

MILLWOOD SEN SCHOOL, RADCLIFFE

PHASE 2 GEO-ENVIRONMENTAL INVESTIGATION, RISK ASSESSMENT AND REMEDIATION STRATEGY

Job Number: LKC 23 1383
Date: September 2023
Client: ISG Construction Ltd



INCREASING LAND VALUE

LK
GROUP

INCREASING LAND VALUE



LK Consult Document Verification			
Site Address	School Street, Radcliffe, Manchester, M26 3BW		
Report Title	Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy		
Job Number	LKC 23 1383	Document Ref.	LKC 23 1383-B2-GI-Millwood School
Date Issued	20 th September 2023	Report Version	R0
Prepared By	Joe Walker Emma Khadun Colin Wardle	Reviewed By	Peter Dunn

Revision Record			
Revision No.	Date	Nature of Revision	Approved By

DISCLAIMER

This report has been prepared by LK Consult (LKC) who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant, experienced in preparing reports of a similar scope.

However, to the extent that the report is based or relies upon information contained in records, reports or other materials provided to LKC, which have not been independently produced or verified, LKC gives no warranty, representation or assurance as to the accuracy or completeness of such information.

This report is issued on the condition that LKC will not be held liable for any loss arising from ground conditions between sampling points (i.e. boreholes/trial pits/hand augers/surface samples) which have not been shown by the sampling points or related testing carried out during the investigation, nor for any loss arising from conditions below the maximum depth of the investigation. Opinions on such conditions, where given, are for general guidance only.

This report is prepared solely for the benefit of ISG Construction Ltd. It may not be relied upon by, or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

Those using this information in subsequent assessments or evaluations do so at their own risk.

EXECUTIVE SUMMARY

Site Details

Site Location	Western end of School Street, to the rear of Millwood School building, Radcliffe, Manchester. Centred at approximate National Grid Reference 377850E 407120N.
Approximate Area	2,000m ² .
Topography	Approximately 80 metres Above Ordnance Datum (AOD). Site is approximately level.
Current Site Use	Site is vacant and grass covered soft landscaped area.
Purpose of Report	Pre-planning.
Proposed Development	Erection of new classroom block and play areas associated with school.

Preliminary Risk Assessment

Main Historical Features	Onsite: undeveloped land (1850), cricket ground and pavilion (1893-1930), playing fields (1937-1987), small buildings (1980-1987), soft landscaped area within school grounds (1999 to 2023). Surrounding Area: coal pits, colliery including foundry, depot, engineering works.
Geology / Hydrogeology	Artificial: No BGS recorded artificial on site. Worked ground (undivided) 15m NW associated with the Manchester, Bolton & Bury Canal. Superficial: Glacial Till. Secondary Undifferentiated Aquifer. Bedrock: Pennine Middle Coal Measures (mudstone, siltstone, sandstone). Secondary A Aquifer. Manchester, Bolton & Bury Canal located 15m west located adjacent to boundary. Site not within a Source Protection Zone (SPZ), no groundwater abstractions within 1km.
Landfills / Infilled ground	1no, recorded landfill within 250m (220m SE, inert waste, last deposited in 1991). Potentially infilled ground identified.
Other relevant environmental settings etc.	The site is within a development high risk area. A CMRA has been undertaken by LKC. A coal mining site investigation is required.
Site walkover	Soft landscaping with small trees. Surface water drainage runs ('Permavoids') present across the site.

Previous Site Investigations

Ground Conditions	Made Ground (maximum thickness of 1.60mbgl): Sandy clayey GRAVEL with anthropogenic inclusions of ash, coal, clinker, glass, pottery, plastic, and brick. Rare slag encountered at TP105. No visual / olfactory evidence of hydrocarbon contamination. No asbestos fibres identified. Superficial: Soft to firm brown sandy CLAY, underlain by loose to medium dense SAND with bands of gravel and clay, stiff sandy CLAY, peat / alluvial clay in the NE at BH5 at 1.50-2.80mbgl (interpreted as Alluvium by Atkins). Bedrock: Grey mudstone with siltstone bands from 15.70mbgl. Coal identified offsite at 24.00mbgl (RBH3 and RBH4) and 31.70mbgl (RBH2)
Obstructions	Encountered at 0.70m at BH6.
Groundwater	2.58-2.81mbgl (BH5) / 75.92mAOD (maximum elevation).
Ground Gas	1no. elevated carbon dioxide concentration (5.1%v/v), no elevated methane concentrations, no flow; no gas protection recommended.
Elevated determinands *	Soil: Arsenic, lead, PAHs (LKC, Atkins, Encia), nickel (Atkins), Copper, zinc, sulphate (Encia). Groundwater / leachates: TPHs, PAHs and copper (Encia). Offsite to the NE: PAHs only (Atkins).

Remediation	Cover system in soft landscaped areas.
--------------------	--

Ground Investigation Work Undertaken

Date of Investigation:	9 th to 22 nd August 2023
Intrusive Investigation Work Undertaken:	5no. window sample boreholes. 2no. cable percussion boreholes. 3no. rotary boreholes. 29no. hand pits.
Monitoring Wells:	Installed in CP101 and all window sample boreholes.
Soil Sampling:	4no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 3no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX, VOCs, SVOCs, PCBs and SOM.
Groundwater Sampling:	2no samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG, BTEX.
Monitoring:	N/A.
Insitu and Laboratory Geotechnical Testing:	SPTs, pocket penetrometers, PSDs, plasticity.

Ground Conditions and Geotechnical Assessment

General Ground conditions	Allowable Bearing Pressure	Anticipated Foundation Type	Other Considerations
Based on CP101-CP102 & WS101-WS105. Made ground up to 3.10mbgl. Interbedded granular and cohesive material, including CLAY, SILT, SAND and GRAVEL to the completion depths of the cable percussive and window sample boreholes. Rotary openhole boreholes encountered bedrock of Pennine Middle Coal Measures at depths of between 20.70m and 21.20mbgl. Groundwater encountered at varying depths between 1.00m and 9.00mbgl.	Highly variable in the upper 5m, representative of the made ground and interbedded loose granular and soft cohesive strata. Below c.5.00mbgl a s_u of 150kPa can be assigned to the cohesive material and the granular strata will return and ABC of between 106 – 250kN/m ² .	Ground improvement technique to support shallow strip foundations or a piled foundation solution.	Consideration of effects of trees also needs to be considered. Temporary supports of excavations may be required. Detailed design should be carried out by structural engineer. Concrete Requirements DS1-AC-1.

Contamination Risk Assessment

The table below shows a summary of the risk assessments undertaken for each pollutant linkage, the revised conceptual model and recommendation for either remediation and / or further investigation.

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users (school children and teachers) via dermal contact, ingestion and inhalation (of soil, dust, fibres and home-grown produce).	Moderate (arsenic, lead)	- Remediation recommended.
		Low (PAHs, TPHs, asbestos)	- No remediation recommended.
2	Volatile contaminants posing a risk to site users (school children and teachers) via the inhalation of vapours.	Low	- No remediation recommended.
3	Gas posing a risk to buildings and site users (school children and teachers) via the migration of gas into building causing explosion and asphyxiation.	Moderate / Low	- No remediation recommended.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	- No remediation recommended.
5	Organic contaminants posing a risk to water pipes.	Moderate	- UU risk assessment to be completed. Remediation recommended.

Waste Assessment

The results show that all the samples tested are classified as non-hazardous for disposal.

Recommendations and Remedial Strategy

PL	Recommendation
1	Environmental cover system required in proposed play areas within site boundary.
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Other Considerations
Unexpected Contamination
Grubbing Out of Inground Structures
Re-use of site generated material
Stockpile Management
Disposal
Control of Water
Health and Safety Considerations
Piling in Contaminated Land
Asbestos Management Plan
Soil Validation
Site Completion Report

CONTENTS

EXECUTIVE SUMMARY	iv
1 Introduction	1
1.1 Background	1
1.2 Site Details	1
2 Review of Previous Work.....	3
2.1 Phase 1 Preliminary Risk Assessment (PRA)	3
2.2 Previous Site Investigations	3
3 Ground Investigation	7
3.1 Site Investigation Design and Methodology.....	7
3.2 Well Installations	7
3.3 Sampling Protocol.....	8
3.4 Gas Monitoring.....	9
3.5 Site Investigation Scope.....	9
3.6 Geotechnical Testing.....	10
4 Ground Conditions.....	11
4.1 Geology – Generalised Sequence.....	11
4.2 Groundwater	11
4.3 In-Situ Geotechnical Testing	12
4.4 Geotechnical Laboratory Testing.....	12
5 Geotechnical Assessment.....	14
5.1 Proposed Development.....	14
5.2 Summary of Ground Conditions	14
5.3 Site Preparation	14
5.4 Foundation Conditions and Bearing Capacity.....	15
5.5 Ground Floor Slabs	17
5.6 Pavement Construction	17
5.7 Drainage	18
5.8 Concrete Durability.....	18
5.9 Excavations.....	18
5.10 Construction Activity and Inspection.....	18
5.11 Enabling Works	19
6 Generic Risk Assessment	20
6.1 Introduction	20
6.2 Soil Risk Assessment.....	20

6.3	Gas Risk Assessment	23
6.4	Controlled Water Assessment	27
6.5	Potable Water Supply (Pollutant Linkage 5)	28
6.6	Revised Contamination Conceptual Model	28
7	Waste Disposal Assessment	30
8	Conclusions	31
8.1	Geotechnical	31
8.2	Contamination Assessment	32
8.3	Waste Assessment	32
9	Recommendations and Remediation Strategy	33
9.1	Remediation and Validation Recommendations	33
9.2	Other Considerations	34
9.3	Validation of Imported / Site Won Soils	36
9.4	Site Completion Report	37

FIGURES

Figure 1:	Site Location & Boundary Plan
Figure 2:	Proposed Development Plan
Figure 3:	Site Investigation Location Plan
Figure 4:	Drainage System Site Investigation Location Plan

APPENDICES

Appendix A:	Risk Matrix
Appendix B:	Profile Logs
Appendix C:	Certificates of Analysis - Soil
Appendix D:	Certificates of Analysis - Geotechnical
Appendix E:	Certificates of Analysis - Water
Appendix F:	Generic Assessment Criteria Values
Appendix G:	HazWasteOnline Assessment Output Sheets

1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by ISG Ltd to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Millwood SEN School, Radcliffe. The investigation was undertaken in support of a future planning application to develop the site for use by the school (equated to residential land use).

The following work has previously been undertaken on site:

- Geo-Environmental Appraisal, undertaken by Encia Consulting Ltd (Ref: 7028/1, dated 20th January 2006).
- Ground Investigation Report, undertaken by Atkins (Ref: 5086974.077.32803, dated February 2010).
- Environmental Investigation and Detailed Quantitative Risk Assessment, undertaken by LKC (ref. CL 1720-02 R0, dated November 2010).
- Phase 2 Geo-Environmental Site Assessment, undertaken by E3P (IMS Ref: QR012-3, dated February 2019).
- Phase 2 Environmental Report, undertaken by Rogers Geotechnical Services Ltd (Ref: C2425/22/E/3709, dated 23rd March 2022).
- Desk Based Coal Mining Risk Assessment (CMRA), undertaken by LKC (ref. LKC 23 1383-A1-CMRA, dated August 2023).

The following work has been undertaken by LKC on the site adjacent to the east:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: CL-602-CL1996-01, dated August 2012).

This investigation has been undertaken to confirm the ground conditions below the site and to allow a contamination and geotechnical assessment to be undertaken. The investigation will aim to confirm the risks of the potential pollutant linkages identified and recommend further assessment / remediation, as required.

The aims of this report are also to establish the feasibility of developing this site, to demonstrate to the Local Planning Authority that in accordance with the National Planning Policy Framework (NPPF)¹ the site may be developed for an equated residential end use and that appropriate site investigation and risk assessment works are in place to allow conditional approval of any future planning application.

A coal mining site investigation has been undertaken by LKC and is reported under separate cover (ref. LKC 23 1383-B1-CMSI, dated September 2023). Gas monitoring undertaken during the coal mining site investigation is included and discussed in Section 6.

1.2 Site Details

A summary of the site details is presented in Table 1-1. Figures 1 and 2 indicate the site location, boundary and proposed development.

¹ "National Planning Policy Framework." Ministry of Housing, Communities and Local Government. July 2021.

Site Location	Western end of School Street, to the rear of Millwood School building, Radcliffe, Manchester. Centred at approximate National Grid Reference 377850E 407120N.
Approximate Area	2,000m ² .
Topography	Approximately 80 metres Above Ordnance Datum (AOD). Site is approximately level.
Current Site Use	Site is vacant and grass covered soft landscaped area.
Purpose of Report	Pre-planning.
Proposed Development	Erection of new classroom block and play areas associated with school.

Table 1-1: Summary of site details.

2 Review of Previous Work

2.1 Phase 1 Preliminary Risk Assessment (PRA)

Phase 1 Desk Studies have been undertaken by Encia Consulting Ltd (Ref: 7028/1, dated 20th January 2006) and Atkins (Ref: 5086974.077.32803, dated February 2010). Relevant information is summarised in Table 2-1.

Main Historical Features	Onsite: undeveloped land (1850), cricket ground and pavilion (1893-1930), playing fields (1937-1987), small buildings (1980-1987), soft landscaped area within school grounds (1999 to 2023). Surrounding Area: coal pits, colliery including foundry, depot, engineering works.
Geology / Hydrogeology	Artificial: No BGS recorded artificial on site. Worked ground (undivided) 15m NW associated with the Manchester, Bolton & Bury Canal. Superficial: Glacial Till. Secondary Undifferentiated Aquifer. Bedrock: Pennine Middle Coal Measures (mudstone, siltstone, sandstone). Secondary A Aquifer. Manchester, Bolton & Bury Canal located 15m west adjacent to boundary. Site not within a Source Protection Zone (SPZ), no groundwater abstractions within 1km.
Landfills / Infilled ground	1no, recorded landfill within 250m (220m SE, inert waste, last deposited in 1991). Potentially infilled ground identified.
Other relevant environmental settings etc.	The site is within a development high risk area. A CMRA has been undertaken by LKC. A coal mining site investigation is required.
Site walkover	Soft landscaping with small trees. Surface water drainage runs ('Permavoids') present across the site.

Table 2-1: Summary of site details, historical review, environmental settings and site reconnaissance.

