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	1	<1	<1	<1	<1	<10	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	5	<1	2	<1	1	16	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	25	<1	4	<1	2	27	<1	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	69	2	7	<1	6	54	<1	mg/kg	1	A-T-055s
EPH Total Ali & Aro (>C10-C16)$_A^{\#}$	-	-	-	-	-	-	<1	mg/kg	1	A-T-055s
EPH Total Ali & Aro (>C16-C35)$_A^{M\#}$	-	-	-	-	-	-	<1	mg/kg	1	A-T-055s
Total Aromatics$_A$	-	-	-	-	-	-	<1	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35)$_A$	-	-	-	-	-	-	<1	mg/kg	1	Calc-As Recd
BTEX and MTBE Total$_A$	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
VPH total (>C5-C10)$_A^{\#}$	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP101			
Depth to Top	0.20	0.00	0.15	0.00	0.00	0.40	0.75			
Depth To Bottom	0.70	0.70	0.25	0.70	0.60	0.80	1.00			
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4AE	3A	3	4A	4A	3A	5A			
TPH UKCWG with Clean Up										
Ali >C35-C44$_A$	9	<1	7	<1	17	312	-	mg/kg	1	A-T-055s
Total Aliphatics$_A$	26	3	51	<1	31	478	-	mg/kg	1	Calc-As Recd
Aro >C35-C44$_A$	6	<1	1	<1	4	105	-	mg/kg	1	A-T-055s
Total Aromatics$_A$	106	<2	14	<2	13	201	-	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C44)$_A$	131	5	65	<2	44	679	-	mg/kg	1	Calc-As Recd
Forensic Description										
% of total sample Inert >10mm	31.70	-	-	72.76	70.61	-	-	% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	3.09	-	-	<0.10	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Vegetation >10mm	<0.10	-	-	<0.10	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	<0.10	-	-	<0.10	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	<0.10	-	-	3.33	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	<0.10	-	-	<0.10	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	<0.10	-	-	<0.10	<0.10	-	-	% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	65.21	-	-	23.91	29.39	-	-	% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil)$^{\#}$	2.21	-	-	0.51	0.28	-	-	% w/w	0.03	Calc-no stones

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
% Moisture at <40C$_A$	-	-	-	-	8.7			% w/w	0.1	A-T-044
% Stones >10mm$_A$	20.4	13.6	13.5	33.7	9.6			% w/w	0.1	A-T-044
pH$_D^{M\#}$	8.09	8.05	7.11	7.66	7.89			pH	0.01	A-T-031s
Electrical conductivity @ 20degC$_D$	549	117	79	43	-			µs/cm	10	A-T-037s
Sulphate (water sol 2:1)$_D^{M\#}$	-	-	-	-	0.19			g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	-	-	-	-	560			mg/kg	200	A-T-028s
Cyanide (total)$_A^{M\#}$	-	-	-	-	<1			mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	-	-	-	-	<0.2			mg/kg	0.2	A-T-050s
Sulphide$_A$	-	-	-	-	<5			mg/kg	5	A-T-043-s
Sulphur (elemental)$_D^{M\#}$	-	-	-	-	<5			mg/kg	5	A-T-029s
Organic Matter$_D^{M\#}$	-	-	-	-	0.3			% w/w	0.1	A-T-032s
Arsenic$_D^{M\#}$	-	-	-	-	<1			mg/kg	1	A-T-024s
Boron (water soluble)$_D^{M\#}$	-	-	-	-	<1.0			mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	-	-	-	-	<0.5			mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	-	-	-	-	4			mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	-	-	-	-	9			mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	-	-	-	-	<1			mg/kg	1	A-T-040s
Chromium (trivalent)	-	-	-	-	9			mg/kg	1	Calc
Lead$_D^{M\#}$	-	-	-	-	2			mg/kg	1	A-T-024s
Mercury$_D$	-	-	-	-	<0.17			mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	-	-	-	-	6			mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	-	-	-	-	<1			mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	-	-	-	-	13			mg/kg	5	A-T-024s
Redox Potential (water soluble)$_D$	252	236	254	256	-			mV		Redox

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	-	-	-	-	NAD					A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-	-					A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	-	-	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	-	-	-	-	N/A					A-T-045

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
PAH-16MS										
Acenaphthene$_A^{M\#}$	-	-	-	-	<0.01			mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	-	-	-	-	<0.01			mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	-	-	-	-	<0.02			mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	-	-	-	-	<0.04			mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	-	-	-	-	<0.04			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	-	-	-	-	<0.05			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	-	-	-	-	<0.05			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	-	-	-	-	<0.07			mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	-	-	-	-	<0.06			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A$	-	-	-	-	<0.04			mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	-	-	-	-	<0.08			mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	-	-	-	-	<0.01			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	-	-	-	-	<0.03			mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	-	-	-	-	<0.03^U			mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	-	-	-	-	<0.03			mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	-	-	-	-	<0.07			mg/kg	0.07	A-T-019s
Total PAH-16MS$_A$	-	-	-	-	<0.08			mg/kg	0.01	A-T-019s

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
SVOC										
4-Bromophenyl phenyl ether$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Hexachlorobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Diethyl phthalate$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Dimethyl phthalate$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Dibenzofuran$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Carbazole$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Butylbenzyl phthalate$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate$_A$	<500	<500	<500	<500	-			µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
4-Nitrophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
3+4-Methylphenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
4-Chloro-3-methylphenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2-Nitrophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2-Methylphenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
1,2,4-Trichlorobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2-Chlorophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,6-Dinitrotoluene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,4-Dinitrotoluene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,4-Dimethylphenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,4-Dichlorophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,4,6-Trichlorophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2,4,5-Trichlorophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
1,4-Dichlorobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
1,3-Dichlorobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
1,2-Dichlorobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2-Chloronaphthalene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
2-Methylnaphthalene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Acenaphthylene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Acenaphthene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Anthracene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Benzo(a)anthracene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
Benzo(b)fluoranthene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Benzo(k)fluoranthene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Benzo(a)pyrene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Benzo(ghi)perylene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Chrysene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Fluoranthene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Fluorene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Indeno(1,2,3-cd)pyrene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Phenanthrene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Pyrene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Naphthalene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Dibenzo(ah)anthracene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Phenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Pentachlorophenol$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
n-Dioctylphthalate$_A$	<500	<500	<500	<500	-			µg/kg	500	A-T-052s
n-Dibutylphthalate$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Nitrobenzene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Isophorone$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Hexachloroethane$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Hexachlorobutadiene$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
SVOC Total (excl. PAH/Phenols/Cresols)$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Phenol Total$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s
Cresol & Chlorinated Phenol Total$_A$	<100	<100	<100	<100	-			µg/kg	100	A-T-052s

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
VOC										
Dichlorodifluoromethane$_A$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Chloromethane$_A$	<10	<10	<10	<10	-			µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Bromomethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Chloroethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Dichloromethane$_A$	<5	<5	<5	<5	-			µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	<5	<5	<5	<5	-			µg/kg	5	A-T-006s
Chloroform$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	<2	<2	<2	<2	-			µg/kg	2	A-T-006s
Benzene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	<10	<10	<10	<10	-			µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Toluene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	<3	<3	<3	<3	-			µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
Chlorobenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Isopropylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	<2	<2	<2	<2	-			µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	<2	<2	<2	<2	-			µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	<3	<3	<3	<3	-			µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	<1	<1	<1	<1	-			µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	<3	<3	<3	<3	-			µg/kg	3	A-T-006s
VOC Total$_{A}$	<10	<10	<10	<10	-			µg/kg	10	A-T-006s

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
TPH CWG with Clean Up										
Ali >C5-C6$_A$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C6-C8$_A$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	3	<1	<1	<1	<1			mg/kg	1	A-T-055s
Total Aliphatics$_A$	3	<1	<1	<1	-			mg/kg	1	Calc-As Recd
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	<1	<1	<1	<2			mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	3	<1	<1	<1	<1			mg/kg	1	A-T-055s
EPH Total Ali & Aro (>C10-C16)$_A^{\#}$	<1	<1	<1	<1	-			mg/kg	1	A-T-055s
EPH Total Ali & Aro (>C16-C35)$_A^{M\#}$	7	<1	<1	<1	-			mg/kg	1	A-T-055s
Total Aromatics$_A$	3	<1	<1	<1	-			mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35)$_A$	7	<1	<1	<1	-			mg/kg	1	Calc-As Recd
BTEX and MTBE Total$_A$	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s

Envirolab Job Number: 23/11268

Client Project Name: Oakwood Lodge, Wythenshawe

Client Project Ref: 33266LG

Lab Sample ID	23/11268/8	23/11268/9	23/11268/10	23/11268/11	23/11268/12			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP102	TP103	TP104	TP106	PT102					
Depth to Top	1.00	0.90	0.75	0.75	0.70					
Depth To Bottom	1.35	1.20	1.00	1.00	1.00					
Date Sampled	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL					
Sample Matrix Code	5A	1A	1A	1A	1A					
TPH UKCWG with Clean Up										
Ali >C35-C44$_A$	-	-	-	-	<1			mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	-	-	-	<1			mg/kg	1	Calc-As Recd
Aro >C35-C44$_A$	-	-	-	-	<1			mg/kg	1	A-T-055s
Total Aromatics$_A$	-	-	-	-	<2			mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C44)$_A$	-	-	-	-	<2			mg/kg	1	Calc-As Recd

Report Notes

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **six weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and Interpretations expressed are outside our scope of accreditation.
The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