2.2 Previous Site Investigations

The following site investigations have been undertaken within the site boundary:

- Encia site investigation, 2005 (Ref: 7028/1, dated 20th January 2006): BH5, BH6 and RBH6.
- Atkins site investigation, 2010 (Ref: 5086974.077.32803, dated February 2010): WS211 and WS213.
- LKC site investigation, 2010 (Ref: 5086974.077.32803, dated February 2010): TP101, TP103, TP104, TP105, TP107.

Ground conditions and pertinent findings are summarised in Table 2-2.

Ground Conditions	Made Ground (maximum thickness of 1.60mbgl): Sandy clayey GRAVEL with anthropogenic inclusions of ash, coal, clinker, glass, pottery, plastic, and brick. Rare slag encountered at TP105. No visual / olfactory evidence of hydrocarbon contamination. No asbestos fibres identified. Superficial: Soft to firm brown sandy CLAY, underlain by loose to medium dense SAND with bands of gravel and clay, stiff sandy CLAY, peat / alluvial clay in the NE at BH5 at 1.50-2.80mbgl (interpreted as Alluvium by Atkins). Bedrock: Grey mudstone with siltstone bands from 15.70mbgl. Coal identified offsite at 24.00mbgl (RBH3 and RBH4) and 31.70mbgl (RBH2)
Obstructions	Encountered at 0.70m at BH6.
Groundwater	2.58-2.81mbgl (BH5) / 75.92mAOD (maximum elevation).
Ground Gas	1no. elevated carbon dioxide concentration (5.1%v/v), no elevated methane concentrations, no flow; no gas protection recommended.
Elevated determinands *	Soil: Arsenic, lead, PAHs (LKC, Atkins, Encia), nickel (Atkins), Copper, zinc, sulphate (Encia). Groundwater / leachates: TPHs, PAHs and copper (Encia). Offsite to the NE: PAHs only (Atkins).
Remediation	Cover system in soft landscaped areas.

Table 2-2: Summary of ground conditions and pertinent findings from site investigation reports.

Note: *Elevated at the time of reporting.

A site walkover was undertaken by LKC in July 2023. The site comprised soft landscaping across the majority of the site, with hardstanding present across the east of the site.

The contamination conceptual models in the LKC, Encia and Atkins reports have been updated to be in line with LKC current risk assessment methodology using contaminant-pathway-receptor pollutant linkages based on guidance in LCRM². The model is provided in Table 2-3.

Each pollutant linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552³. The risk matrix is provided in Appendix A.

Due to the minor consequence associated with the phytotoxic effect to flora (i.e. loss of plants in a landscaping scheme), the overall risk for the majority of sites will be very low to low. Where soils contain significant concentrations of heavy metals, in general there will other pollutant linkages (i.e. the risk to human health) that will trigger the requirement for remediation (e.g. a clean environmental cover system). As such the risk to flora associated with phytotoxic contaminants will not be considered further.

The risk to buildings associated with elevated sulphate will be considered as part of the geotechnical assessment and will not be included in the contamination risk assessment.

It should be noted that there may be risk from short term exposure from contaminated soil to site workers during development work. The Preliminary Contamination Conceptual Model deals with long term exposure to key receptors associated with the future use of the site. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as

² Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

³ CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

per HSE guidance⁴) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

⁴ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, home-grown produce, soil attached to home-grown produce. - Windblown dust.	- Future site users. - Offsite receptors.	- Heavy metals. - PAHs.	Likely (given site history, site conditions and proposed end use)	Medium	Moderate	Intrusive investigation required. Soil analysis of CoC.
			- ACM	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low	Low density intrusive investigation required. Soil analysis of CoC.
			- Petroleum hydrocarbons	Unlikely	Medium	Low	No further assessment required.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (naphthalene).	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low	Intrusive investigation required, to include PID testing. Soil analysis of CoC.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Ground / hazardous gas (carbon dioxide, methane).	Unlikely (given no / limited viable gas source and no / limited pathway)	Severe	Moderate / Low	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, precautionary gas protection measures required.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Secondary Undifferentiated & A Aquifers).	- Mobile contaminants such as metals, PAHs, hydrocarbons.	Low Likelihood (elevated determinands previously identified with limited pathway)	Medium	Moderate / Low	Intrusive investigation required. Groundwater sampling. Analysis for CoC.
		- Surface water (Canal).		Unlikely (puddle clay lining, majority of determinands associated with crystalline material in made ground, no direct pathway)	Medium	Low	No further assessment required.
5	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as naphthalene	Likely (given site history, site conditions and direct contact / pathway)	Medium	Moderate	Intrusive investigation required. Soil analysis of CoC.

Table 2-3: Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

In order to assess the ground conditions at the site and to investigate the potential pollutant linkages identified in the preliminary contamination conceptual model an intrusive investigation was undertaken.

The investigation was carried out on 9th to 22nd August 2023 and comprised the following:

- 5no. window sample boreholes drilled to 5.45 metres below ground level (mbgl) (ref. WS101 to WS105).
- 2no. cable percussion boreholes drilled to 5.43-14.30mbgl (ref. CP101 to CP102).
- 3no. rotary boreholes drilled to 50.00mbgl (ref. RBH101 to RB103).
- 29no. hand pits (using hand auger / spade) excavated to 0.16-0.95mbgl (ref. HD101 to HD129).

All site investigation locations are shown in Figures 3 and 4.

The locations were chosen to allow good coverage across the site as well as target areas of concern. Table 3-1 details the targeted and general coverage (non-targeted) site investigation locations.

Site Investigation Locations	Rationale
CP101-CP102	Geotechnical information.
RBH101-103	Identify shallow coal workings.
WS101-105	General site coverage.
HD101-HD129	Positively prove the location of the existing surface water drainage system.

Table 3-1: Summary of sampling locations.

The number of site investigation points corresponds to approximately one location per 13m square centres. This is considered to be a conservative sampling density and is in line with BS10175⁵ for a 'detailed investigation'.

All profile logs are provided in Appendix B and are in line with BS14688-1⁶ and BS5930⁷.

3.2 Well Installations

All of the window sample boreholes and one of the cable percussive boreholes (CP101) were installed with monitoring wells for groundwater monitoring and groundwater sampling. Monitoring wells were installed in accordance with BS10175 and CIRIA C665⁸.

Well installation details are provided in Profile Logs in Appendix B.

⁵ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.

⁶ British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.

⁷ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

⁸ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

3.3 Sampling Protocol

3.3.1 Soil Sampling (Contamination)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation⁹.

Soil was collected for onsite testing. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for total volatile organic compounds (TVOCs) using a MiniRAE Lite photoionisation detector (PID). All results were below detection limits. The on-site monitoring was carried out in line CIRIA C665¹⁰ to aid in screening samples for volatile analysis.

Soil samples of approximately 500g were recovered in amber jars, amber vials for volatile analysis and plastic tubs. All the samples were labelled and stored in cool boxes prior to being collected by courier at the end of the day for delivery to the Chemtest laboratory in Newmarket for chemical testing. If collection was not possible the same day then samples were stored in the sample storage fridge at the LK Group offices below 4°C. Samples were tracked using appropriate Chain of Custody forms provided by Chemtest.

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C. Table 3-2 shows the soil testing undertaken.

Suites and Contaminants	No. Samples	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	4	A basic suite with a broad selection of contaminants tested on samples across the site where no significant evidence of contamination was identified (with the exception of occasional ash, clinker and coal) and no TVOCs identified from the PID tests.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	3	Although no visual/olfactory evidence of contamination was identified (with the exception of some ash), more detailed suite including TPHs undertaken to aid waste classification.
TPH C10-40	1	
SOM & TOC	1	Undertaken on organic alluvium to aid ground gas risk assessment.

Table 3-2. Summary of soil sample testing undertaken.

Notes:

If asbestos present during screen identification and quantification will be undertaken.

Metal/metalloids=arsenic, cadmium, chromium, (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc and boron; TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; PAH=polycyclic aromatic hydrocarbons, BTEX=benzene, toluene, ethylbenzene and xylenes; MTBE=Methyl tert-butyl ether; SOM=Soil Organic Matter; TOC=Total Organic Carbon.

3.3.2 Water Sampling

To establish the condition of deep groundwater LKC obtained 2no. groundwater samples.

⁹ EA (2000). "Technical Aspects of Site Investigation. Volumes 1 & 2 Text Supplements Research and Development Technical Report." P5-065/Tr.

¹⁰ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

The groundwater samples were collected a minimum of 1 week after drilling had finished and following well development. Sample collection was undertaken using low flow sampling pump using thin-walled tubing to encourage laminar flow and minimise the potential loss of volatiles during sampling. The borehole was purged of all standing water and the sample collected from the recharged water. The sample was collected in glass and plastic bottles and a glass vial. A water meter was used to test the pH, temperature and conductivity before sampling until equilibrium conditions were met, as per BS10175¹¹ guidelines.

All water samples were placed in glass bottles, plastic bottles and septum topped vials and stored in ice packed cool boxes. The samples were sent to Chemtest on the same day for analysis. Sampling was carried out in accordance with BS5930¹² and BS5667-11¹³.

Many of the tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix E. Table 3-3 shows the groundwater testing undertaken.

Suites and Contaminants	No. Samples	Location	Justification
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol and hardness.	2	CP101 (G) WS105 (G)	Detailed suite undertaken to confirm presence / absence of contamination within the groundwater.

Table 3-3: Summary of groundwater sampling tests undertaken.

Notes:

G=Groundwater Sample

Metal/metalloids=arsenic, cadmium, chromium, (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc and boron; TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; PAH=polycyclic aromatic hydrocarbons, BTEX=benzene, toluene, ethylbenzene and xylenes; MTBE=Methyl tert-butyl ether.

3.4 Gas Monitoring

Gas monitoring was not carried out as part of this investigation. 4no. gas monitoring visits have previously been undertaken on the wider site by Encia Consulting Ltd in 2005 (Ref: 7028/1, dated 20th January 2006).

A low risk was identified in the preliminary contamination conceptual model for gas (pollutant linkage 3) and further action (precautionary gas protection measures) was only recommended if significant organic / putrescible material was identified on site. This is discussed further in Section 6.3.

3.5 Site Investigation Scope

The scope of the contaminated land investigation was agreed with the Environmental Protection Officer at Bury Metropolitan Borough Council prior to undertaking the work.

This investigation was generally in line with the agreed scope.

¹¹ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.

¹² British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

¹³ British Standard (2009). "Water Quality – Sampling. Part 11: Guidance on Sampling of Groundwaters". BS ISO 5667-11:2009.

3.6 Geotechnical Testing

3.6.1 In-situ Onsite Geotechnical Testing

In-situ geotechnical tests were performed in the boreholes to further characterise the sub-soil conditions. The following tests were undertaken:

- Standard Penetration Tests (SPTs) were performed in the window sample boreholes and cable percussion boreholes at approximately 1-1.5m intervals, generally within the natural strata.
- Pocket Penetrometer (PP) tests (giving undrained shear strength) were performed in the window sample boreholes within the natural clay strata.

The SPT and PP readings are provided within the profile logs (Appendix B).

3.6.2 Laboratory Geotechnical Testing

Soil samples taken during the investigation were collected in tubs and bulk bags and sent to Murray Rix Laboratories or tested in-house for geotechnical testing.

Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix D. Table 3-4 shows the geotechnical testing undertaken.

Suites and Contaminants	No. Samples
pH and water-soluble sulphate	1
BRE SD1 (short suite)	2
Atterberg Limits (plasticity testing)	5
Particle Size Distribution (PSD)	6
Particle Size Distribution (PSD) sedimentation	2

Table 3-4: Summary of geotechnical testing undertaken.

4 Ground Conditions

4.1 Geology – Generalised Sequence

The ground conditions beneath the site generally comprised made ground underlain by natural sandy gravelly clay or gravelly silty sand with bands of gravel and clay.

4.1.1 Made Ground

Made ground was recorded in all boreholes to depths of 0.70-3.10mbgl. A layer of made ground (topsoil) was encountered across the site comprising silt with anthropogenic material including brick, coal and glass; this is interpreted as the environmental cover system laid as part of the existing school development. This was underlain by horizons of silt or gravel with anthropogenic material including brick, coal, clinker and ash.

4.1.2 Superficial Strata

Natural strata comprised interbedded soft to stiff variably gravelly variably sandy silty clay (with low cobble content), (gravelly) variably sandy (clayey) silt, gravelly silty sand (with occasional clay lenses) with occasional gravel lenses, and silty sand and gravel with pockets of silt.

Organic clay was encountered at 3.00-5.40mbgl at CP102, at 3.00-3.50mbgl at WS101 and at 1.70-2.80mbgl at WS102.

4.1.3 Bedrock

Weathered sandstone and mudstone bedrock was encountered from 20.70-21.20mbgl. Intact coal seams were recorded at 40.80-43.50mbgl at RBH101-RBH103.

4.1.4 Contamination

With the exception of the anthropogenic material encountered in the made ground (as described above). No visual / olfactory evidence of hydrocarbons or volatile contaminants in any locations. The PID recorded a maximum of <0.1ppm TVOC in the samples.

4.2 Groundwater

4.2.1 Groundwater Levels

Groundwater strikes were recorded during the investigation in the boreholes. In addition, one groundwater monitoring visit has been undertaken in the deeper installations. Results are contained in Table 4-1.

BH/TP	Water Strike Depths (mbgl)	Well Response Zone (mbgl)	No. of Monitoring Visits	Monitoring Depths (mbgl)	Sample Taken?	Evidence of Contam?
WS101	3.1	1.0-5.0 (MG/S)	-	-	N	N
WS102	3.10	1.00-2.00 (S/C)	-	-	N	N
WS103	1.00	1.00-2.00 (MG/C)	-	-	N	N
WS104	2.00	0.50-3.50 (MG/S)	-	-	N	N
WS105	1.70, Damp	1.65-4.50 (C/S)	1	1.47	Y	N
CP101	5.00, 9.00	4.00-10.0 (C/S/SG/C)	1	2.13	Y	N
CP102	Dry	-	-	-	N	N

Table 4-1: Summary of water strike depths within boreholes.

Response Zones:

MG=Made Ground; SG=Sands and Gravel; S=Sand; C=Clay.

4.3 In-Situ Geotechnical Testing

4.3.1 Standard Penetration Tests

In-situ standard penetration tests (SPTs) were undertaken, predominantly in the natural ground. The results are provided within the profile logs in Appendix B.

4.4 Geotechnical Laboratory Testing

4.4.1 Particle Size Distribution

Particle size distribution (PSDs) tests were carried out on granular strata to confirm the material type. Full results are presented in Appendix D.

4.4.2 Atterberg Limits

Representative samples of natural clay were subjected to Atterberg Limits (plasticity) and Moisture Content testing. Results are presented in Appendix D and summarised in Table 4-2.

Table 4-2 also includes the modified plasticity index as detailed in Chapter 4.2-D5 of the NHBC standards (modified plasticity index = plasticity index x % less than 425µm sieve / 100%).

Location	Depth (mbgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Class	Passing 425 micron (%)	Modified Plasticity Index (%)
CP101	3.00-3.45	20.5	37	18	19	CM	95	18.05
CP101	4.00-4.45	20.5	39	18	21	CM	90	18.90
CP101	10.50-10.95	11.5	37	14	23	CM	84	19.32
CP102	3.00-3.45	16.0	39	15	24	CM	99	23.76
CP102	5.00-5.45	11.3	38	13	25	CM	82	20.50

Table 4-2: Summary of plasticity index testing.

The modified plasticity index is between 18% and 24%. This characterises the clay as having a low to medium volume change potential.

4.4.3 Water Soluble Sulphate and pH

Water soluble sulphate and pH tests were carried out on soil and groundwater samples. Full results are presented in Appendix C and Appendix E (groundwater) and summarised in Table 4-3. Table 4-3 also contains soil results from previous site investigations.

Strata	pH		Sulphate	
	Soil	Groundwater	Soil (g/l)	Groundwater (mg/l)
Made Ground	6.5-9.1	6.2-6.5	<0.01-0.47	25-38
Natural	6.9-8.7		0.01-0.03	

Table 4-3: Summary of pH and water soluble sulphate results.

4.4.4 BRE SD1 Results

BRE SD1 results are presented in Appendix C and summarised in Table 4-4.

Strata	pH	Water Sol. Chloride (g/l)	Water Sol. Nitrate (g/l)	Water Sol. Magnesium (g/l)	Water Sol. Sulphate (g/l)
Made Ground	6.7-7.2	3-6.5	3.9-5	1.2-1.4	0.01-0.06

Table 4-4: Summary of BRE SD1 results.

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that the proposed development will comprise a new single storey classroom block and play areas associated with the school. Details of the proposed loadings are not known.

The finished ground levels have not been provided and it is therefore anticipated that they will not vary significantly from current levels. However, should the development proposals or finished levels be altered then the comments/recommendations in this section may require revising.

The depths of any underground engineering works (sewers etc.) are unknown and therefore have not been taken into account in the following assessment. It is considered that any such works will be designed so as not to have an effect on, or compromise, proposed or existing foundations or ground stability.

Given the nature of the proposed development it is considered that the structure meets the criteria of Geotechnical Category 2 of Euro Code 7.

5.2 Summary of Ground Conditions

Ground conditions identified at the site are detailed in Section 4.1, and typically comprise Made Ground up to 3.10mbgl over natural interbedded cohesive and granular deposits of clay, silt, sand and gravel to the completion depths investigated in the window sample and cable percussive boreholes.

Bedrock comprising Pennine Middle Coal Measures (mudstone, sandstone and coal) was recorded within the rotary openhole boreholes from depths of between 20.70 and 21.20mbgl to the completion depths of 50.00mbgl.

5.3 Site Preparation

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works. This should include:

- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill.
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill.
- Buried structures and old foundations can be anticipated from historical structures which were on site. Where encountered these should be excavated from below the proposed development footprint with the resulting void backfilled.

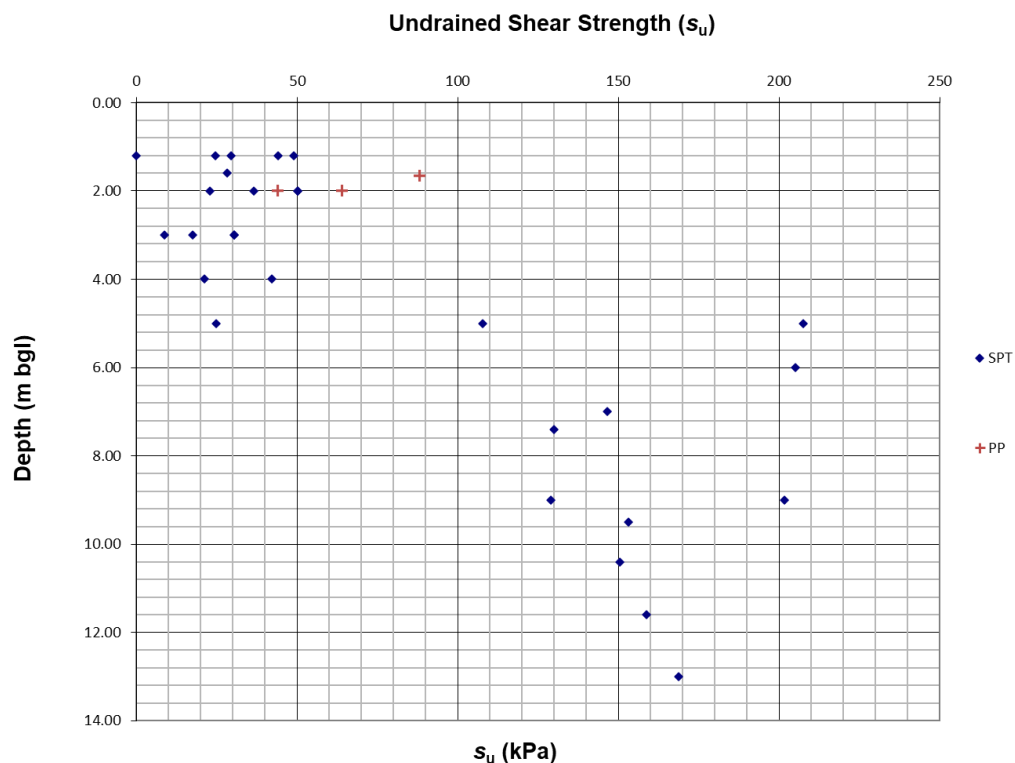
The near surface soils may potentially be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may result in more onerous floor slab design, road cap thickness and increased amount of site disposal etc. A working platform will be required for piling plant.

5.4 Foundation Conditions and Bearing Capacity

5.4.1 General

The Made Ground is not suitable for a founding material due to the inherent variability of the material. Shallow natural deposits are variable between cohesive and granular and as such the potential for differential settlements will preclude the option for shallow foundations. The graphs below include SPT 'N' data from 2no. nearby cable percussive boreholes, BH5 and BH6b, undertaken by Encia Consulting Ltd in 2005.

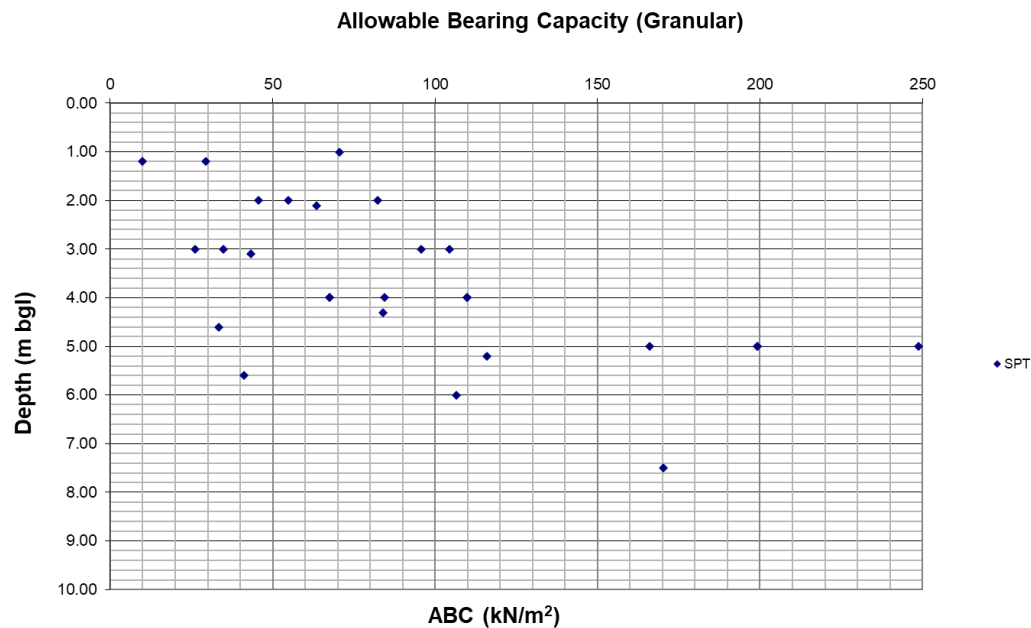
Strength of the cohesive material (made ground and natural) has been assessed using in-situ testing by SPT and PP. The results of the testing have been plotted against depth as is shown in Graph 5-1 below:



Graph 5-1: Summary of s_u vs depth from in-situ SPT, SHDP and HV testing.

From Graph 5-1 it can be seen that the undrained shear strength (s_u) of the cohesive deposits is quite variable between 1.20 and 4.00mbgl, ranging between 9 and 88kPa. At 5.00mbgl the strength of the clay ranges between 25 and 207kPa, below 5mbgl the s_u is more uniform, offering a conservative 150k-169Pa.

Density of the granular material has been assessed using in-situ testing by SPT. The results of the testing have been plotted against depth as is shown in Graph 5-2 overleaf:



Graph 5-2: Summary of s_u vs depth from in-situ SPT, SHDP and HV testing.

From Graph 5-2 it can be seen that the density of the granular material follows a similar theme as the cohesive, with variable Allowable Bearing Capacities (ABC) of between 10 and 250kN/m² to 5mbgl. Below 5.00m the ABC increases, returning values of between 106 and 250kN/m² with the exception of a low value of 41kN/m² returned at a depth of 5.60mbgl.

Foundation options are therefore:

- Conventional strip footings on vibro granular columns,
- Deeper pile foundations.

These options are discussed below:

5.4.2 Ground Improvement

The use of ground improvement techniques such as vibro granular columns will allow shallow foundations to be utilised with the Made Ground. The vibro granular columns should provide a bearing capacity of around 150kN/m² but will also remove variability within the Made Ground as well as the natural interbedded cohesive and granular strata. Specialist advice should be sought from a suitably experienced contractor with regard to allowable bearing capacity and settlements.

Atterberg limits determinations, summarised in Table 4-2 show the clay to be of low to medium plasticity and as such the sides of the foundations may require protection using clay board or similar.

5.4.3 Piled Foundations

Consideration should also be given to the use of piled foundations to transfer loadings through any deep made ground / poor ground conditions and bear upon more competent strata encountered below c. 5mbgl.

Use of piles will reduce the amount of offsite disposal of spoil generated from foundation trenches along with reducing the amount of concrete required for the development.

Up to 3.10m thickness of made ground has been recorded within the exploratory holes and consideration must be given to the potential for negative skin friction to have an adverse effect upon the piles.

Pile design should be undertaken by a specialist contractor to allow them to reduce the factor of safety based on their extensive pile testing data.

Should a piled foundation solution be the preferred option then warranty providers, such as NHBC or LABC, may require further information on ground conditions to a minimum of 5m below the base of the pile.

Recommendation

Whilst a piling solution is viable it may require deeper boreholes to satisfy warranty providers of the soils strata and bearing capacity, it is therefore considered that vibro granular columns will provide the most reliable and cost-effective option for the site.

5.5 Ground Floor Slabs

Due to the presence of substantial thicknesses of made ground (up to 3.10m) ground bearing floor slabs, whilst viable, will require detailed design to accommodate variability of the formation and account for differential settlement. Following suitable preparation of the sub-grade by a combination of excavation and re-compaction, a ground bearing floor slab should be suitable for the proposed structure. Floor slabs should be designed by a suitably experienced structural engineer.

If vibro granular columns are used for the foundations, then this could be extended to the floor slab to improve formation conditions and reduce the risk of damage from settlement. However, it may be more reliable to opt for suspended floor slabs.

5.6 Pavement Construction

It is considered that the topsoil is not suitable for use as a sub-grade. Untreated Made Ground is considered unsuitable as a sub-grade due to its potential variability and potentially low strength/high compressibility. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation at a later date through in-situ CBR tests.

Based on the plasticity index the soils may be frost susceptible. Frost action can cause differential heaving, surface roughness and cracking, blocked drainage, and a reduction in bearing capacity during thaw periods. In areas of proposed roads and car parking it may be necessary to remove the frost susceptible soils and replace with non-frost susceptible material to the expected frost depth penetration.

Following excavation, the sub formation should be proof rolled and any soft material inspected and removed.

5.7 Drainage

The presence of substantial depths of Made Ground across the site may result in settlement. It is therefore recommended that drain runs are designed using steeper gradients and flexible joints to allow for some differential settlement.

5.8 Concrete Durability

Based upon the results of the chemical analyses summarised in Tables 4-3 & 4-4 it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with the recommendations provided in BRE Special Digest 1 (2005).

5.9 Excavations

Site observations indicated that excavations should be feasible in the near surface with normal plant, however obstructions may be encountered in the near surface including former foundations and former floor slabs. It is anticipated that any obstructions will be grubbed out during the reduced level dig for the sub structure works.

Groundwater seepage was recorded in a number of the exploratory holes, evidenced as isolated perched water in the Made Ground and slightly organic CLAY but also as strikes within the granular strata. The short- and long-term stability of near vertically sided excavations can therefore not be guaranteed and random and sudden instability within these soils should be anticipated.

Due to the variability of the Made Ground it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97¹⁴. Groundwater seepages were noted in exploratory holes, however, these were minor, and it is considered that conventional sump pumping should be adequate.

5.10 Construction Activity and Inspection

The following activities and inspections should be incorporated into the site works:

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction.
- Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 utilised.
- It is considered that de-watering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.

¹⁴ CIRIA Report 97 – Trenching Practice – Second Edition (2001 revision)

- Where access to confined spaces is required appropriate mitigation measures should be addressed within the Construction Stage Health and Safety Plan. Particular account should be taken of the gas results.
- The presence of potential contamination and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan and should include measures to design out the risks, reduce their impact and finally the use of Personnel Protective Equipment (PPE).

5.11 Enabling Works

It is considered that the ground will require preparation to facilitate a developable platform for the first stage of construction works.

As referenced in Section 5.3, obstacles such as foundations, floor slabs, services, etc. can be anticipated on site from historical land uses and it is recommended that these are grubbed out as part of a general site turnover to remove obstacles.

The enabling works should also cover activities such as undertaking site preparation works including pre commencement surveys of the site and surrounding areas, preparation of access routes and providing suitable piling mats if required, surveying the site and producing topographical plans on completion of the earthworks, as well as installation of safety signs and security fencing.

6 Generic Risk Assessment

6.1 Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM¹⁵). Information gathered from the risk assessment has been collated in the revised contamination conceptual model in Section 6.6.