Asbestos
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25ºC / 11550µS/cm @ 20ºC fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AF
Tel. 0161 368 4921 email. ask@envlab.co.u

Client: Sutcliffe, 18-20 Harrington Street, Liverpool, L2 9QA

Project No:

Date Receive

Project: Oakwood Lodge, Wythenshawe

Cool Box Ter

Clients Project No: 33266LG

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published st
ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	23/11268/8	23/112
Client Sample No									
Client Sample ID/Depth	TP101 0.20-0.70m	TP102 0.00-0.70m	TP103 0.15-0.25m	TP104 0.00-0.70m	TP105 0.00-0.60m	TP106 0.40-0.80m	TP101 0.75-1.00m	TP102 1.00-1.35m	TP1 0.90-1
Date Sampled	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/1
A-T-006s							20/11/2023	20/11/2023	20/11/
A-T-007w	23/11/2023		23/11/2023						
A-T-019s	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023			
A-T-019w	22/11/2023		22/11/2023						
A-T-022s	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/
A-T-024s	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023			
A-T-025w	28/11/2023		23/11/2023						
A-T-026s	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023			
A-T-026w	23/11/2023		23/11/2023						
A-T-027s	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023			
A-T-028s	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023			
A-T-029s	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023			
A-T-029w	23/11/2023		23/11/2023						
A-T-031s	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/
A-T-031w	22/11/2023		22/11/2023						
A-T-032s	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023			
A-T-032w	23/11/2023		23/11/2023						
A-T-037s							22/11/2023	22/11/2023	22/11/
A-T-040s	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023			
A-T-040w	23/11/2023		23/11/2023						
A-T-042sTCN	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023			
A-T-042wTCN	22/11/2023		22/11/2023						
A-T-043-s	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023			
A-T-043-w	23/11/2023		23/11/2023						
A-T-044	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/
A-T-045	17/11/2023	17/11/2023	17/11/2023	17/11/2023	17/11/2023	17/11/2023			
A-T-050s	21/11/2023	21/11/2023	21/11/2023	21/11/2023	21/11/2023	21/11/2023			
A-T-050w	22/11/2023		22/11/2023						
A-T-052s							22/11/2023	22/11/2023	22/11/
A-T-055s	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/
Calc	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023			
Calc-As Recd	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/2023	20/11/

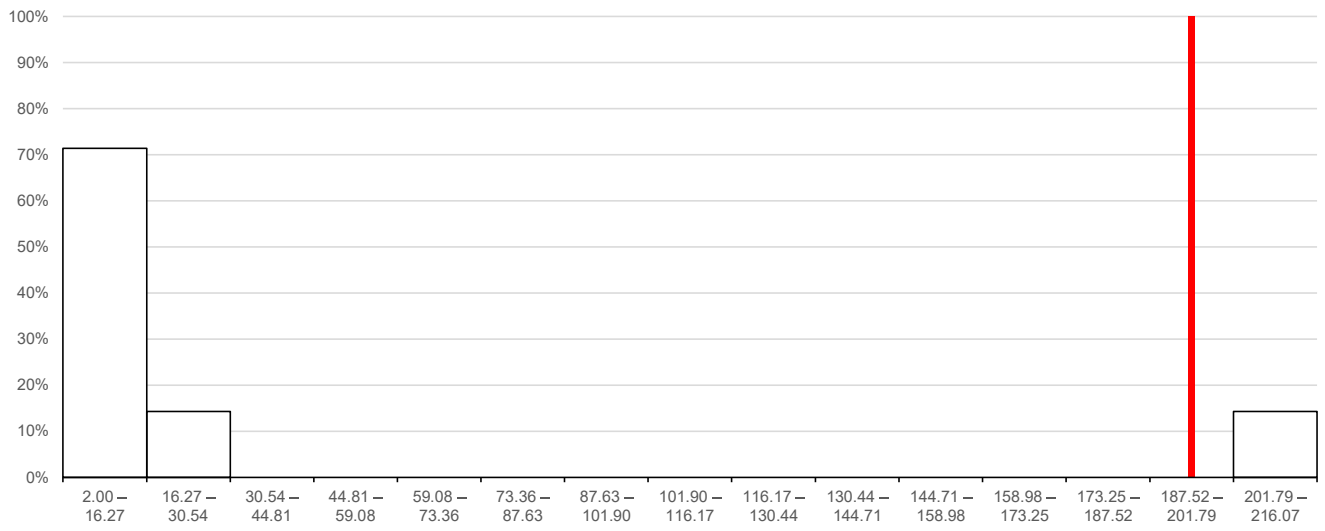
Lab Sample ID	23/11268/1	23/11268/2	23/11268/3	23/11268/4	23/11268/5	23/11268/6	23/11268/7	23/11268/8	23/112
Client Sample No									
Client Sample ID/Depth	TP101 0.20-0.70m	TP102 0.00-0.70m	TP103 0.15-0.25m	TP104 0.00-0.70m	TP105 0.00-0.60m	TP106 0.40-0.80m	TP101 0.75-1.00m	TP102 1.00-1.35m	TP1 0.90-1
Date Sampled	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/11/23	13/1
Calc-no stones	29/11/2023			29/11/2023	29/11/2023				
Redox							22/11/2023	22/11/2023	22/11/

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analy

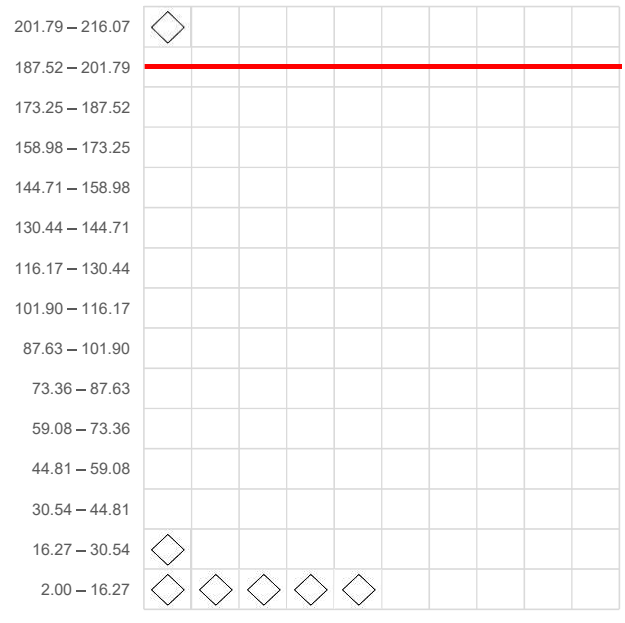
End of Report

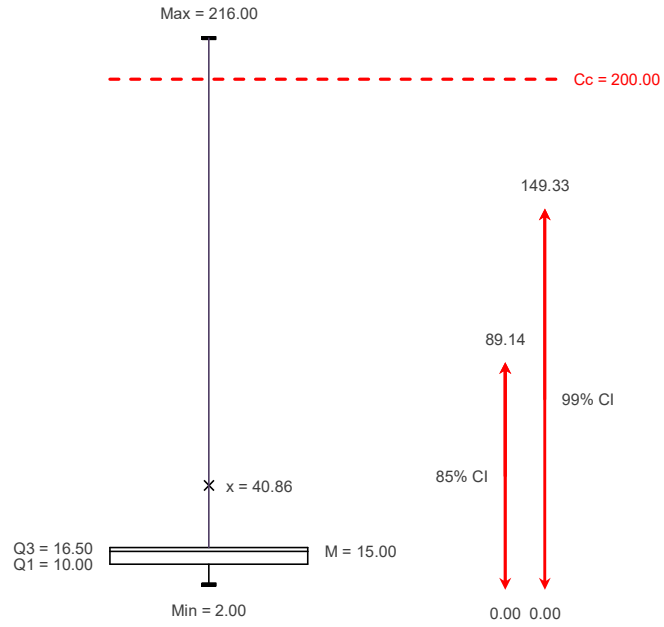
Sutcliffe	**SUTCLIFFE INVESTIGATIONS** TEL: 0151 227 3155 FAX: 0151 227 3156	**Statistical Analysis** **(2-Way Confidence Intervals)**

Job Name:	Oakwood Lodge	**Job No.:**	33266LG
Proposed Land Use:	Residential With Plant Uptake	**No. of Samples:**	7
Contaminant:	Lead (Total)	**No. of Bin:**	15
Data Type:	Symmetric	**% Confidence Interval:**	85% CI
Non-detect Rule	No Non-detects		99% CI



Maximum (Max):	216.00		**Critical Concentration (Cc):**	200.00	
Upper Quartile (Q3):	16.50		**Mean (x):**	40.86	
Median (M):	15.00		**Range (R):**	214.00	
Lower Quartile (Q1):	10.00		**Standard Deviation (s):**	77.41	
Minimum (Min):	2.00		**Interquartile Range (IQR):**	6.50	
85% CI	0.00	89.14	**99% CI**	0.00	149.33





Summary

Sutcliffe are 85% confident that the true mean concentration (μ) for Lead (Total) lies between 0.00mg/kg and 89.14mg/kg.

Sutcliffe are 99% confident that the true mean concentration (μ) for Lead (Total) does not lie outside of 0.00mg/kg and 149.33mg/kg.

The Critical Concentration (Cc) for Lead (Total) under a 1.0% S.O.M. Residential With Plant Uptake end use is 200.00mg/kg.