This section includes results from all site investigation locations undertaken to date.

6.2 Soil Risk Assessment

6.2.1 Methodology

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs).
- LQM Suitable 4 Use Levels (S4ULs).

Where no C4SLs have been generated LKC will use the LQM S4ULs¹⁶. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions^{17,18,19,20}.

As the proposed development is for a new classroom block with play areas, LKC considers comparing the results with the POS_{res} criteria to be appropriate, as this criterion is based on a child using the area sporadically through the year (170-day exposure) close to home.

All criteria have been generated using the CLEA V1.06 model²¹ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

A summary of the generic assessment criteria is provided in Appendix F.

B(a)P as Surrogate Marker

LKC consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the

¹⁵ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

¹⁶ LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."

¹⁷ EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.

¹⁸ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

¹⁹ EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.

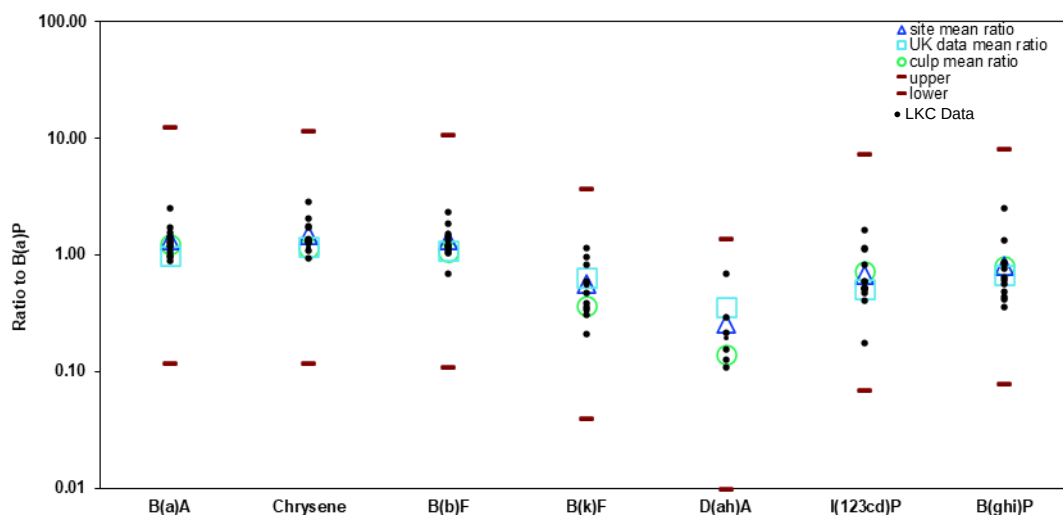
²⁰ EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.

²¹ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

PAHs^{22,23} and naphthalene the most volatile and soluble²⁴. The C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, if it falls within appropriate limits, since the risk from other non-carcinogenic PAHs are considered negligible²⁵. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)²⁶ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

Based on the above assumption for PAHs, LKC undertook an assessment of the data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*²⁷, which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

Graph 6-1 summarises the study site data with respect to how the ratios of carcinogenic PAHs relate to B(a)P, within the confidence limits provided in the HPA document.



Graph 6-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 14no. samples (where values were >LOD to allow the calculation of a ratio).

Notes:

B(a)P=Benzo(a)pyrene; D(ah)A=Dibenzo(ah)anthracene; B(a)A=Benzo(a)anthracene; B(b)F=Benzo(b)fluoranthene; B(k)F=Benzo(k)fluoranthene; I(123cd)P=Indeno(123cd)pyrene; B(ghi)P=Benzo(ghi)perylene

All the data points that could be used to calculate ratios fall inside the upper or lower limits.

Based on this distribution of data LKC considers B(a)P can be used as a surrogate marker for carcinogenic PAHs and the C4SL criteria is suitable for this dataset.

²² EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.

²³ USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."

²⁴ EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.

²⁵ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

²⁶ HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.

²⁷ Culp, S; Gaylor, D; Sheldon, W; Goldstein, L and Beland, F (1998). "A Comparison of Tumours Induced by Coal Tar and Benzo-a-pyrene in a 2-Year Bioassay." Carcinogenesis. Vol 19, no. 1, pp. 117-124.

6.2.2 Soil Results Comparison against Assessment Criteria

All analysis sheets are presented in Appendix C. Elevated and pertinent results from all site investigation locations completed to on site to date are presented in Table 6-1.

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria	Source of Criteria
Metals						
Arsenic	mg/kg	18	241	WS103 (1.70-1.90m)	79	C4SL
			172	WS104 (0.30-1.00m)		
			110	WS210 (0.50m)		
			140	WS211 (0.60m)		
			87	TP105 (0.00-0.10m)		
			98	TP110 (0.10-0.25m)		
Lead	mg/kg	18	500	WS103 (1.70-1.90m)	630	C4SL
			690	WS210 (0.50m)		
			1,100	TP104 (0.00-0.10m)		
GENERAL						
pH	pH	19	Range 4.6 to 8.1			
SOM	%	19	Range 1.9 to 37.9			
Asbestos	N/A	18	Not detected.			

Table 6-1: Summary of elevated and pertinent analytical results.

Notes:

Only results that exceeded assessment criteria have been shown and results from **all depths** are noted. Results have been compared to the nearest appropriate SOM.

No asbestos was identified in any soil samples analysed.

No elevated levels of contaminants were encountered in the natural sand deposits (based on one sample only). As such LKC considers that the natural strata was not impacted by the made ground above, with regards to human health.

As no significant concentrations of petroleum hydrocarbons were identified in any of the soil samples a hazard index (HI) as described by the Environment Agency²⁸ technical report (to examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions) has not been undertaken as part of this assessment.

6.2.3 Direct Contact Risk – Pollutant Linkage 1

Elevated metals (arsenic and lead) have been identified within the made ground on site, given the number and location of elevated samples, the contamination is considered to be site wide.

The source of the contamination is expected to the ash, clinker, coal, pottery and glass noted in the made ground. LKC also note that the existing cover system soils contain glass.

At the concentrations identified, the contaminants are considered to pose a potential risk to future site users (school children and teachers) in proposed play areas, where made ground may be exposed. The principal pathways are the ingestion pathways (soil, dust and home-grown produce) and dermal contact.

²⁸ EA (2005). "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils." Science Report P5-080/TR3.

The probability of metal contamination affecting site users is likely. With a medium consequence, the risk is considered to be moderate, and remediation is recommended in proposed play areas.

No asbestos was identified in any of the samples; therefore, the probability of asbestos affecting site users is considered to be unlikely. With a moderate consequence, the risk is low. However, as a precaution, construction workers should be and vigilant for any suspected ACM during groundworks (discussed further in Section 9.2).

No elevated petroleum hydrocarbon or PAH concentrations were identified, therefore the probability of these contaminants posing a risk to site users is considered unlikely. With a medium consequence, the risk is considered to be low, and no remediation is recommended.

6.2.4 Risk from Inhalation of Vapours – Pollutant Linkage 2

No visual / olfactory evidence of volatile contaminants was identified during the investigation. The PID did not detect any TVOCs. Confirmatory soil analysis did not detect any elevated naphthalene concentrations.

LKC therefore consider the probability of volatile contaminants affecting site users as unlikely. The consequence is expected to be medium, giving a low risk and no remediation is required with respect to pollutant linkage 2.

6.3 Gas Risk Assessment

6.3.1 Potential Sources

The following potential sources of ground gas have been identified from the desk-based information and ground conditions:

Type	Source	Location
Hazardous Ground Gas	Deep made ground (max. thickness 3.10m).	On-site
	Artificial ground recorded 15m north-west assoc. with the Manchester, Bolton & Bury Canal (upfilled).	Off-site
	Landfill 220m south-east, 'SW of Sion Street' inert waste comprising ash and natural clay from adjacent railway embankments, waste last deposited 1991	Off-site
Ground Gas	Organic CLAY encountered at: CP102 (3.00-5.40mbgl), WS101 (3.00-3.50mbgl) and WS102 (1.70-2.80mbgl).	On-site
	Shallow potentially worked coal seams.	On-site
	Intact coal seams recorded at 40.80-43.50mbgl at RBH101-103.	On-site
	Shallow worked coal seams recorded offsite on land 145m east of the school, grouting remedial works undertaken.	Off-site

Table 6-2: Summary of potential gas sources.

Assessment of sources

The landfill is not considered to be a credible source of hazardous ground gas as the waste deposits do not record any putrescible material – the waste is described as ash and clay in the appendices contained in the Encia Consulting Report (Ref: 7028/1, dated 20th January 2006) and is unlikely to produce hazardous gas.

Artificial ground associated with the Manchester, Bolton and Bury Canal is likely to be predominately puddle clay and other non-putrescible made ground used in the construction of the canal channel, and c. 200 years old; this is unlikely to be a significant source of hazardous ground gas.

Per the recommendations of NHBC guidance (2023)²⁹, organic material with a TOC of <5% is classified as having low degradable content, and <2% is not considered to produce gas. TOC from the organic material encountered at WS101 during the LKC site investigation was 1.6%, therefore the organic material (likely alluvium) is not considered to be a significant source of ground gas (NHBC, 2021).

Made ground was recorded in all boreholes to depths of 0.70-3.10mbgl and comprised made ground (topsoil) silt with anthropogenic material including brick, coal and glass, further underlain by horizons of silt or gravel with anthropogenic material including brick, coal, clinker and ash. No significant thickness of putrescible material was encountered. Given the composition of the made ground, it is unlikely to be a significant source of ground gas (NHBC, 2021). This is discussed further in the sections below.

6.3.2 Previous Gas Monitoring Data

4no. gas monitoring rounds have previously been undertaken across the wider site by Encia Consulting Ltd between 8th and 29th June 2005. Although undertaken some time ago, and some of the locations are from the wider school site, ground conditions are similar and the gas data remains a useful line of evidence to assess the gas risk.

All gas concentrations, flow, pressure and groundwater levels are shown on Table 6-3.

Location	Install (mbgl)	Strata	O ₂ (%v/v)	CO ₂ (%v/v)	CH ₄ (%v/v)	Max. Flow (l/hr)
BH1	0.50-10.00	S-SG-C-G-C	20.70- 21.10	<0.10-0.20	<0.10	<0.10
BH2	1.00-9.00	C-S-C	20.40-20.60	<0.10-0.20	<0.10	<0.10
BH5	1.00-10.00	S-P-C-S-C	20.60-20.90	<0.10-0.40	<0.10	<0.10
BH6b	1.00-10.00	MG-S-C	20.70-21.00	<0.10-0.30	<0.10	<0.10
WS1*	1.50-3.50	C-Si-C	18.00	0.70	<0.10	<0.10
WS4	0.50-3.00	MG-C-SG	14.80-18.90	2.00-5.10	<0.10	<0.10
WS7	0.50-3.50	MG-S	16.00-18.30	3.10-4.70	<0.10	<0.10
WS12	0.50-4.00	C-S-SG-C	20.30-20.70	0.00-0.90	<0.10	<0.10

Table 6-3: Summary of 2005 Encia Consulting Ltd gas monitoring data.

Notes:

If concentrations / flow is zero, then equipment detection limits are assumed.

*Only 1no. monitoring visit undertaken.

Response Zones:

MG=Made Ground; P=Peat; Si=Silt; SG=Sands and Gravel; S=Sand; C=Clay.

Carbon dioxide concentrations were generally below 5%v/v, a maximum of 5.1%v/v on one occasion at WS4. No flow or methane concentrations were recorded.

6.3.3 Pathway

Natural strata comprised interbedded cohesive and granular deposits of clay, silt, sand and gravel. Granular layers encountered do not appear to be continuous across the site; there is no clear pathway (NHBC, 2021). At depth, a layer of stiff to very stiff clay was encountered between 5.00-9.0mbgl to the base of the cable percussive boreholes. Sandstone and mudstone bedrock were encountered from 20.70-21.20mbgl.

²⁹ NHBC (NF94) (2023) "Hazardous Ground Gas-An Essential Guide for Housebuilders" April 2023. Report NF94.

6.3.4 Assessment

Gas Screening Values

In accordance with CIRIA C665³⁰, a Gas Screening Value (GSV) has been calculated for the previous monitoring data. Assuming worst-case scenario maximum gas concentrations and flow for each borehole have been used to calculate the GSV. The GSV can be used to determine the Characteristic Situation (CS).

Table 6-4 shows the maximum GSV for each borehole and the appropriate characteristic situation (based on GSV only). An overall site assessment has also been included (worst case values across the wider site).

Location	GSV CO ₂ (l/hr)	GSV CH ₄ (l/hr)	CS
BH1	0.0002	0.0001	1
BH2	0.0002	0.0001	1
BH5	0.0004	0.0001	1
BH6b	0.0003	0.0001	1
WS1	0.0007	0.0001	1
WS4	0.0051	0.0001	1
WS7	0.0047	0.0001	1
WS12	0.0009	0.0001	1
Overall Site	0.0051	0.001	1

Table 6-4: Summary of worst-case Gas Screening Values (GSV).

Notes:

CS – Characteristic Situation, assuming a flow rate at detection of limits of 0.10l/hr.

Although CIRIA C665³¹ suggests that carbon dioxide and methane are recorded above 5%v/v and 1%v/v respectively, that you should consider upgrading the characteristic situation from CS1 to CS2, only one visit encountered carbon dioxide that was only slightly above CS2. In this case, LKC concur with the conclusions of previous site investigation reports and based on the GSVs the site should be treated as CS1.

Given the above justification, LKC consider the probability of carbon dioxide and methane gas associated with the made ground affecting site users and buildings as unlikely. With a severe consequence, a moderate / low risk has been identified. The site classified as CS1, and no remediation (gas protection measures) are recommended.

Shallow Coal Seams

On the Coal Authority's advice, gas monitoring was undertaken during the coal mining site investigation. Gas monitoring was undertaken at 1.5m intervals. A summary of the results is provided in Table 6-5

Location	Min. CH ₄ (% v/v)	Max. CH ₄ (%v/v)	Min. CO ₂ (%v/v)	Max. CO ₂ (%v/v)	Min. O ₂ (%v/v)	Max. O ₂ (%v/v)
----------	---------------------------------	--------------------------------	--------------------------------	--------------------------------	-------------------------------	-------------------------------

³⁰ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

³¹ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

RBH101	<0.10	<0.10	<0.10	0.10	19.70	21.90
RBH102	<0.10	0.10	<0.10	0.10	20.80	21.90
RBH103	<0.01	0.20	<0.10	0.20	19.60	21.20

Location	Min. CO (% v/v)	Max. CO (%v/v)	Min. H ₂ S (%v/v)	Max. H ₂ S (%v/v)
RBH101	<0.10	3.00	<0.10	1.00
RBH102	<0.10	<0.10	<0.10	1.00
RBH103	<0.10	1.00	<0.10	1.00

Table 6-5: Summary of gas monitoring data obtained during coal mining site investigation.