Appendix E – Forensic Data / WML Gas Data and Calibration

Sutcliffe	**SUTCLIFFE INVESTIGATIONS** TEL: 0151 227 3155 FAX: 0151 227 3156	**CL:AIRE RB17 Assessment**
Job Name:	Oakwood Lodge	**Job No.:** 33266LG

Age of Made Ground:	>20 Years
Average Total Organic Carbon (% of total sample):	1.0%
Average Thickness of Made Ground (m):	0.68
Maximum Thickness of Made Ground (m):	1.00

Characteristic Situation	Thickness of Made Ground	TOC (%) <20 Yrs	TOC (%) >20 Yrs
CS1	Maximum 5m Average <3m	≤ 1.0	≤ 1.0
CS2	Maximum 5m Average <3m	≤ 1.5	≤ 3.0
CS3	Maximum 5m Average <3m	≤ 4.0	≤ 6.0
This method only can be used to define up to CS3	Gas monitoring required where TOC is greater than 4% (or 6% in old Made Ground). Gas monitoring results will show whether the high TOC is available and conditions are suitable to generate ground gas.		

Characteristic Situation (BS 8485 and CIRIA C665):

CS1

Sample ID:	TP101	TP102	TP103	TP104	TP105	TP106	TP101	TP102	TP103	TP104	TP106	PT102
Depth (m bgl):	0.20-0.70	0.00-0.70	0.15-0.25	0.00-0.70	0.00-0.60	0.40-0.80	0.75-1.00	1.00-1.35	0.90-1.20	0.75-1.00	0.75-1.00	0.70-1.00
Thickness of Made Groud (m):												
Date Sampled:	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23
Material Description (% of total sample)	**TP101**	**TP102**	**TP103**	**TP104**	**TP105**	**TP106**	**TP101**	**TP102**	**TP103**	**TP104**	**TP106**	**PT102**
Total Sample	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Inert (>10mm)	31.7%	n/t	n/t	72.8%	70.6%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Wood (>10mm)	3.1%	n/t	n/t	0.0%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Vegetation (>10mm)	0.0%	n/t	n/t	0.0%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Cloth (>10mm)	0.0%	n/t	n/t	0.0%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Other Inert Material (>10mm)	0.0%	n/t	n/t	3.3%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Paper (>10mm)	0.0%	n/t	n/t	0.0%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Other Degradable Material (>10mm)	0.0%	n/t	n/t	0.0%	0.0%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Fine Soil and Gravel (<10mm)	65.2%	n/t	n/t	23.9%	29.4%	n/t	n/t	n/t	n/t	n/t	n/t	n/t
Total Organic Carbon (Fine Soil)	**2.2%**	**n/t**	**n/t**	**0.5%**	**0.3%**	**n/t**	**n/t**	**n/t**	**n/t**	**n/t**	**n/t**	**n/t**

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 30/09/2019
Start Time:- 07:45
End Time:- 08:30
Ground Conditions:- Wet
Weather Conditions:- Drizzle

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	-0.1	-0.1	-0.0001	3.2	3.2	0.0032	16.9	0	0
WS3	<0.1	<0.1	0	0.0	-0.1	-0.0001	1.0	1.0	0.0010	18.9	0	0
WS5	<0.1	<0.1	0	0.0	-0.1	-0.0001	7.1	7.1	0.0071	11.2	0	0
WS7	<0.1	<0.1	0	0.0	-0.1	-0.0001	2.1	2.1	0.0021	18.2	0	0
WS9	<0.1	<0.1	0	-0.1	-0.1	-0.0001	2.9	2.9	0.0029	16.6	0	0

Additional Comments

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 08/10/2019
Start Time:- 11:10
End Time:- 11:50
Ground Conditions:- Wet
Weather Conditions:- Sunny

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	0.0	-0.2	-0.0002	2.4	2.4	0.0024	17.9	0	0
WS3	<0.1	<0.1	0	0.0	-0.2	-0.0002	0.9	0.9	0.0009	18.7	0	0
WS5	<0.1	<0.1	0	0.0	-0.2	-0.0002	7.1	7.1	0.0071	10.9	0	0
WS7	<0.1	<0.1	0	0.0	-0.2	-0.0002	0.6	0.6	0.0006	19.6	0	0
WS9	<0.1	<0.1	0	0.0	-0.2	-0.0002	2.9	2.9	0.0029	16.2	0	0

Additional Comments

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 21/10/2019
Start Time:- 12:45
End Time:- 13:15
Ground Conditions:- Dry
Weather Conditions:- Overcast

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	0.0	-0.1	-0.0001	1.8	1.8	0.0018	17.9	0	0
WS3	<0.1	<0.1	0	0.0	-0.1	-0.0001	0.8	0.8	0.0008	19.0	0	0
WS5	<0.1	<0.1	0	0.0	-0.1	-0.0001	7.0	7.0	0.0070	11.4	0	0
WS7	<0.1	<0.1	0	0.0	-0.1	-0.0001	1.7	1.7	0.0017	18.1	0	0
WS9	<0.1	<0.1	0	0.0	-0.1	-0.0001	3.1	3.1	0.0031	16.6	0	0

Additional Comments

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 04/11/2019
Start Time:- 12:25
End Time:- 13:05
Ground Conditions:- Dry
Weather Conditions:- Overcast

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	0.0	-0.1	-0.0001	0.8	0.8	0.0008	18.9	0	0
WS3	<0.1	<0.1	0	0.0	-0.1	-0.0001	1.8	1.8	0.0018	18.0	0	0
WS5	<0.1	<0.1	0	0.0	-0.1	-0.0001	5.4	5.3	0.0053	12.2	0	0
WS7	<0.1	<0.1	0	0.0	-0.1	-0.0001	1.8	1.8	0.0018	17.9	0	0
WS9	<0.1	<0.1	0	0.0	-0.1	-0.0001	2.8	2.8	0.0028	16.3	0	0

Additional Comments

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 15/11/2019
Start Time:- 11:30
End Time:- 12:30
Ground Conditions:- Damp
Weather Conditions:- Overcast

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	0.0	0.0	0.0000	0.6	0.6	0.0006	19.3	0	0
WS3	<0.1	<0.1	0	0.0	0.0	0.0000	1.9	1.9	0.0019	17.5	0	0
WS5	<0.1	<0.1	0	0.0	0.0	0.0000	5.2	5.2	0.0052	12.3	0	0
WS7	<0.1	<0.1	0	0.0	0.0	0.0000	2.0	2.0	0.0020	17.5	0	0
WS9	<0.1	<0.1	0	0.0	0.0	0.0000	1.6	1.6	0.0016	18.1	0	0

Additional Comments

Gas & Groundwater Monitoring Record Sheet

Project Name:- Oakwood Lodge
Project No:- 8928G
Client:- Garden City Design & Build

Date:- 04/12/2019
Start Time:- 10:30
End Time:- 11:30
Ground Conditions:- Frozen
Weather Conditions:- Dry

Atmo
Start
End:-
Trend

Instrument:- Gas Data GFM436

Operator:- P Hobson

Hole ID	Peak Flow l/hr	Steady Flow l/hr	DP	CH4			CO2			Min O2 %	Peak H2S ppm	Pea CO ppm
				Peak %	Steady %	Qhg l/hr	Peak %	Steady %	Qhg l/hr			
WS2	<0.1	<0.1	0	0.0	0.0	0.0000	1.9	1.9	0.0019	17.4	0	0
WS3	<0.1	<0.1	0	0.0	0.0	0.0000	0.5	0.5	0.0005	19.3	0	0
WS5	<0.1	<0.1	0	0.0	0.0	0.0000	5.9	5.9	0.0059	11.3	0	0
WS7	<0.1	<0.1	0	0.0	0.0	0.0000	1.9	1.9	0.0019	17.9	0	0
WS9	<0.1	<0.1	0	0.0	0.0	0.0000	3.2	3.2	0.0032	16.2	0	0

Additional Comments

TEST DATE AND CONDITIONS		
Date	14/08/19	
Atmospheric Pressure	993	mB
Ambient Temperature	21.9	°C
Environics Serial No.	5089	

GFM436 Final Inspection & Calibration Check Certificate

GAS DATA LTD
Unit 4, Fairfield Court
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LJ
Tel 02476303311 Fax 02476307711

Customer	WML Consulting Ltd
Certificate Number	121220
Order Number	323564

Serial Number	12969
Software Version	G436-00.0027/0010

Recalibration DUE Date
14/08/20

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	500	*Accept > 200 cc/min*	Pump Flow @ -200mB	300	*Accept > 200 cc/min*
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
Sensor	CH_4		CO_2		O_2	
	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %
	60	60	40	40	20.9	20.9
	Accept ±3.0		*Accept ±3.0*		*Accept ±0.5*	
	5	5	5	5	6	6
	Accept ±0.3		*Accept ±0.3*		*Accept ±0.3*	
Zero Reading 100% N2	0	0	0	0	0	0
	Accept ±0.0		*Accept ±0.0*		*Accept ±0.1*	

Optional Gas Checks						
Applied Gas & Range		Concentration Tested @ (ppm)	Instrument Readings *(ppm)*			
			Zero Reading		Instrument Gas Reading	
Gas Type	Range *(ppm)*					
H2S	5000	*1500*	0	*Accept ±0.0*	1500	*Accept ±5.0*
CO	2000	*1000*	0	*Accept ±0.0*	1000	*Accept ±5.0*
Hexane	*2.0%*	2.0%	0	*Accept ±0.0*	1.99	*Accept ±10.0*

Cross Gas Effects									
Applied Gas *(ppm)*		Instrument Readings *(ppm)*							
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:	HEX		
H2S	*1500*	1500		0		0			
CO	*1000*	40		1000		0			
Hexane	*2.0%*	0		0		1.99			