Minimal carbon dioxide and methane concentrations were recorded. Hydrogen sulphide ranged from <0.10 to 1.00%v/v and carbon monoxide ranged from 3.00 to <0.1%v/v. Interbedded sand, clay and gravel was encountered above the bedrock. 19.80-20.80m thickness of sandstone and mudstone rock was encountered above shallow coal seams.

LKC have utilised the decision support tool provided in CL:AIRE mine gas emissions guidance³² (Figure 13.1). The site is located in a low risk zone due to the following:

- Although interbedded sand, clay, silt and gravel deposits have been recorded, no continuous granular deposits were encountered making the superficial deposits unlikely to act as a pathway for ground gas.
- Groundwater levels were encountered in the superficial deposits between 1.00-9.00mbgl during the LKC site investigation, which indicate that any workings, if present at depth, are likely to be flooded.
- intact coal seams were recorded at >30mbgl (40.80-43.50mbgl), which is below the 30m depth stated in the guidance (CL:AIRE, 2021) and unlikely to pose a significant risk to the site.
- The closest mine entry is located 45m south, which is >20m radius stated in the CL:AIRE (2021) guidance, and therefore unlikely to pose a significant risk to the site.
- Given the c. 19.80-20.80 thickness of rock cover encountered above the coal seams and the advice given in NHBC Report N94 (NHBC, 2021), should a piled foundation for the proposed classroom block is unlikely to create a preferential pathway to the underlying coal seams.
- Minimal methane (<0.30%v/v) and carbon dioxide (<0.30%v/v) concentrations, no oxygen depletion and low hydrogen sulphide (<2%v/v) and carbon monoxide (<4%v/v) were encountered during the coal mining site investigation. The ternary plot (Plate 6-2) suggests that the minimal levels of ground gas are likely due to microbial activity.
- The LKC CMSI report (ref. LKC 23 1383-B1-CMSI) recommends grouting due to insufficient thickness of rock cover, which will further reduce the ground gas risk.

As the site falls into a low risk zone, per the recommendations in the guidance (CL:AIRE 2021), no mitigation measures (i.e., gas protection measures) are required.

³² CL:AIRE (2021). "Good Practice for Risk Assessment for Coal Mine Gas Emissions".

Given the above justification, LKC consider the probability of carbon dioxide and methane gas associated with shallow worked coal seams affecting site users and buildings as unlikely. With a severe consequence, a moderate / low risk has been identified. The site classified as CS1, and no remediation (gas protection measures) are recommended.

6.4 Controlled Water Assessment

LKC considers the Secondary Undifferentiated and Secondary A Aquifers and the Manchester, Bolton & Bury Canal located 15m west as the primary receptors. The site is not within a Source Protection Zone (SPZ) and there are no groundwater abstractions within 1km.

LKC have compared results above Limits of Detection (LOD). Where relevant the review of priority substances takes precedence considering threshold values for groundwater cannot be used '*as part of site-specific investigations*'. The hierarchy is as follows:

- River Basin District Standards³³ and updated Water Framework Directive³⁴ for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2016 private water supply standards (UKDWS potable)³⁵.
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)³⁶.
- Resource Protection Values (RPVs)³⁷.
- Minimal Reporting Values (MRVs).

With regards to hydrocarbon mixtures (TPHCWG) for UKDWS, LKC will use the CL:AIRE guidance on petroleum hydrocarbons in groundwater³⁸ based on WHO guidelines.

No criteria values have been presented for surface waters (EQS) except the odour, visual evidence and taste test for fish³⁹. However, criteria for each banding has been presented by WHO within the CL:AIRE report for drinking water and will be used in the assessment.

No elevated contaminants above detection limits were identified in any water sample.

Based on the above, LKC considers the probability of contaminants on site affecting the Secondary Undifferentiated and Aquifers and the Manchester, Bolton & Bury Canal as unlikely. Given the medium consequence, a low risk is anticipated (Pollutant Linkage 4) and no remediation is required.

³³ Defra (2010). "The River Basin Districts Typology, Standards and Groundwater Threshold Values". Water Framework Directive (England and Wales) Directions 2010.

³⁴ Defra (2015). "Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015".

³⁵ Statutory Instruments (2016). "The Private Water Supplies Regulation 2016." No. 614

³⁶ EA (2002). "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the Environment Protection Act 1990."

³⁷ SEPA (2010). "Assigning Groundwater Assessment Criteria for Pollutant Inputs." WAT-PS-10-01.

³⁸ CL:AIRE (2017). "Petroleum Hydrocarbons in Groundwater: Guidance on Assessing Petroleum Hydrocarbons Using Existing Hydrological Risk Assessment Methodologies."

³⁹ EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."

6.5 Potable Water Supply (Pollutant Linkage 5)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination⁴⁰. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be a risk and therefore not included in the analysis suites: chlorinated compounds, cresols, ethers, nitrobenzene, ketones, aldehydes and amines.

The following elevated contaminants were identified:

- Elevated TVOCs (inc. naphthalene) in made ground across the site.
- Elevated EC10-EC16 aliphatic and aromatic hydrocarbons in the made ground at WS211 in the southeast of the site.

It is likely that barrier pipe may be required across the site subject to the depth and location of the water pipes and in consultation with UU.

It should be noted typical pipework depths are 0.75mbgl to 1.35mbgl. The pipework will likely be laid into the underlying made ground after levels have been reduced.

Once details of the pipeline location and depths are known a UU Risk Assessment should be undertaken.

At this stage, the probability of organic contaminants affecting potable water pipes is likely. Given the consequence is considered to be medium, the risk (pollutant linkage 6) is anticipated to be moderate and remediation (i.e. barrier pipe) is likely to be required (subject to further risk assessment).

6.6 Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-3) has been revised following the risk assessments undertaken in Sections 6.1-6.5. The revised contamination conceptual model follows the same methodology and guidance used in the preliminary contamination conceptual model. The risk matrix is provided in Appendix A.

The revised contamination conceptual model is presented in Table 6-6.

Where a very low risk is identified, no specific remediation is required.

Where a low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

Where a moderate or higher risk is identified, remediation or further investigation work is recommended.

Further details of the remedial proposals and a remedial option appraisal are given in Section 7.

⁴⁰ UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, home-grown produce, soil attached to home-grown produce. - Windblown dust.	- Future site users. - Offsite receptors.	- Heavy metals (arsenic & lead).	Likely	Medium	Moderate	Remediation recommended.
			- Petroleum hydrocarbons - ACM, - PAHs.	Unlikely	Medium	Low	No remediation recommended.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (naphthalene).	Unlikely	Medium	Low	No remediation recommended.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Ground / hazardous gas (carbon dioxide, methane).	Unlikely	Severe	Moderate / Low	No remediation recommended.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Secondary Undifferentiated & A Aquifers). - Surface water (Canal).	- Mobile contaminants such as metals, PAHs, hydrocarbons.	Unlikely	Medium	Low	No remediation recommended.
5	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as naphthalene	Likely	Medium	Moderate	Remediation recommended.

Table 6-6: Revised Contamination Conceptual Model.

Notes

*¹ Although no ACM identified, contractors should be vigilant during earthworks of any potential ACM. This is discussed further in Section 9.

*² The conceptual model only takes into consideration the future use of the site and long-term exposure. Consideration should also be given to the short-term exposure of construction workers and nearby land users to ACM containing soils during groundworks. This is discussed further in Section 9.

7 Waste Disposal Assessment

The soil contamination results as presented in Appendix C have been used to help determine the waste classification of material for off-site disposal.

As an initial screen the soil results were inputted into HazWasteOnline™. This is a web-based facility that allows an assessment waste as either hazardous or non-hazardous waste based on relevant guidance and legislation^{41, 42, 43, 44, 45, 46, 47, 48, 49}.

HazWasteOnline™. has been designed to cover, amongst other waste types, the European Waste List of Waste (LoW) code number 17 "Construction and Demolition Waste (Including Excavated Soil from Contaminated Sites)".

Where less than limits of detection (LOD) were recorded, the value of the LOD was inputted.

Where applicable, appropriate metal species based on hazard statements/ molecular weight, site history, ground conditions and likely species present in soils were used (e.g. metal oxides relating to an ash based source).

The results show that all the samples tested are classified as NON-HAZARDOUS WASTE and LoW code "17-05-04 - soil and stones other than those mentioned in 17 05 03" is suitable. The HazWasteOnline™ output sheets are provided in Appendix G.

The output sheet is presented in Appendix G.

⁴¹ EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

⁴² CLP Regulation - Regulation 1272/2008/EC of 16 December 2008.

⁴³ 1st ATP - Regulation 790/2009/EC of 10 August 2009

⁴⁴ Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

⁴⁵ WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

⁴⁶ Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

⁴⁷ 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

⁴⁸ POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

⁴⁹ 2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

8 Conclusions

8.1 Geotechnical

Geotechnical observations and conclusions are contained in Table 8-1 below, more detailed discussions are contained within Section 5.

Proposed Development	Single storey classroom block for existing school with associated play areas and infrastructure.
General Ground conditions / Geotechnical Testing	Based on CP101-CP102 & WS101-WS105. - Maximum investigation depth 14.30mbgl. - Made ground up to 3.10mbgl. - Interbedded granular and cohesive material, including CLAY, SILT, SAND and GRAVEL to the completion depths of the cable percussive and window sample boreholes. - Rotary openhole boreholes encountered bedrock of Pennine Middle Coal Measures at depths of between 20.70m and 21.20mbgl. - Groundwater encountered at varying depths between 1.00m and 9.00mbgl, typically within horizons of granular material although strikes are recorded as perched groundwater within the made ground and slightly organic clay.
Allowable Bearing Pressure	Highly variable in the upper 5m, representative of the made ground and interbedded loose granular and soft cohesive strata. Below c.5.00mbgl a s_u of 150kPa can be assigned to the cohesive material and the granular strata will return and ABC of between 106 – 250kN/m ² .
Anticipated Foundation Type	Traditional shallow foundations are not expected to be suitable for the proposed development given the ground conditions encountered. It is considered that a ground improvement or piling solution is utilised.
Shallow Groundwater	Shallow groundwater identified on the site which is considered representative of perched groundwater pockets within the made ground, slightly organic clay and within the granular strata.
Concrete Requirements	Based on BRE Digest 2005 ⁵⁰ – DS-1 AC-1 recommended.
Services	Services – consideration to the presence of services running through the site. Services may need to re-routed.
Coal Mining	A mining investigation has been carried out as part of this investigation and is reported under separate cover (ref. LKC 23-1338-B1-CMSI, dated September 2023).
Temporary support of excavation	May be required; excavations should be supported following guidance contained in CIRIA R97.
Plasticity	Consideration will need to be given to the shrink / swell of the clay strata if it is to be used as founding strata, particularly where trees/hedges are present. Foundations may need to be deepened. A low to medium volume change potential has been calculated for the site.
Road / Pavement Design	Made ground should be removed to a depth of 0.50m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled, and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation through in-situ CBR tests.

Table 8-1: Geotechnical Observations and Conclusions Table.

⁵⁰ BRE (2005). "Concrete in Aggressive Ground." Special Digest 1.

8.2 Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 8-2 below (more detailed model provided in Section 6).

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users (school children and teachers) via dermal contact, ingestion and inhalation (of soil, dust, fibres and home-grown produce).	Moderate (arsenic, lead)	-Remediation recommended.
		Low (PAHs, TPHs, asbestos)	-No remediation recommended.
2	Volatile contaminants posing a risk to site users (school children and teachers) via the inhalation of vapours.	Low	-No remediation recommended.
3	Gas posing a risk to buildings and site users (school children and teachers) via the migration of gas into building causing explosion and asphyxiation.	Moderate / Low	-No remediation recommended.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	-No remediation recommended.
5	Organic contaminants posing a risk to water pipes.	Moderate	-UU risk assessment to be completed. Remediation recommended.

Table 8-2: Summary Risk Table.

8.3 Waste Assessment

The results show that all the samples tested are classified as non-hazardous for disposal.

Remedial recommendations are presented in Section 9.

9 Recommendations and Remediation Strategy

The recommendations provided below are considered appropriate for the site based on the site investigation work undertaken. LKC should stress that no remediation, enabling works or designing works should take place until Regulatory approval has been obtained.

A summary of remediation requirements is included in Table 9-1.

PL	Recommendation
1	Environmental cover system required in proposed play areas within site boundary.
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Table 9-1: Remediation Summary.

9.1 Remediation and Validation Recommendations

9.1.1 Environmental Cover System (PL1)

In gardens and soft landscaping areas, an environmental cover system will be required and should comprise 600mm depth in proposed play areas. The existing cover system soils also contain glass and should be replaced. The environmental cover system should be constructed as shown in Plate 9-1.

Either (physical break layer)		Or (geotextile membrane)	
600mm soft landscaping & play areas (minimum)	Chemically validated TOPSOIL ¹	600mm soft landscaping and play areas (minimum)	Chemically validated TOPSOIL ¹
	Chemically validated SUBSOIL		Chemically validated SUBSOIL
	100mm (minimum) PHYSICAL BREAK LAYER ²		GEOTEXTILE MEMBRANE (at base of subsoil)
Existing MADE GROUND			

Plate 9-1: Typical Environmental Cover System Construction.

Notes:

Hardstood Areas – No Remediation Required.

¹NHBC recommend 100mm minimum topsoil depth.

²Gravel break layer, minimal fines.

Where there are TPO's in influencing distance of environmental cover systems it is likely the arboriculture officer may only allow a 100mm clean cover system over a geotextile membrane.

Validation of environmental cover soils will be required and should include measuring depth using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer should also be collected.

Chemical validation of imported soils is required, details are included in Section 9.3.

9.1.2 Potable Water Pipe Remediation (PL5)

It is recommended that a Water Pipeline Assessment⁵¹ is undertaken once the location and depth of potable water pipes are known. It is likely that barrier pipe will be required. Validation of pipeline installation should include delivery notes of pipe materials, photographs of installed pipe and confirmation of connections.

9.2 Other Considerations

9.2.1 Unexpected Contamination

The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.

Impacted soils should be placed on an impermeable surface to await further assessment, treatment, or removal from site (this may be subject to chemical testing to confirm suitable waste facility). The work should be done under the supervision and instruction of an environmental consultant.

To determine that significantly impacted soils have been removed, verification samples will be collected from the base and sides of the excavation. If all impacted ground cannot be removed and contamination remains on the ground, further remediation may need to be considered.

Validation requirements should include a log of work undertaken, including photographs and details of any sampling undertaken and validation of any potential additional remedial work.

9.2.2 Decommissioning of Boreholes

Decommission all existing groundwater sampling, ground gas monitoring and groundwater level monitoring wells by grouting should be undertaken to ensure no contamination of aquifers. Any other boreholes or borehole installations encountered during groundworks should also to be decommissioned.

All borehole and borehole installation decommissioning is to be undertaken in accordance with current EA guidelines⁵².

9.2.3 Grubbing Out of In-ground Structures

Relict features including former foundations can be expected across the site wide. It is recommended that in-ground structures are grubbed out as part of the groundworks.

Hard materials can be used to generate suitable aggregates for re-use on site as part of engineered made ground and/ or construction platforms (subject to geo-environmental testing and client design specifications). Suitable materials derived from grubbing-up should be stored in a location on site, to be agreed with the Engineer, prior

⁵¹ UK Water Industry Research Limited, 2010, "Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites", Report Ref. No.: 10/WM/03/21.

⁵² Environment Agency (1996). "Decommissioning Redundant Boreholes and Wells". National Groundwater and Contaminated Land Centre.

to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

9.2.4 *Re-use of Site Generated Material*

To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used⁵³):

- 5,000 tonnes (c. 2,500m³) treatment of crushed concrete / stone.
- 1,000 tonnes (c. 500m³) use of non-hazardous soil.
- 5,000 tonnes (c. 2,500m³) use of clays, sand, gravel, brick, concrete, stone etc.
- 50,000 tonnes (c. 25,000m³) use of bituminous material to be used in roadways.

A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice⁵⁴ may be required if volumes exceed exemption limits. This must be registered before material movement starts onsite.

If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'.

For all the above material will need to be tested at the rate and analytical suites presented in Table 9-2.

9.2.5 *Stockpile Management*

Stockpiled material should be suitably managed. Material should be segregated by type and source. For example, construction / demolition arisings, site won subsoil. Stockpiles may also require covering to minimise the generation of vapours, fibres, dust, and possible nuisance to adjacent receptors, and to prevent rainwater ingress. The source of each stockpile should be recorded and appropriate validation testing for re-use or potential offsite disposal should be undertaken as required.

9.2.6 *Disposal*

Material required to be removed from site should be undertaken under an appropriate duty of care and the results of chemical analysis should be provided to a licensed landfill for confirmation of waste classification.

Waste records such as disposal tickets and waste carrier licences should be provided in the Site Completion Report. Photographic evidence of removal and waste removal tickets should be retained and included in the validation report.

9.2.7 *Control of Water*

If significant organic contamination is present or to chase out deeper obstructions some localised excavation below the groundwater table may be required. Contingency arrangements to remove groundwater (including contaminated groundwater if encountered) from excavations/ relict structures should be allowed.

⁵³ Environment Agency, February 2016, "Register or renew waste exemptions".

⁵⁴ CL:AIRE, March 2011, "The Definition of Waste: Development Industry Code of Practice", Version 2.

Small volumes of pumped fluids/ groundwater may be stored in appropriate, sealed tanks/containers and analysed for a range of determinants prior to disposal to suitable facility. Alternatively, a temporary discharge licence, including their requirements for treatment/ testing should be agreed with local utility providers (United Utilities) prior to start on site.

Where relict structures are found to retain fluid contaminants, they should be drained prior to removal.

9.2.8 Health and Safety Considerations

In working with, removing, or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance⁵⁵) should be adopted by all workers involved with site enabling and construction works.

9.2.9 Piling in Contaminated Land

If a piled foundation is being considered this may provide a preferential pathway for contaminants to the underlying aquifer. A piling risk assessment may be required. Good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency⁵⁶.

9.2.10 Asbestos in Soils Management Plan

If asbestos containing material is encountered during site clearance, earthworks, and construction, it is recommended that additional precautions are taken in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations.

LKC recommend that an appropriate 'Asbestos Management Strategy' is developed in line with CIRIA C733⁵⁷.

9.3 Validation of Imported / Site Won Soils

Chemical validation of all imported and site-won soils to be used on site in soft landscaping and play areas should be undertaken. Imported soils should be accompanied by a certificate of analysis and source details.

A summary of the required imported material sampling requirements is presented in Table 9-2 and is based on the YALPAG guidance (2021)⁵⁸. Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. Where this is not possible then material imported should be segregated based on source and soil type. Validation samples should be taken prior to placement in gardens to ensure suitability for use.

⁵⁵ Health & Safety Executive, 1991, "Protection of Workers and the General Public during the Development of Contaminated Land".

⁵⁶ Environment Agency, May 2001, "Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention", National Groundwater & Contaminated Land Centre report NC/99/73.

⁵⁷ CIRIA, March 2014, "Asbestos in soil and made ground: a guide to understanding and managing risks", C733.

⁵⁸ Yorkshire and Lincolnshire Pollution Advisory Group, June 2021, "Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants", Version 4.1.

Material Type	Source	Suite of Analysis	Sampling Rate
Topsoil / Subsoil	Greenfield / manufactured / site-won natural	Suite A*	1 sample per 50m³
	Brownfield / unknown	Suite B**	
Subsoil	Quarried sand	No testing required. Certification of material provenance is required.	
Gravel break layer	Quarried stone	No testing required. Certification of material provenance is required.	
	Recycled stone (6F2 / screened)	Suite B*	1 sample per 500m³

Table 9-2: Sampling Requirements for Imported and Site Won Soils.

Notes:

Suite A - Heavy metals, pH, water soluble sulphate, speciated PAH, soil organic matter and asbestos screen.

Suite B - Heavy metals, pH, water soluble sulphate, speciated PAH, phenol, total and free cyanide, soil organic matter, asbestos screen, banded petroleum hydrocarbons (TPH CWG), BTEX, MTBE.

*Minimum sampling rate of 3 samples per source.

**Minimum sampling rate of 6 samples per source.

Any soil with visual or olfactory evidence of hydrocarbons should be rejected. In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882⁵⁹). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against POS (residential) criteria (as used in the contamination risk assessment in Section 6).

9.4 Site Completion Report

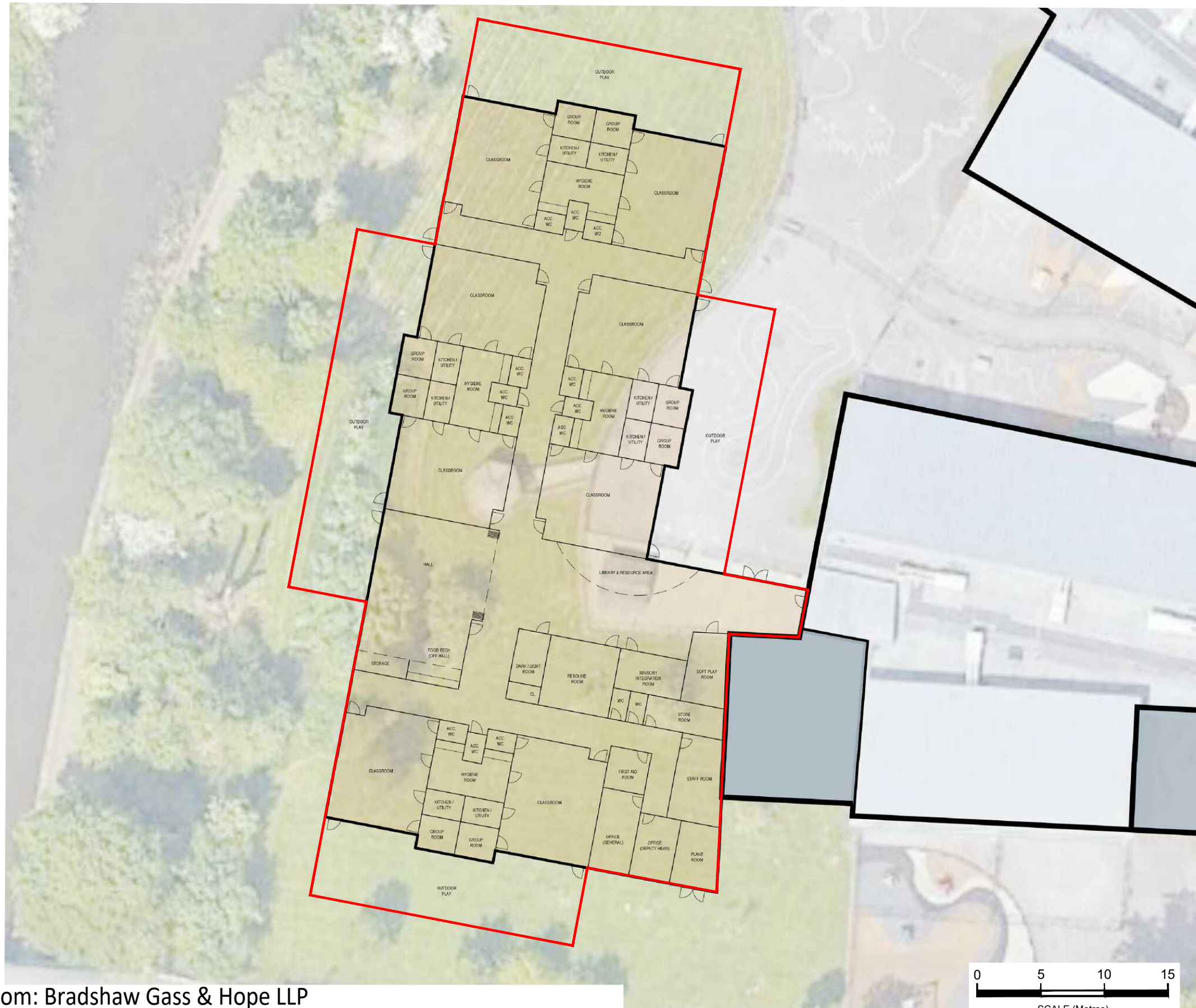
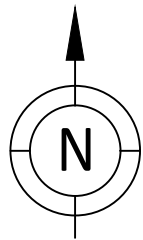
All remediation and validation work should be documented in a Site Completion Report. The Site Completion Report will allow discharge of relevant planning conditions.

⁵⁹ The British Standards Institution (BSI Standards), April 2015, "Specification for topsoil", BS 3882:2015 - TC.

Figures



Client: ISG Construction Ltd				Title: Site Location & Boundary Plan			
Site: Milward SEN School, Radcliffe				Scale (see scale bar): 1:15,000 & 1:1000 @ A4			
Job No.: LKC 23 1383	Drawn By: AE	Checked By: HM	Drawn: Jul 2023	Figure: 1	Revision:		



KEY

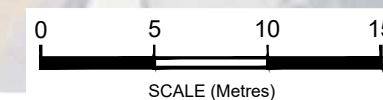
 Site Boundary

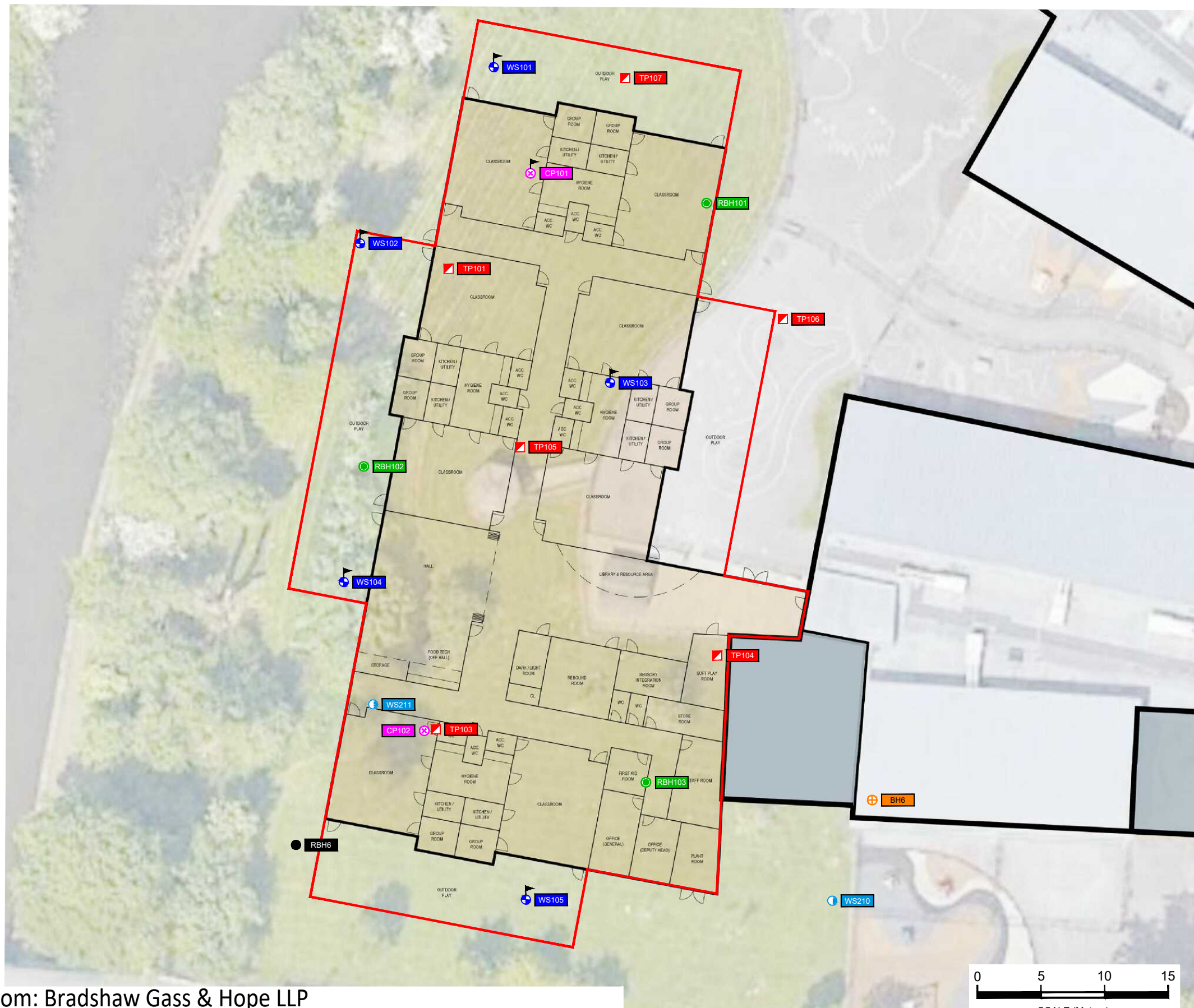
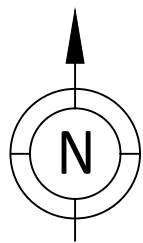
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client:			
ISG Construction Ltd			
Site:			
Millwood SEN School, Radcliffe			
Title:			
Proposed Development Plan			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 23 1383	See Scale Bar	2	
Drawn By:	Checked By:	Drawn:	
AC	HM	Aug 2023	