Pressure Checks			
Atmospheric Pressure [AP] *(mB)*			
Current Atmospheric Pressure (mB)		Instrument Atmospheric Pressure Reading (mB)	
AP Open Ports		993	*Accept ±2.0*
AP Port (Internal)	*+800 mB*	800	*Accept ±5.0*
	+1200mb	1200	*Accept ±5.0*

Flow Checks					
Borehole Flow			Differential Pressure		
Applied Reading *(l/h)*	Instrument Reading *(l/h)*		Applied Pressure *(Pa)*	Instrument Reading *(Pa)*	
-30	-30.3	*Accept ±3.0*	-556	-570	*Accept ±50*
-3	-3	*Accept ±1.0*	-23	-22	*Accept ±6.0*
0	0	*Accept ±0.0*	0	0	*Accept ±0.5*
3	3	*Accept ±0.5*	17	17	*Accept ±3.0*
30	30	*Accept ±3.0*	385	384	*Accept ±50*
60	60	*Accept ±6.0*	1192	1193	*Accept ±130*
90	90.4	*Accept ±9.0*	2362	>>>>>	*Accept ±250*

Temperature Checks		
Calibration Temperature Applied Temperature °C	Instrument Temperature Reading °C	
-10	-10	*Accept ±2.0*
0	0	*Accept ±1.0*
30	30	*Accept ±1.0*
60	60	*Accept ±1.0*
100	100	*Accept ±1.0*

Technician:	Date Tested:
Jack Rutland	*15/08/19*

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015. Certificate NQA 8374. Valid until 21/03/2022

Appendix F – CBR Certificates

Hixtra Ltd
Unit 103, Caxton Court
Garamonde Drive
Milton Keynes
MK8 8DD

Certificate for the Determination of the Vertical Deformation and Strength Characteristics of Soil by the Incremental Plate Loading Test to BS 1377: Part 9: 1990

Report No: 10790-1
Report Date: 14/11/2023
Client: Sutcliffe
Address: 18-20 Harrington Road
Liverpool
L2 9QA

Site: Oakwood Lodge, Longkey Lane, Wythenshawe, Manchester, M22 4HY

Test Details

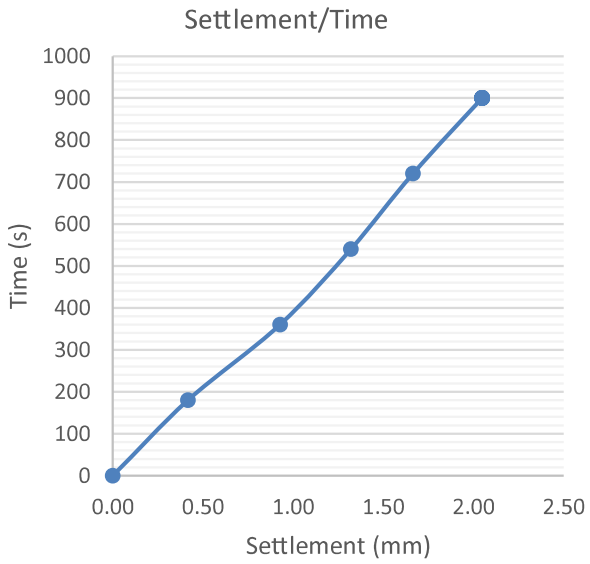
Test Location: CBR 1
Date of Test: 14/11/2023
Description: Crushed CONCRETE/BRICK
Reaction Load: 9 Tonne JCB
Material Class: Subbase
Weather: Overcast
Layer: Ground Level
Plate Diameter (mm): 300
Condition: The results apply only to the location tested and the material was tested in an 'as found' condition

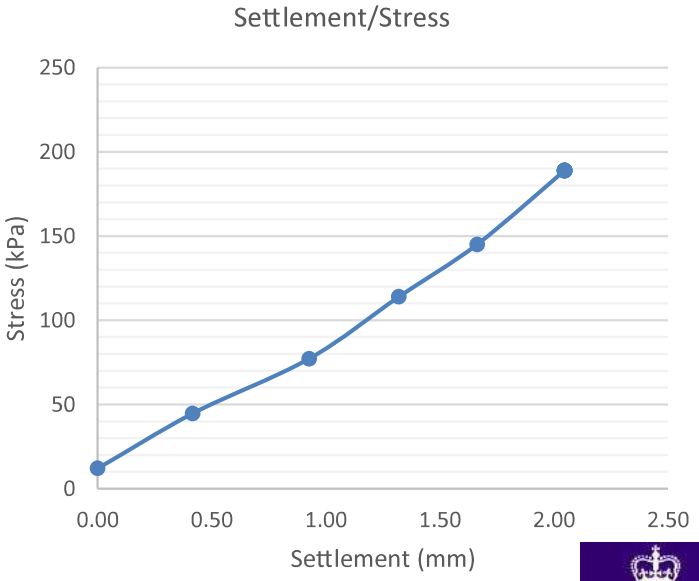
Test Results

Time, s	Settlement, mm	Plate Stress, kPa
0	0.00	12
180	0.42	45
360	0.93	77
540	1.32	114
720	1.66	145
900	2.05	189

Maximum Applied Stress (kPa):	189
Maximum Settlement (mm):	2.05
Equivalent CBR Value (%):	5
Modulus of Subgrade Reaction, k_{762} ($MN/m^2/m$):	38

Note: Supplemental test method, calculation of Nominal CBR Value and Modulus of Subgrade Reaction: IAN 73/06 revision 1 (2009), HD 25/94 (withdrawn)





For and on behalf of Hixtra Ltd

Kevin Shorthouse
Authorised signatory

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Unit 103, Caxton Court
Garamonde Drive
Milton Keynes
MK8 8DD

Certificate for the Determination of the Vertical Deformation and Strength Characteristics of Soil by the Incremental Plate Loading Test to BS 1377: Part 9: 1990

Report No: 10790-2
Report Date: 14/11/2023
Client: Sutcliffe
Address: 18-20 Harrington Road
Liverpool
L2 9QA

Site: Oakwood Lodge, Longkey Lane, Wythenshawe, Manchester, M22 4HY

Test Details

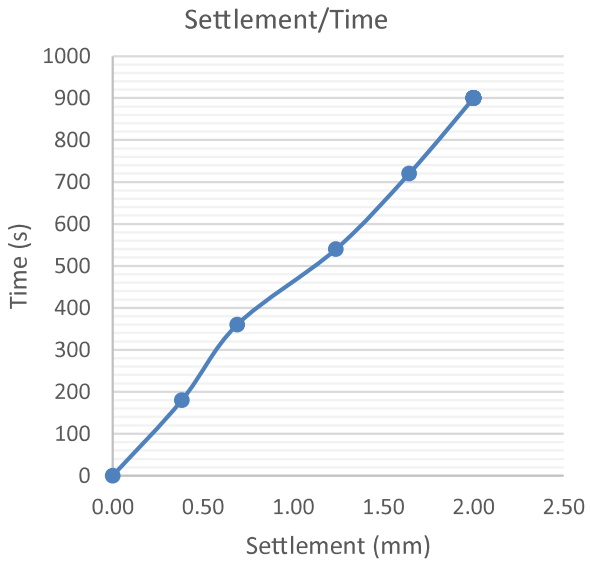
Test Location: CBR 2
Date of Test: 14/11/2023
Description: Crushed CONCRETE/BRICK
Reaction Load: 9 Tonne JCB
Material Class: Subbase
Weather: Overcast
Layer: Ground Level
Plate Diameter (mm): 300
Condition: The results apply only to the location tested and the material was tested in an 'as found' condition

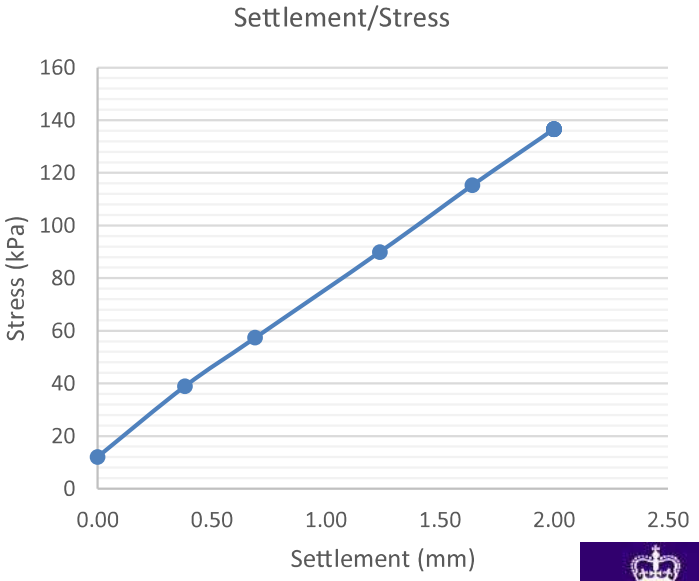
Test Results

Time, s	Settlement, mm	Plate Stress, kPa
0	0.00	12
180	0.38	39
360	0.69	57
540	1.24	90
720	1.64	115
900	2.00	137

Maximum Applied Stress (kPa):	137
Maximum Settlement (mm):	2.00
Equivalent CBR Value (%):	4
Modulus of Subgrade Reaction, k_{762} ($MN/m^2/m$):	32

Note: Supplemental test method, calculation of Nominal CBR Value and Modulus of Subgrade Reaction: IAN 73/06 revision 1 (2009), HD 25/94 (withdrawn)