Extract From: Bradshaw Gass & Hope LLP
Drawing Ref: Proposed Floor Plan, No.2128.26.301, Rev:P4 (19/05/2023)





KEY

-  Site Boundary
-  Window Sample Borehole (WS)
-  Rotary Borehole (RBH)
-  Cable Percussive Borehole (CP)
-  Installation

Previous Site Investigations:

Encia Site Investigation (2005)

-  Borehole (BH)
-  Rotary Borehole (RBH)

Atkins Site Investigation (2010)

-  Window Sample Borehole (WS)

LKC Site Investigation (2010)

-  Trial Pit (TP)

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client: ISG Construction Ltd			
Site: Millwood SEN School, Radcliffe			
Title: Site Investigation Location Plan			
Job No.: LKC 23 1383	Scale (See Scale Bar): See Scale Bar	Figure: 3	Revision: A
Drawn By: AC	Checked By: EK	Drawn: Sep 2023	

Extract From: Bradshaw Gass & Hope LLP
Drawing Ref: Proposed Floor Plan, No.2128.26.301, Rev:P4 (19/05/2023)



KEY

-  Site Boundary
-  Hand Dug Trial Pit (HD)

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client:				ISG Construction Ltd	
Site:				Millwood SEN School, Radcliffe	
Title:				Drainage System Site Investigation Location Plan	
Job No.:	LKC 23 1383	Scale (See Scale Bar):	See Scale Bar	Figure:	4
Drawn By:	AC	Checked By:	JW	Drawn:	Aug 2023

Extract From: © Google Maps
Drawing Ref: Millwood SEN School, Radcliffe

Appendix A

Risk Matrix

Risk Evaluation

The method for risk evaluation is a qualitative method of interpreting the output from the risk estimation stage of the assessment, based on CIRIA 552⁶⁰. It involves the classification of the:

- Magnitude of the potential consequence (severity) of the risk occurring (Table A).
- Magnitude of the probability (likelihood) of the risk occurring (Table B).

Consequence (Severity)		
Classification	Definition	Example
Severe	- Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment 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/properties. - A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definition 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 waters. - Explosion, causing building collapse (can also equate to 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.	- Concentrations of a contaminant from site exceed generic, or site-specific assessment criteria. - Leaching of contaminants from a site to a major or minor aquifer (Principal and Secondary). - 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 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 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. - Discoloration of concrete.

Table A. Classification of Consequence

Probability (Likelihood)	
Classification	Definition
High Likelihood	- There is a pollutant 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 pollutant 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 pollutant 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.

⁶⁰ CIRIA C552 (2001) Contaminated Land Risk Assessment - A Guide to Good Practice.

Unlikely	- There is a pollutant linkage, but circumstances are such that it is improbable that an event would occur in the very long term.
-----------------	---

Table B. Classification of Probability.

These classifications are then compared to indicate the risk presented by each pollutant linkage (Table C). It is important that this classification is only applied where there is a possibility (which can range from high likelihood to unlikely) of a pollutant linkage existing.

		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 C. Comparison of Consequence against Probability

Once the risk has been determined the corresponding action can be assessed (Table D).

Risk	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 already undertaken) 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 either 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 D. Description of the Classification and Likely Action Required.

Where a very low risk is identified no specific remediation is required. Where a low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

Where there is a moderate/low risk identified, an assessment will be undertaken to establish what category the pollutant linkage will fall into.

Where LKC identifies a moderate or higher risk, remediation or further investigation work is recommended.

Appendix B

Profile Logs

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (dGPS)

377841.5 E 407151.8 N

Ground Level (mOD)

78.58

Client

ISG

**Job
Number**

LKC 23 1383

Dates

10/08/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50-1.00	ES				(1.65)	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with occasional brick fragments, coal fragments, glass and rare clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Occasional rootlets present at 0.00-0.30mbgl.			
1.20-1.65	SPT N=5		3,2/2,1,1,1	76.93	1.65 (0.35)	NO RECOVERY.			
2.00-2.45	SPT N=5		2,0/1,0,2,2	76.58	2.00 (0.45)	Brownish grey slightly sandy SILT with occasional rootlets. Sand is fine to coarse. Approximately 10% recovery at 2.00-3.00mbgl. No consistency or strength assigned due to lack of recovery.			
3.00-3.45	SPT N=7		2,2/1,2,1,3	75.58	3.00 (0.50)	Brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Approximately 10% recovery at 2.00-3.00mbgl. No consistency or strength assigned due to lack of recovery.			
3.00-3.50	D			75.08	3.50	Very soft consistency organic grey very sandy silty CLAY with occasional rootlets. Sand is fine to coarse.			
3.50-4.00	D					Medium dense grey gravelly silty SAND with occasional clay lenses. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Strata is wet.			
4.00-4.45	SPT N=13		3,2/3,3,3,4		(1.95)				
5.00-5.45	SPT N=20		5,5/5,5,5,5	73.13	5.45	Complete at 5.45m			

Remarks

Approximately 10% recovery at 2.00-3.00mbgl. No accurate consistency or strength data available.
Borehole stable.
Borehole wet within sand strata at 3.50-5.45mbgl.

**Scale
(approx)**

1:40

**Logged
By**

JW

Figure No.

LKC 23 1383.WS101

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (dGPS)

377831 E 407137.9 N

Ground Level (mOD)

78.59

Client

ISG

Job
Number
LKC 23 1383

Dates

10/08/2023

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.70-1.00	ES			77.89	(0.70)	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with occasional brick fragments, coal fragments and glass fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Occasional rootlets present to c. 0.30mbgl.			
1.00-1.20	D			77.59	(0.30)	Brown slightly silty SAND. Sand is fine to coarse.			
1.20-1.65	SPT N=3		1,0/0,1,1,1		(0.70)	Loose grey silty SAND with occasional clay lenses. Sand is fine to coarse. Strata is damp.			
1.70-2.00	D			76.89	1.70	Firm consistency medium strength slightly organic brown slightly sandy silty CLAY with occasional sand lenses. Sand is fine to coarse.			
2.00-2.45	PP 64kPa SPT N=11		10,8/3,3,2,3		(1.10)				
2.50-2.80	D			75.79	2.80	Loose to medium dense grey brown gravelly silty SAND with occasional clay lenses. Sand is medium to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Approximately 20% recovery, strata is loose and wet from 3.00mbgl.			
3.00-3.45	SPT N=4		1,0/1,0,1,2 Water strike(1) at 3.10m.		(1.90)				
3.50-4.00	D								
4.00-4.45	SPT N=10		1,2/1,2,2,5			Sand is medium dense from 4.00mbgl.			
				73.89	4.70	Very stiff grey silty CLAY.			
5.00-5.45	SPT N=26		5,3/3,8,9,6		(0.75)	Limited recovery at 4.70-5.45mbgl. Unable to undertake pocket penetrometer tests.			
				73.14	5.45	Complete at 5.45m			

Remarks

Borehole stable.
Groundwater strike at 3.10mbgl. Strata damp / wet at 1.00-1.70mbgl and 2.80-4.70mbgl.
Approximately 10% recovery at 2.00-3.00mbgl. No accurate consistency or strength data available for this strata.

Scale (approx)

1:40

Logged By

JW

Figure No.

LKC 23 1383.WS102

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (dGPS)

377850.6 E 407127 N

Ground Level (mOD)

78.59

Client

ISG

Job
Number
LKC 23 1383

Dates

10/08/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	ES			78.29	(0.30)	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with occasional coal fragments, glass and rare brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
0.50-1.00	ESD				0.30				
			Water strike(1) at 1.00m.		(1.60)	MADE GROUND: Grey and brown sandy slightly silty GRAVEL with occasional coal fragments, ash, clinker and rare brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.			
1.20-1.65	SPT N=1		1,0/0,1,0,0						
1.70-1.90	ES			76.69	1.90	Firm consistency medium strength with moderate organic odour grey very sandy silty CLAY with occasional rootlets. Sand is fine to coarse.			
2.00	PP 44kPa		0,0/0,1,1,2		(0.80)				
2.00-2.45	SPT N=4								
2.50-2.70	D			75.89	2.70	Loose to medium dense grey brown gravelly silty SAND with occasional clay lenses. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
3.00-3.45	SPT N=11		2,3/2,4,2,3			Sand is medium dense and wet from 3.00mbgl.			
3.50-4.00	D								
4.00-4.45	SPT N=8		1,2/1,2,2,3		(2.75)	Sand is loose from 4.00mbgl.			
5.00-5.45	SPT N=24		3,3/3,5,8,8			Band of silt present at 4.95-5.20mbgl. Sand is medium dense from 5.00mbgl.			
				73.14	5.45	Complete at 5.45m			

Remarks

Borehole stable.
Groundwater strike at 1.00mbgl. Borehole is wet within sand strata a 2.70-5.45mbgl.

Scale (approx)

1:40

Logged By

JW

Figure No.

LKC 23 1383.WS103

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (dGPS)

377823.5 E 407106.4 N

Ground Level (mOD)

78.77

Client

ISG

Job
Number

LKC 23 1383

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.30-1.00	ES			78.47	(0.30) 0.30	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with frequent rootlets occasional brick fragments, coal fragments and rare glass fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
1.20-1.65	SPT N=0		1,0/0,0,0,0		(1.30)	MADE GROUND: Dark brownish grey very gravelly slightly sandy SILT with occasional brick fragments, clinker, ash and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
1.80-2.00	ESD			77.17	1.60	Brown slightly gravelly very silty SAND. Sand is fine to medium. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
2.00-2.45	SPT N=5		1,1/1,1,1,2 Water strike(1) at 2.10m.	76.77	2.00	Loose to medium dense brown slightly gravelly slightly silty SAND with occasional clay lenses. Strata is slightly damp. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded comprising sandstone. Sand is loose from 2.00mbgl.			
2.50-3.00	D								
3.00-3.45	SPT N=12		1,0/4,4,2,2		(3.00)	Sand is medium dense from 3.00mbgl.			
4.00-4.45	SPT N=8		3,2/2,2,2,2			Sand is loose from 4.00mbgl.			
4.50-5.00	D								
5.00-5.45	SPT N=30		5,5/7,6,7,10	73.77	5.00	Sand is medium dense to dense from 5.00mbgl. Complete at 5.45m			

Remarks

Borehole stable.
Groundwater strike at 2.10mbgl.

Scale (approx)

1:40

Logged By

JW

Figure No.

LKC 23 1383.WS104

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (dGPS)

377844 E 407086.3 N

Ground Level (mOD)

78.55

Client

ISG

Job
Number

LKC 23 1383

Dates

10/08/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50-1.00	ES			78.25	(0.30) 0.30	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with frequent rootlets occasional brick fragments, coal fragments and rare glass fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
1.20-1.65	SPT N=6		1,1/2,2,1,1	77.35	(0.90) 1.20	MADE GROUND: Dark brown slightly gravelly sandy SILT with occasional rootlets, brick fragments, coal fragments, wood and rare metal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. Slight organic odour.			
1.65-1.80 1.80-2.00	PP 88kPa ES D			76.85	(0.50) 1.70	Stiff consistency high strength brown and grey mottled slightly sandy silty CLAY. Sand is fine to coarse.			
2.00-2.45	SPT N=6		1,1/1,1,1,3			Very loose to medium dense brown slightly gravelly slightly silty SAND with occasional clay lenses. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded comprising sandstone. Sand is loose and damp from 2.00mbgl.			
3.00-3.45	SPT N=3		0,0/0,1,1,1			Sand is very loose from 3.00mbgl			
3.50-4.00	D				(3.75)				
4.00-4.45	SPT N=13		3,4/4,3,3,3			Sand is medium dense from 4.00mbgl.			
5.00-5.45	SPT N=24		3,3/3,5,7,9	73.10	5.45	Complete at 5.45m			

Remarks

Borehole stable.
Borehole damp within sand strata at 1.70-5.45mbgl.

Scale (approx)

1:40

Logged By

JW

Figure No.

LKC 23 1383.WS105

Boring Method

Hand dug to 1.20mbgl. Cased to 13.50mbgl.

Casing Diameter

150mm to 13.50mbgl

Ground Level (mOD)

78.62

Client

ISG

Job Number

LKC 23 1383

Location (dGPS)

377844.4 E 407143.4 N

Dates

01/08/2023

Engineer

LKC

Sheet

1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.20-1.65 1.20-1.65	SPT(C) N=10 D			2,2/3,2,2,3	78.02	(0.60) 0.60	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with frequent rootlets, occasional brick and coal fragments, and rare glass fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
1.80 2.00-2.45 2.00-2.45	D SPT N=9 D			1,2/3,3,2,1	76.82	(1.20) 1.80	MADE GROUND: Dark brownish grey very gravelly slightly sandy SILT with occasional ash, brick fragments, coal fragments, clinker and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
3.00-3.45 3.00-3.45	SPT N=4 D,			1,1/1,1,1,1	75.62	(1.20) 3.00	Loose dark greyish brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium, angular to subangular comprising quartz, mudstone, siltstone and sandstone. From 2.00mbgl: Pockets of soft consistency brown silty CLAY.			
4.00-4.45 4.00-4.45	SPT N=5 D			1,1/2,1,1,1		(2.40)	Soft consistency slightly organic dark brownish grey slightly gravelly sandy silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is fine, angular to subangular comprising quartz, mudstone, siltstone and sandstone.			
5.00-5.45 5.00-5.45	D SPT N=6			Water strike(1) at 5.00m, rose to 3.10m in 20 mins, sealed at 3.10m. 1,2/0,0,2,4	73.22	5.40 (0.60)	From 4.00mbgl: Becomes firm to stiff consistency.			
6.00-6.45 6.00-6.45	SPT N=13 D,			9,4/2,2,4,5	72.62	6.00 (2.20)	Dark greyish brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium, angular to subrounded comprising quartz, mudstone, siltstone and sandstone.			
7.50-7.95 7.50-7.95	SPT N=21 D			3,4/5,5,6,5	70.42	8.20	Medium dense dark greyish brown very silty SAND and GRAVEL with pockets of very soft grey SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded comprising quartz, chert, flint, mudstone, siltstone, and mudstone.			
9.00-9.45 9.00-9.43	D SPT 50/275			Water strike(2) at 9.00m, rose to 6.90m in 20 mins, sealed at 6.90m. 12,11/12,14,14,10			From 7.50mbgl: Increasing silt content.			
							Stiff to very stiff consistency dark brown gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising mudstone, siltstone, sandstone and coal. From 8.20mbgl: Clay is desiccated and friable.			