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Certificate for the Determination of the Vertical Deformation and Strength Characteristics of Soil by the Incremental Plate Loading Test to BS 1377: Part 9: 1990

Report No: 10790-5
Report Date: 14/11/2023
Client: Sutcliffe
Address: 18-20 Harrington Road
Liverpool
L2 9QA

Site: Oakwood Lodge, Longkey Lane, Wythenshawe, Manchester, M22 4HY

Test Details

Test Location: CBR 3
Description: Crushed CONCRETE/BRICK
Material Class: Subbase
Layer: Ground Level
Condition: The results apply only to the location tested and the material was tested in an 'as found' condition

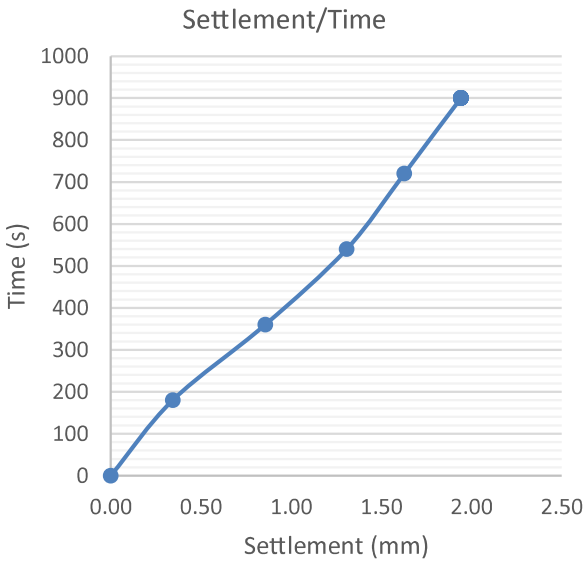
Date of Test: 14/11/2023
Reaction Load: 9 Tonne JCB
Weather: Overcast
Plate Diameter (mm): 300

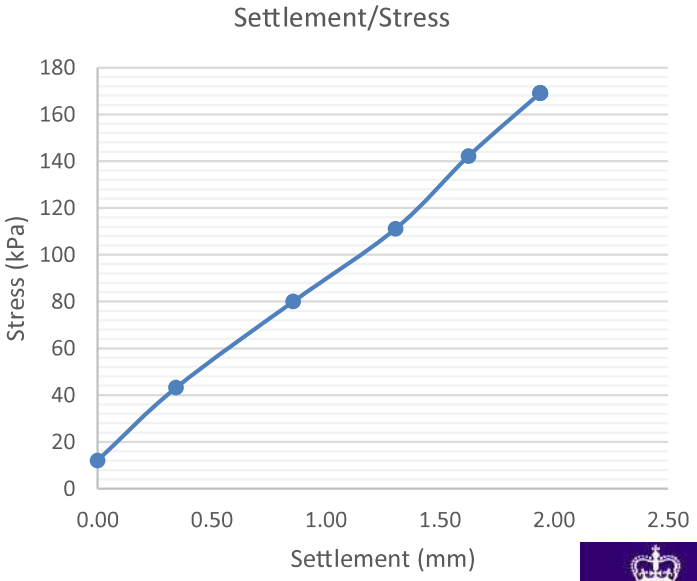
Test Results

Time, s	Settlement, mm	Plate Stress, kPa
0	0.00	12
180	0.34	43
360	0.86	80
540	1.31	111
720	1.63	142
900	1.94	169

Maximum Applied Stress (kPa):	169
Maximum Settlement (mm):	1.94
Equivalent CBR Value (%):	5
Modulus of Subgrade Reaction, k_{762} ($MN/m^2/m$):	38

Note: Supplemental test method, calculation of Nominal CBR Value and Modulus of Subgrade Reaction: IAN 73/06 revision 1 (2009), HD 25/94 (withdrawn)





For and on behalf of Hixtra Ltd

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Authorised signatory

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Garamonde Drive
Milton Keynes
MK8 8DD

Certificate for the Determination of the Vertical Deformation and Strength Characteristics of Soil by the Incremental Plate Loading Test to BS 1377: Part 9: 1990

Report No: 10790-4
Report Date: 14/11/2023
Client: Sutcliffe
Address: 18-20 Harrington Road
Liverpool
L2 9QA

Site: Oakwood Lodge, Longkey Lane, Wythenshawe, Manchester, M22 4HY

Test Details

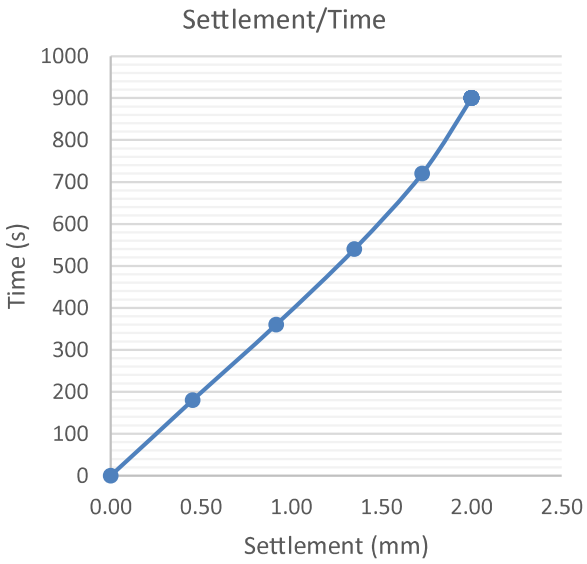
Test Location: CBR 4
Date of Test: 14/11/2023
Description: Crushed CONCRETE/BRICK
Reaction Load: 9 Tonne JCB
Material Class: Subbase
Weather: Overcast
Layer: Ground Level
Plate Diameter (mm): 300
Condition: The results apply only to the location tested and the material was tested in an 'as found' condition

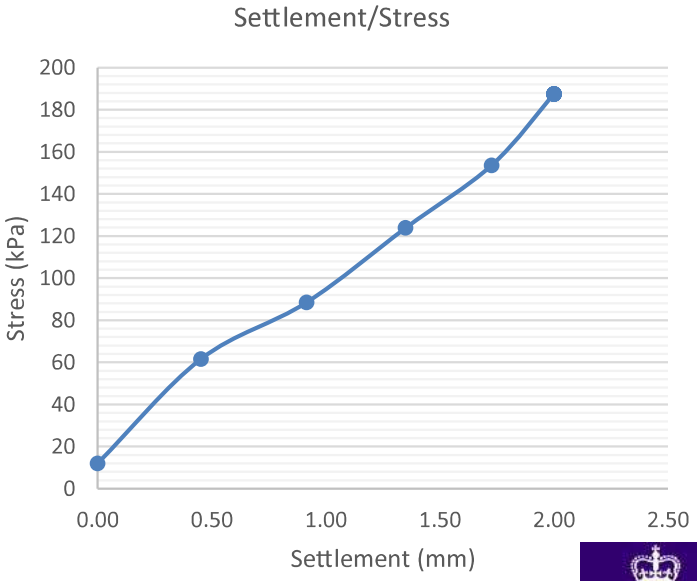
Test Results

Time, s	Settlement, mm	Plate Stress, kPa
0	0.00	12
180	0.45	62
360	0.92	88
540	1.35	124
720	1.73	154
900	2.00	188

Maximum Applied Stress (kPa):	188
Maximum Settlement (mm):	2.00
Equivalent CBR Value (%):	6
Modulus of Subgrade Reaction, k_{762} ($MN/m^2/m$):	41

Note: Supplemental test method, calculation of Nominal CBR Value and Modulus of Subgrade Reaction: IAN 73/06 revision 1 (2009), HD 25/94 (withdrawn)





For and on behalf of Hixtra Ltd

Kevin Shorthouse
Authorised signatory

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Unit 103, Caxton Court
Garamonde Drive
Milton Keynes
MK8 8DD

Certificate for the Determination of the Vertical Deformation and Strength Characteristics of Soil by the Incremental Plate Loading Test to BS 1377: Part 9: 1990

Report No: 10790-3
Report Date: 14/11/2023
Client: Sutcliffe
Address: 18-20 Harrington Road
Liverpool
L2 9QA

Site: Oakwood Lodge, Longkey Lane, Wythenshawe, Manchester, M22 4HY

Test Details

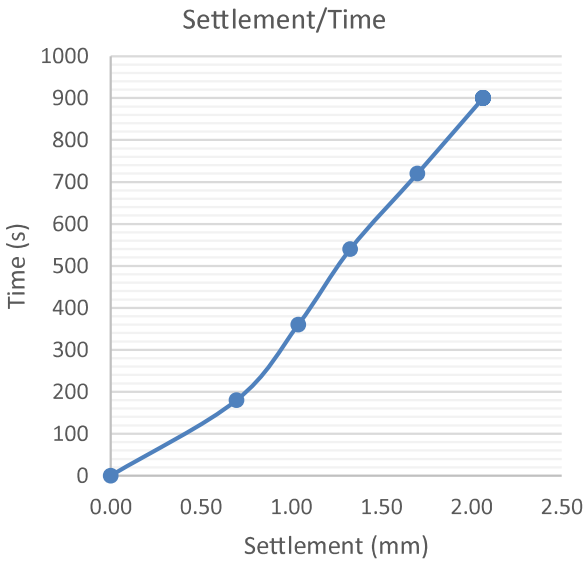
Test Location: CBR 5
Date of Test: 14/11/2023
Description: Crushed CONCRETE/BRICK
Reaction Load: 9 Tonne JCB
Material Class: Subbase
Weather: Overcast
Layer: Ground Level
Plate Diameter (mm): 300
Condition: The results apply only to the location tested and the material was tested in an 'as found' condition

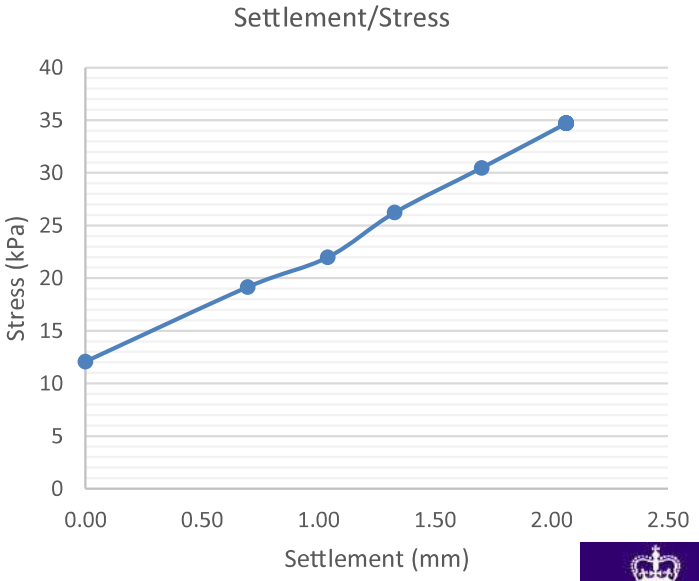
Test Results

Time, s	Settlement, mm	Plate Stress, kPa
0	0.00	12
180	0.70	19
360	1.04	22
540	1.33	26
720	1.70	30
900	2.06	35

Maximum Applied Stress (kPa):	35
Maximum Settlement (mm):	2.06
Equivalent CBR Value (%):	0
Modulus of Subgrade Reaction, k_{762} ($MN/m^2/m$):	9

Note: Supplemental test method, calculation of Nominal CBR Value and Modulus of Subgrade Reaction: IAN 73/06 revision 1 (2009), HD 25/94 (withdrawn)





For and on behalf of Hixtra Ltd

Kevin Shorthouse
Authorised signatory

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Appendix G – Soil Screening Tables

Sutcliffe	**SUTCLIFFE INVESTIGATIONS** TEL: 0151 227 3155 FAX: 0151 227 3156		**Human Health Assessment**							
	Job Name:	Oakwood Lodge	**Job No.:**	33266LG						
	Proposed Land Use:	Residential With Plant Uptake	**S.O.M.:**	1.0						
	Above Threshold:			**Sample ID:**	TP101	TP102	TP103	TP104	TP105	TP106
	Below Limit of Detection:	<0.01		**Depth Top (m bgl):**	0.20	0.00	0.15	0.00	0.00	0.40
	Not Tested:	n/t		**Depth Base (m bgl):**	0.70	0.70	0.25	0.70	0.60	0.80
	No Asbestos Detected:	NAD		**Date Sampled:**	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23
	Contaminant	**Units**	**Threshold Source**	**Threshold Value**	**TP101**	**TP102**	**TP103**	**TP104**	**TP105**	**TP106**
Metals / Non-Metals / Other Suite	Arsenic (Total)	mg/kg	LQM S4UL	37	8	1	4	2	4	2
	Boron (Soluble)	mg/kg	LQM S4UL	290	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium (Total)	mg/kg	LQM S4UL	11	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
	Chromium III	mg/kg	LQM S4UL	910	24	11	19	15	18	12
	Chromium VI	mg/kg	LQM S4UL	6	<1	<1	<1	<1	<1	<1
	Copper (Total)	mg/kg	LQM S4UL	2400	54	7	39	9	14	7
	Lead (Total)	mg/kg	C4SL	200	216	12	15	16	17	8
	Mercury (Total)	mg/kg	LQM S4UL	40	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
	Nickel (Total)	mg/kg	LQM S4UL	180	23	9	11	12	23	9
	Selenium (Total)	mg/kg	LQM S4UL	250	<1	<1	<1	<1	<1	<1
	Zinc (Total)	mg/kg	LQM S4UL	3700	201	24	25	30	35	32
	Cyanide (Total)	mg/kg	ATKINS	34	<1	<1	<1	<1	<1	<1
	Phenols (Total)	mg/kg	LQM S4UL	280	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Organic matter	%	LQM S4UL	N/a	4.4	0.5	0.9	0.9	0.7	0.8
	Sulphate (Acid Soluble)	mg/kg	LQM S4UL	N/a	470	1600	420	1100	2800	3800
	Sulphate as Water Soluble	g/l	LQM S4UL	N/a	0.02	0.45	0.09	0.33	0.68	0.58
	Sulphide	mg/kg	LQM S4UL	N/a	230	46	81	32	50	16
	pH	pH units	LQM S4UL	N/a	7.17	8.66	7.63	7.9	8.44	9.94
	Sulphur (Elemental)	mg/kg	LQM S4UL	N/a	20	<5	230	<5	<5	<5
Asbestos Suite	Asbestos in soil	N/a		N/a	NAD	NAD	NAD	NAD	NAD	NAD
	Asbestos Matrix (microscope)	N/a		N/a	n/t	n/t	n/t	n/t	n/t	n/t
	ACM - Suitable for Water Absorption Test?	N/a		N/a	n/t	n/t	n/t	n/t	n/t	n/t
	Asbestos in soil % composition	% w/w		0.001	n/t	n/t	n/t	n/t	n/t	n/t
TPH Suite	TPH (Total)	mg/kg		N/a	131	5	65	<2	44	679
	Total Aliphatic	mg/kg		N/a	26	3	51	<1	31	478
	C5 to C6 aliphatic	mg/kg	LQM S4UL	42	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	C6 to C8 aliphatic	mg/kg	LQM S4UL	100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	C8 to C10 aliphatic	mg/kg	LQM S4UL	27	<1	<1	<1	<1	<1	<10
	C10 to C12 aliphatic	mg/kg	LQM S4UL	130	<1	<1	<1	<1	<1	<10
	C12 to C16 aliphatic	mg/kg	LQM S4UL	1100	<1	<1	<1	<1	<1	<10
	C16 to C35 aliphatic	mg/kg	LQM S4UL	65000	17	2	44	<1	14	n/t
	C35 to C44 aliphatic	mg/kg	LQM S4UL	65000	9	<1	7	<1	17	312
	Total Aromatic	mg/kg		N/a	106	<2	14	<2	13	201
	C5 to C7 aromatic (Benzene)	mg/kg	LQM S4UL	70	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	C7 to C8 aromatic (Toluene)	mg/kg	LQM S4UL	130	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	C8 to C10 aromatic	mg/kg	LQM S4UL	34	<2	<2	<2	<2	<2	<10
	C10 to C12 aromatic	mg/kg	LQM S4UL	74	1	<1	<1	<1	<1	<10
	C12 to C16 aromatic	mg/kg	LQM S4UL	140	5	<1	2	<1	1	16
	C16 to C21 aromatic	mg/kg	LQM S4UL	260	25	<1	4	<1	2	27
	C21 to C35 aromatic	mg/kg	LQM S4UL	1100	69	2	7	<1	6	54
	C35 to C44 aromatic	mg/kg	LQM S4UL	1100	6	<1	1	<1	4	105
	Aliphatic + Aromatic EC >44-70	mg/kg	LQM S4UL	N/a	n/t	n/t	n/t	n/t	n/t	n/t
BTEX Suite	benzene	mg/kg	LQM S4UL	0.87	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	toluene	mg/kg	LQM S4UL	130	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	ethylbenzene	mg/kg	LQM S4UL	47	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	M&P Xylene	mg/kg	LQM S4UL	56	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	O-Xylene	mg/kg	LQM S4UL	60	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PAH Suite	naphthalene	mg/kg	LQM S4UL	2.3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	acenaphthylene	mg/kg	LQM S4UL	170	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
	acenaphthene	mg/kg	LQM S4UL	210	0.04	<0.01	0.02	<0.01	<0.01	0.18
	fluorene	mg/kg	LQM S4UL	170	0.04	<0.01	0.04	<0.01	<0.01	0.21
	phenanthrene	mg/kg	LQM S4UL	95	0.48	<0.03	0.43	<0.03	<0.03	1.46
	anthracene	mg/kg	LQM S4UL	2400	0.1	<0.02	0.07	<0.02	<0.02	0.49
	fluoranthene	mg/kg	LQM S4UL	280	0.87	<0.08	0.35	<0.08	<0.08	0.73
	pyrene	mg/kg	LQM S4UL	620	0.77	<0.07	0.27	<0.07	<0.07	0.68
	benzo(a)anthracene	mg/kg	LQM S4UL	7.2	0.26	<0.04	0.09	<0.04	<0.04	0.21
	chrysene	mg/kg	LQM S4UL	15	0.39	<0.06	0.09	<0.06	<0.06	0.32
	benzo(b)fluoranthene	mg/kg	LQM S4UL	2.6	0.34	<0.05	0.07	<0.05	<0.05	0.18
	benzo(k)fluoranthene	mg/kg	LQM S4UL	77	0.12	<0.07	<0.07	<0.07	<0.07	0.08
	benzo(a)pyrene	mg/kg	LQM S4UL	2.2	0.27	<0.04	0.06	<0.04	<0.04	0.15
	dibenzo(ah)anthracene	mg/kg	LQM S4UL	0.24	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
	benzo(ghi)perylene	mg/kg	LQM S4UL	320	0.15	<0.05	<0.05	<0.05	<0.05	0.09
	indeno(123cd)pyrene	mg/kg	LQM S4UL	27	0.17	<0.03	<0.03	<0.03	<0.03	0.08

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Sutcliffe	**SUTCLIFFE INVESTIGATIONS** TEL: 0151 227 3155 FAX: 0151 227 3156		**Controlled Waters Assessment**														
	Job Name:	Oakwood Lodge		**Job No.:**	33266LG												
	Above EQS Threshold:			**Sample ID:**	TP101	TP102	TP103	TP104	TP105	TP106	TP101	TP102	TP103	TP104	TP106	PT10
	Above UK DWS Threshold:																
	Above all Thresholds:			**Depth Top:**	0.20	0.00	0.15	0.00	0.00	0.40	0.75	1.00	0.90	0.75	0.75	0.70	
	Below Limit of Detection:	<0.01		**Depth Base:**	0.70	0.70	0.25	0.70	0.60	0.80	1.00	1.35	1.20	1.00	1.00	1.00	
	Not tested:	n/t		**Date Sampled:**	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov-23	13-Nov	
	Contaminant Leachate Prep (10:1 Std NRA)*	**Units**	**EQS Threshold**	**UK DWS Threshold**	**TP101**	**TP102**	**TP103**	**TP104**	**TP105**	**TP106**	**TP101**	**TP102**	**TP103**	**TP104**	**TP106**	**PT10**	
Metals / Non-Metals / Other Suite	Arsenic (Soluble)*	µg/l	50	10	1	n/t	3	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Boron (Soluble)	µg/l	1000	1000	11	n/t	27	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Cadmium (Soluble)	µg/l	0.45 - 1.5	5	<1	n/t	<1	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Chromium Trivalent (Soluble)	µg/l	4.7	50	<0.05	n/t	<0.05	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Chromium Hexavalent (Soluble)	µg/l	3.4	50	<0.05	n/t	<0.05	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Copper (Soluble)	µg/l	1	2000	94	n/t	17	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Lead (Soluble)	µg/l	14	10	29	n/t	26	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Mercury (Soluble)	µg/l	0.07	1	<0.1	n/t	<0.1	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Nickel (Soluble)	µg/l	34	20	<2	n/t	<2	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Selenium (Soluble)*	µg/l	-	10	<1	n/t	1	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Sulphur (Free)	mg/l	-	-	<0.1	n/t	<0.1	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Zinc (Soluble)	µg/l	10.9	5000	23	n/t	8	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Cyanide (Total)*	mg/l	1	50	<0.005	n/t	<0.005	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Phenols (Total)	µg/l	7.7	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Sulphate as SO_3	mg/l	400	250	8.77	n/t	15.65	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	Sulphide as S	µg/l	0.25	-	<0.1	n/t	<0.1	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	pH	pH units	-	-	6.59	n/t	6.94	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	TPH Total C6-C40 (leachable)		-	-	<80	n/t	<80	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
PAH Suite	naphthalene*	µg/l	130	-	0.03	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	acenaphthylene*	µg/l	-	-	0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	acenaphthene*	µg/l	-	-	0.01	n/t	0.03	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	fluorene*	µg/l	-	-	<0.01	n/t	0.02	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	phenanthrene*	µg/l	-	-	0.01	n/t	0.03	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	anthracene*	µg/l	0.1	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	fluoranthene*	µg/l	0.12	-	<0.01	n/t	0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	pyrene*	µg/l	-	-	0.01	n/t	0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	benzo(a)anthracene*	µg/l	-	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	chrysene*	µg/l	-	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	benzo(b)fluoranthene*	µg/l	0.017	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	benzo(k)fluoranthene*	µg/l	0.017	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	benzo(a)pyrene*	µg/l	0.27	0.01	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	dibenzo(ah)anthracene*	µg/l	-	-	0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	benzo(ghi)perylene*	µg/l	0.0082	-	<0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	
	indeno(123cd)pyrene*	µg/l	0.002	-	0.01	n/t	<0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	n/t	

Appendix H – Waste Classification Report

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

ON6Z7-U3VLD-F4QHW

Job name

Oakwood Lodge

Description/Comments

Project

33266LG

Site

Oakwood Lodge

Classified by

Name:
Daniel Evans
Date:
11 Dec 2023 11:46 GMT
Telephone:
0151 227 3155

Company:
Sutcliffe Projects Ltd
18-20 Harrington St
Liverpool
L2 9QA

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

Oakwood Lodge, Wythenshawe **Post Code** M22 4LA

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment

Description of the specific process, sub-process and/or activity that created the waste

Excavation of foundations for new build

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.20-0.70	Non Hazardous		3
2	TP102	0.00-0.70	Non Hazardous		6
3	TP103	0.15-0.25	Non Hazardous		9
4	TP104	0.00-0.70	Non Hazardous		12
5	TP105	0.00-0.60	Non Hazardous		14
6	TP106	0.40-0.80	Non Hazardous		17
7	PT102	0.70-1.00	Non Hazardous		20

Related documents

#	Name	Description
1	Sutcliffe Suite 2 2023	waste stream template used to create this Job

Report

Created by: Daniel Evans

Created date: 11 Dec 2023 11:46 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	22
Appendix B: Rationale for selection of metal species	23
Appendix C: Version	24

Classification of sample: TP101

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP101
Sample Depth:
0.20-0.70 m
Moisture content:
18.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.6% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8 mg/kg	1.32	10.563 mg/kg	0.00106 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.6 mg/kg	1.142	0.685 mg/kg	0.0000685 %		
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24 mg/kg	1.462	35.077 mg/kg	0.00351 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		**<LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		54 mg/kg	1.126	60.798 mg/kg	0.00608 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	216 mg/kg	1.56	336.92 mg/kg	0.0216 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17 mg/kg	1.353	<0.23 mg/kg	<0.000023 %		**<LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23 mg/kg	2.976	68.454 mg/kg	0.00685 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		**<LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		201 mg/kg	2.774	557.603 mg/kg	0.0558 %		
12	TPH (C6 to C40) petroleum group			TPH		131 mg/kg		131 mg/kg	0.0131 %		
13	pH			PH		7.17 pH		7.17 pH	7.17 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-917-1	208-96-8									
16		acenaphthene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-469-6	83-32-9									
17		fluorene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-695-5	86-73-7									
18		phenanthrene				0.48	mg/kg		0.48	mg/kg	0.000048 %		
			201-581-5	85-01-8									
19		anthracene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
			204-371-1	120-12-7									
20		fluoranthene				0.87	mg/kg		0.87	mg/kg	0.000087 %		
			205-912-4	206-44-0									
21		pyrene				0.77	mg/kg		0.77	mg/kg	0.000077 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.26	mg/kg		0.26	mg/kg	0.000026 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.39	mg/kg		0.39	mg/kg	0.000039 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.34	mg/kg		0.34	mg/kg	0.000034 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
			205-883-8	191-24-2									
30		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
31		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
32		ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
33		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
										Total:	0.109 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations are too low to be considered a flammable risk

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0131%)

Classification of sample: TP102

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP102
Sample Depth:
0.00-0.70 m
Moisture content:
9.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.5% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		1	mg/kg	1.32	1.32	mg/kg	0.000132 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		**<LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		**<LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		7	mg/kg	1.126	7.881	mg/kg	0.000788 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	12	mg/kg	1.56	18.718	mg/kg	0.0012 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		**<LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9	mg/kg	2.976	26.786	mg/kg	0.00268 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		24	mg/kg	2.774	66.58	mg/kg	0.00666 %		
12	TPH (C6 to C40) petroleum group			TPH		5	mg/kg		5	mg/kg	0.0005 %		
13	pH			PH		8.66	pH		8.66	pH	8.66 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene											
			205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
16		acenaphthene											
			201-469-6	83-32-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
17		fluorene											
			201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
19		anthracene											
			204-371-1	120-12-7		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
20		fluoranthene											
			205-912-4	206-44-0		<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
21		pyrene											
			204-927-3	129-00-0		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
22		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
23		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
25		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
26		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[ghi]perylene											
			205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32		ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane											
		603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.0144 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations are too low to be considered a flammable risk

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0005%)

Classification of sample: TP103

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP103
Sample Depth:
0.15-0.25 m
Moisture content:
12.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.5% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4 mg/kg	1.32	5.281 mg/kg	0.000528 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5 mg/kg	1.142	<0.571 mg/kg	<0.0000571 %		**<LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		**<LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		39 mg/kg	1.126	43.91 mg/kg	0.00439 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	15 mg/kg	1.56	23.397 mg/kg	0.0015 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17 mg/kg	1.353	<0.23 mg/kg	<0.000023 %		**<LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		11 mg/kg	2.976	32.739 mg/kg	0.00327 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		**<LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		25 mg/kg	2.774	69.354 mg/kg	0.00694 %		
12	TPH (C6 to C40) petroleum group			TPH		65 mg/kg		65 mg/kg	0.0065 %		
13	pH			PH		7.63 pH		7.63 pH	7.63 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				0.01	mg/kg		0.01	mg/kg	0.000001 %		
			205-917-1	208-96-8									
16		acenaphthene				0.02	mg/kg		0.02	mg/kg	0.000002 %		
			201-469-6	83-32-9									
17		fluorene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-695-5	86-73-7									
18		phenanthrene				0.43	mg/kg		0.43	mg/kg	0.000043 %		
			201-581-5	85-01-8									
19		anthracene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
			204-371-1	120-12-7									
20		fluoranthene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
			205-912-4	206-44-0									
21		pyrene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			205-883-8	191-24-2									
30		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
31		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
32		ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
33		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
										Total:	0.0268 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations are too low to be considered a flammable risk

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0065%)

Classification of sample: TP104

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP104
Sample Depth:
0.00-0.70 m
Moisture content:
13.8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.8% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		2	mg/kg	1.32	2.641	mg/kg	0.000264 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	21.923	mg/kg	0.00219 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		9	mg/kg	1.126	10.133	mg/kg	0.00101 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16	mg/kg	1.56	24.957	mg/kg	0.0016 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<LOD
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12	mg/kg	2.976	35.715	mg/kg	0.00357 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		30	mg/kg	2.774	83.224	mg/kg	0.00832 %		
12	TPH (C6 to C40) petroleum group			TPH		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
13	pH			PH		7.9	pH		7.9	pH	7.9 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-917-1	208-96-8									
16		acenaphthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-469-6	83-32-9									
17		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
18		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
19		anthracene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
			204-371-1	120-12-7									
20		fluoranthene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
			205-912-4	206-44-0									
21		pyrene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
			204-927-3	129-00-0									
22		benzo[a]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			205-883-8	191-24-2									
30		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
31		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
32		ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
33		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
										Total:	0.018 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP105

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP105
Sample Depth:
0.00-0.60 m
Moisture content:
9.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.6% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4	mg/kg	1.32	5.281	mg/kg	0.000528 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		14	mg/kg	1.126	15.762	mg/kg	0.00158 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	17	mg/kg	1.56	26.517	mg/kg	0.0017 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<LOD
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23	mg/kg	2.976	68.454	mg/kg	0.00685 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		35	mg/kg	2.774	97.095	mg/kg	0.00971 %		
12	TPH (C6 to C40) petroleum group			TPH		44	mg/kg		44	mg/kg	0.0044 %		
13	pH			PH		8.44	pH		8.44	pH	8.44 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene											
			205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
16		acenaphthene											
			201-469-6	83-32-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
17		fluorene											
			201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
19		anthracene											
			204-371-1	120-12-7		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
20		fluoranthene											
			205-912-4	206-44-0		<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
21		pyrene											
			204-927-3	129-00-0		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
22		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
23		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
25		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
26		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[ghi]perylene											
			205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32		ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane											
		603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.0282 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations are too low to be considered a flammable risk

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0044%)

Classification of sample: TP106

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP106
Sample Depth:
0.40-0.80 m
Moisture content:
5.9%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.9% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		2 mg/kg	1.32	2.641 mg/kg	0.000264 %		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5 mg/kg	1.142	<0.571 mg/kg	<0.0000571 %		**<LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12 mg/kg	1.462	17.539 mg/kg	0.00175 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		**<LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		7 mg/kg	1.126	7.881 mg/kg	0.000788 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8 mg/kg	1.56	12.479 mg/kg	0.0008 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17 mg/kg	1.353	<0.23 mg/kg	<0.000023 %		**<LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9 mg/kg	2.976	26.786 mg/kg	0.00268 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		**<LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		32 mg/kg	2.774	88.773 mg/kg	0.00888 %		
12	TPH (C6 to C40) petroleum group			TPH		679 mg/kg		679 mg/kg	0.0679 %		
13	pH			PH		9.94 pH		9.94 pH	9.94 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-917-1	208-96-8									
16		acenaphthene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
			201-469-6	83-32-9									
17		fluorene				0.21	mg/kg		0.21	mg/kg	0.000021 %		
			201-695-5	86-73-7									
18		phenanthrene				1.46	mg/kg		1.46	mg/kg	0.000146 %		
			201-581-5	85-01-8									
19		anthracene				0.49	mg/kg		0.49	mg/kg	0.000049 %		
			204-371-1	120-12-7									
20		fluoranthene				0.73	mg/kg		0.73	mg/kg	0.000073 %		
			205-912-4	206-44-0									
21		pyrene				0.68	mg/kg		0.68	mg/kg	0.000068 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.21	mg/kg		0.21	mg/kg	0.000021 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			205-883-8	191-24-2									
30		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
31		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
32		ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
33		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
										Total:	0.0843 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations are too low to be considered a flammable risk

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0679%)

Classification of sample: PT102

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
PT102
Sample Depth:
0.70-1.00 m
Moisture content:
8.7%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.7% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		<LOD
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		9	mg/kg	1.462	13.154	mg/kg	0.00132 %		
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		4	mg/kg	1.126	4.504	mg/kg	0.00045 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	2	mg/kg	1.56	3.12	mg/kg	0.0002 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<LOD
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		6	mg/kg	2.976	17.858	mg/kg	0.00179 %		
10	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		13	mg/kg	2.774	36.064	mg/kg	0.00361 %		
12	TPH (C6 to C40) petroleum group			TPH		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
13	pH			PH		7.89	pH		7.89	pH	7.89 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene											
			205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
16		acenaphthene											
			201-469-6	83-32-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
17		fluorene											
			201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
19		anthracene											
			204-371-1	120-12-7		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
20		fluoranthene											
			205-912-4	206-44-0		<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
21		pyrene											
			204-927-3	129-00-0		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
22		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
23		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
24		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
25		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
26		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
27		indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
29		benzo[ghi]perylene											
			205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
30		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32		ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane											
		603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.00851 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst Case

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

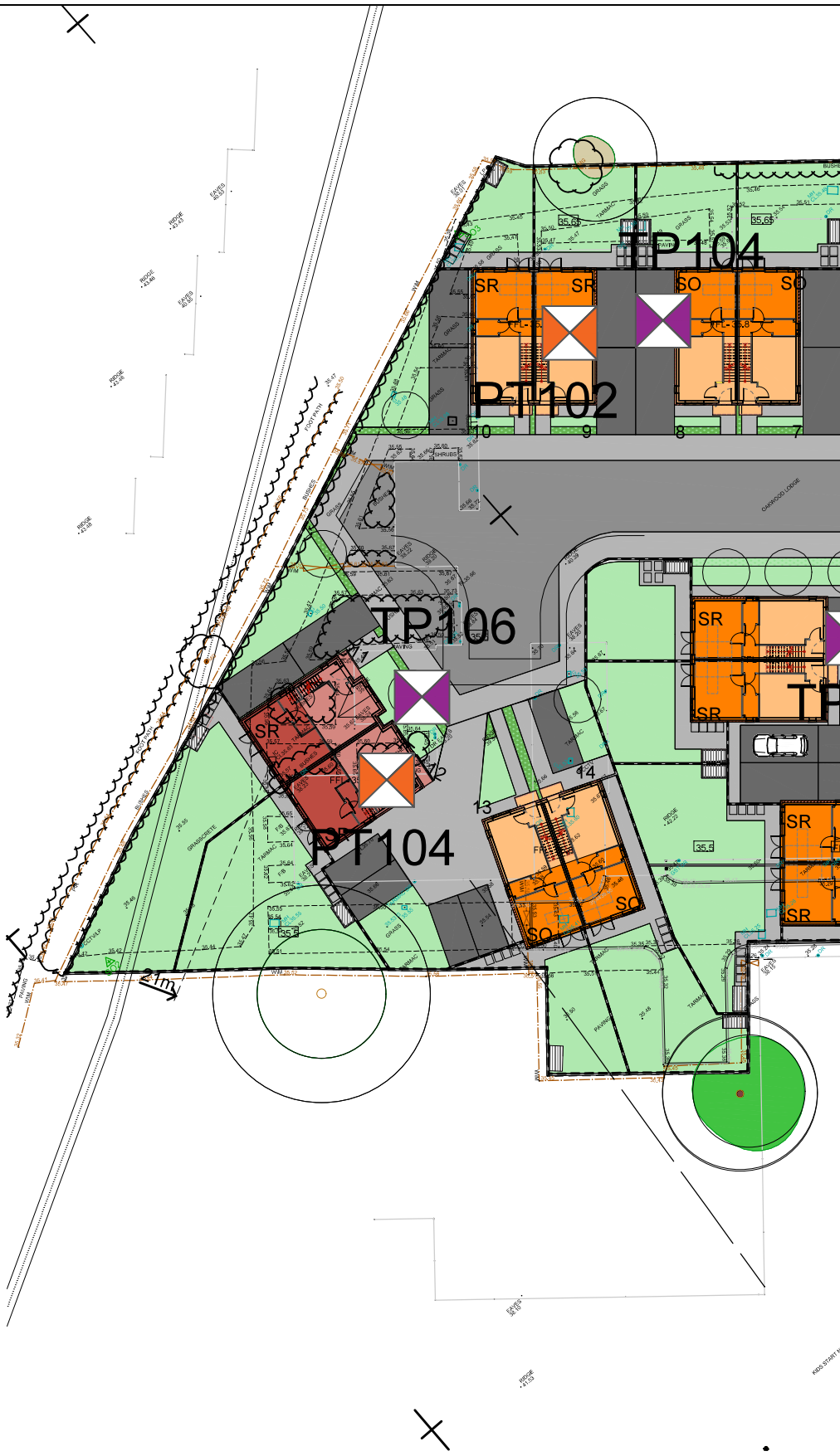
Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.341.5847.10836 (07 Dec 2023)
HazWasteOnline Database: 2023.341.5847.10836 (07 Dec 2023)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023

Drawing Ref. – 33266-SUT-ZZ-00-DR-G-7251 (Site Investigation on Proposed Layout)



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S
C

Drawing Ref. – 5415 C-09 REV A (Proposed Site Plan)



Proposed Site Plan