Remarks

Borehole stable. Groundwater encountered at 5.00mbgl and 9.00mbgl.
Cable tool stuck in very stiff clay at 14.30mbgl. Standing time 1 hour on 10.08.2023 and 2.5 hours on 11.08.2023.
Chiselling from 9.00m to 13.50m.

Scale (approx)

1:50

Logged By

EK

Figure No.

LKC 23 1383.CP101

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Millwood SEN Primary School, Radcliffe

**Borehole
Number
CP101****Boring Method**Hand dug to 1.20mbgl. Cased
to 13.50mbgl.**Casing Diameter**

150mm to 13.50mbgl

Ground Level (mOD)

78.62

Client

ISG

**Job
Number
LKC 23 1383****Location (dGPS)**

377844.4 E 407143.4 N

Dates

01/08/2023

Engineer

LKC

**Sheet
2/2**

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.50-10.79 10.50-10.95	SPT 50/140 D,			9,18/26,24		(6.10)				
12.00-12.26 12.00-12.45	SPT 25*/135 50/125 D			11,14/28,22						
13.50-13.53 13.50-13.95	SPT 25*/20 50/10 D			25/50						
					64.32	14.30	Complete at 14.30m			

RemarksBorehole stable. Groundwater encountered at 5.00mbgl and 9.00mbgl.
Cable tool stuck in very stiff clay at 14.30mbgl. Standing time 1 hour on 10.08.2023 and 2.5 hours on 11.08.2023.**Scale
(approx)**

1:50

**Logged
By**

EK

Figure No.

LKC 23 1383.CP101

Boring Method

Cased to 5.00mbgl.
Hand excavated to 1.20mbgl.

Casing Diameter

150mm to 5.00m

Ground Level (mOD)

78.65

Client

ISG

Job Number

LKC 23 1383

Location (dGPS)

377836 E 407099.6 N

Dates

11/08/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.20-1.65 1.20-1.65	SPT(C) N=9 D			2,2/2,3,2,2	78.35	(0.30) 0.30	MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with frequent rootlets, occasional brick and coal fragments, and rare glass fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
2.00-2.45 2.00-2.45	SPT(C) N=8 D			2,2/1,2,2,3		(2.20)	MADE GROUND: Dark brownish grey very gravelly slightly sandy SILT with occasional brick fragments, coal fragments, clinker and ash. Sand is fine to coarse, Gravel is fine to coarse, subangular to subrounded comprising sandstone.			
3.00-3.45 3.00-3.45	SPT N=7 D,			2,2/1,3,2,1	76.15	2.50	Soft consistency dark greyish brown slightly gravelly sandy clayey SILT. Sand is fine to coarse. Gravel is fine, angular to subangular comprising flint, sandstone, siltstone, mudstone, quartz and chert. From 3.00mbgl: Pockets of very soft consistency brown silty CLAY.			
4.00-4.45 4.00-4.45	SPT N=10 D			2,2/3,2,2,3		(2.00)	From 4.00mbgl: Increasing sand content.			
4.50	D				74.15	4.50				
4.80	D				73.85	(0.30) 4.80	Brown slightly sandy slightly silty GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded comprising flint, chert, quartz, sandstone, siltstone and mudstone. Cobbles are subrounded to rounded comprising sandstone.			
5.00-5.43 5.00-5.43	SPT 50/275 D			9,9/10,10,16,14	73.22	(0.63) 5.43	Stiff to very stiff consistency brown slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse comprising mudstone, siltstone, sandstone and coal. From 5.00mbgl: Becomes very stiff.			
							Complete at 5.43m			

Remarks

Borehole completed at 5.43mbgl due to SPT refusal.
Borehole stable. No groundwater encountered.

Scale (approx)

1:50

Logged By

EK

Figure No.

LKC 23 1383.CP102



LK CONSULT LTD
Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com

Site
Millwood SEN Primary School, Radcliffe

Borehole Number
RBH101

Machine : Baretta T41 Flush : Air Mist Core Dia : 100 mm Method : Rotary Cored	Casing Diameter	Ground Level (mOD) 78.29	Client ISG	Job Number LKC 23 1383
	Location (dGPS) 377858.2 E 407141.1 N	Dates 16/08/2023- 17/08/2023	Engineer LKC	Sheet 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						78.14	0.15	MADE GROUND: Topsoil.		
							(2.95)	MADE GROUND: Ash and brickfill.		
						75.19	3.10	Stiff light grey and brown CLAY with sand and gravel bands.		
							(18.10)			
						57.09	21.20	Light grey SANDSTONE with mudstone bands.		
							(9.60)			
						47.49	30.80	Light grey MUDSTONE.		
							(11.20)			

Remarks Borehole dry. Strata descriptions derived from drillers logs. Borehole dry.								Scale (approx) 1:200		Logged By JW	
								Figure No. LKC 23 1383.RBH101			



Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						36.29	42.00 (1.50)	Shaley COAL (intact).		
						34.79	43.50	Dark grey MUDSTONE.		
						34.49	43.80 (0.90)	COAL seam (intact).		
						33.59	44.70	Dark grey MUDSTONE.		
							(5.30)			
						28.29	50.00	Complete at 50.00m		

Remarks Strata descriptions derived from drillers logs.	Scale (approx) 1:200	Logged By JW
	Figure No. LKC 23 1383.RBH101	
	(Empty space for additional remarks or notes)	

[illegible]

Produced by the GEotechnical DAtabase SYstem (GEODASY) © all rights reserved

**LK CONSULT LTD**Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com**Site**

Millwood SEN Primary School, Radcliffe

**Borehole
Number****RBH103****Machine :** Baretta T41**Flush :** Air Mist**Core Dia:** 100 mm**Method :** Rotary Cored**Casing Diameter****Ground Level (mOD)**

78.30

Client

ISG

**Job
Number**

LKC 23 1383

Location (dGPS)

377853.5 E 407095.6 N

Dates21/08/2023-
22/08/2023**Engineer**

LKC

Sheet

1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						78.15	0.15	MADE GROUND: Topsoil.		
							(2.35)	MADE GROUND: Ash and brickfill.		
						75.80	2.50	Dark grey stiff CLAY with bands of sand and gravel with occasional large boulders.		
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										

RemarksBorehole dry.
Strata descriptions derived from drillers logs.
Borehole dry.**Scale
(approx)**

1:200

**Logged
By**

JW

Figure No.

LKC 23 1383.RBH101



LK CONSULT LTD
Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS
Tel: 0161 763 7200 web: www.thelkgroup.com

Site
Millwood SEN Primary School, Radcliffe
Borehole Number
RBH103

Machine : Baretta T41 Flush : Air Mist Core Dia : 100 mm Method : Rotary Cored			Casing Diameter		Ground Level (mOD) 78.30	Client ISG		Job Number LKC 23 1383	
			Location (dGPS) 377853.5 E 407095.6 N		Dates 21/08/2023- 22/08/2023	Engineer LKC		Sheet 2/2	

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						36.80	41.50 (1.50)	COAL (intact).		
						35.30	43.00	Dark grey shaley MUDSTONE.		
						35.00	43.30 (0.30)	COAL (intact).		
						34.10	44.20	Dark grey MUDSTONE.		
							(5.80)			
						28.30	50.00	Complete at 50.00m		

Remarks Strata destriptions derived from drillers logs.								Scale (approx) 1:200	Logged By JW
								Figure No. LKC 23 1383.RBH101	

Appendix C

Certificates of Analysis – Soil



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-10600

Site Reference: Milwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383- EK

Sample Receipt Date: 17/08/2023

Sample Scheduled Date: 17/08/2023

Report Issue Number: 1

Reporting Date: 23/08/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-10600	Date Sampled	None Supplied				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Milwood SEN School, Radcliffe	TP / BH No	WS102				
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied				
Order No: LKC231383- EK	Depth (m)	0.70 - 1.00				
Reporting Date: 23/08/2023	DETS Sample No	670489				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	8.1			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	14			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01			
Organic Matter (SOM)	%	< 0.1	MCERTS	1.9			
Arsenic (As)	mg/kg	< 2	MCERTS	5			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	10			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	22			
Lead (Pb)	mg/kg	< 3	MCERTS	14			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	13			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	12			
Zinc (Zn)	mg/kg	< 3	MCERTS	66			

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



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



Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-10600	Date Sampled	None Supplied				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Milwood SEN School, Radcliffe	TP / BH No	WS102				
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied				
Order No: LKC231383- EK	Depth (m)	0.70 - 1.00				
Reporting Date: 23/08/2023	DETS Sample No	670489				

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



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-10600	
LK Consult Limited	
Site Reference: Milwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383- EK	
Reporting Date: 23/08/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 670489	WS102	None Supplied	0.70 - 1.00	14.5	Brown sandy clay

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

Insufficient Sample ^{1/S}

Unsuitable Sample ^{u/S}

^ no sampling date provided; unable to confirm if samples are within acceptable holding times



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



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-10600

LK Consult Limited

Site Reference: Milwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383- EK

Reporting Date: 23/08/2023

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators	
DETS Report No: 23-10600	
LK Consult Limited	
Site Reference: Milwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383- EK	
Reporting Date: 23/08/2023	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-10585

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Sample Receipt Date: 17/08/2023

Sample Scheduled Date: 17/08/2023

Report Issue Number: 1

Reporting Date: 23/08/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-10585	Date Sampled	16/08/23	16/08/23	16/08/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	TS101	TS102	TS103		
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 23/08/2023	DETS Sample No	670447	670448	670449		

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	7.3	7.1	6.8		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	58	20	< 10		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.02	< 0.01		
Organic Matter (SOM)	%	< 0.1	MCERTS	6.6	5.2	4.1		
Arsenic (As)	mg/kg	< 2	MCERTS	14	10	7		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	10	9	7		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	43	30	25		
Lead (Pb)	mg/kg	< 3	MCERTS	82	57	48		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	12	8	7		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	19	15	12		
Zinc (Zn)	mg/kg	< 3	MCERTS	61	50	45		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

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



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



Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-10585	Date Sampled	16/08/23	16/08/23	16/08/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	TS101	TS102	TS103		
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 23/08/2023	DETS Sample No	670447	670448	670449		

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	0.13	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.85	0.88	0.76	
Anthracene	mg/kg	< 0.1	MCERTS	0.18	0.15	0.16	
Fluoranthene	mg/kg	< 0.1	MCERTS	1.15	1.30	1.07	
Pyrene	mg/kg	< 0.1	MCERTS	1.04	1.20	0.97	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.44	0.50	0.42	
Chrysene	mg/kg	< 0.1	MCERTS	0.48	0.51	0.43	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.43	0.46	0.40	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.13	0.15	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.36	0.38	0.33	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.19	0.18	0.17	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.16	0.16	0.16	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.6	5.9	5	



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



Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 23-10585	Date Sampled	16/08/23	16/08/23	16/08/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	TS101	TS102	TS103		
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 23/08/2023	DETS Sample No	670447	670448	670449		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS 1D MS AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8 : HS 1D MS AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C21 - C34 : EH CU 1D AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21		
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C12 - C16 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	5	5	5		
Aromatic >C21 - C35 : EH CU 1D AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10		
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21		
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42	< 42	< 42		



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



Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-10585	Date Sampled	16/08/23	16/08/23	16/08/23		
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	TS101	TS102	TS103		
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 23/08/2023	DETS Sample No	670447	670448	670449		

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5		



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-10585	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 23/08/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
670447	TS101	None Supplied	None Supplied	16.5	Black loamy sand with vegetation
670448	TS102	None Supplied	None Supplied	17.7	Black loamy sand with vegetation
670449	TS103	None Supplied	None Supplied	18.5	Black loamy sand with vegetation

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

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}



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



Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-10585	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 23/08/2023	

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators	
DETS Report No: 23-10585	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 23/08/2023	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-10498

Site Reference: Milwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Sample Receipt Date: 16/08/2023

Sample Scheduled Date: 16/08/2023

Report Issue Number: 1

Reporting Date: 24/08/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate					
DETS Report No: 23-10498	Date Sampled	10/08/23	10/08/23	10/08/23	10/08/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Milwood SEN School, Radcliffe	TP / BH No	WS101	WS103	WS104	WS105
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC231383-EK	Depth (m)	0.50 - 1.00	1.70 - 1.90	0.30 - 1.00	0.50 - 1.00
Reporting Date: 24/08/2023	DETS Sample No	669898	669900	669901	669902

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.5	6.7	6.2	7.2
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	14	57	62	19
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01	0.06	0.06	0.02
Organic Matter (SOM)	%	< 0.1	MCERTS	12.7	24.6	37.9	11.3
W/S Chloride (2:1)	mg/kg	< 1	MCERTS		13		6
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS		6.5		3
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS		8		10
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS		3.9		5
Arsenic (As)	mg/kg	< 2	MCERTS	52	241	172	39
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	< 0.2	0.6	0.4
Chromium (Cr)	mg/kg	< 2	MCERTS	16	32	33	18
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	114	442	277	111
Lead (Pb)	mg/kg	< 3	MCERTS	182	873	547	242
W/S Magnesium	mg/l	< 0.1	NONE		1.2		1.4
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	26	76	93	23
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	44	150	167	40
Zinc (Zn)	mg/kg	< 3	MCERTS	92	279	279	142
EPH (C10 - C40) : EH 1D Total	mg/kg	< 6	MCERTS	16		< 6	

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

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



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



Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-10498	Date Sampled	10/08/23	10/08/23	10/08/23	10/08/23	
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Milwood SEN School, Radcliffe	TP / BH No	WS101	WS103	WS104	WS105	
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: LKC231383-EK	Depth (m)	0.50 - 1.00	1.70 - 1.90	0.30 - 1.00	0.50 - 1.00	
Reporting Date: 24/08/2023	DETS Sample No	669898	669900	669901	669902	

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.15
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.41
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.23
Phenanthrene	mg/kg	< 0.1	MCERTS	0.35	< 0.1	0.20	2.40
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.49
Fluoranthene	mg/kg	< 0.1	MCERTS	0.51	< 0.1	0.28	3.20
Pyrene	mg/kg	< 0.1	MCERTS	0.48	< 0.1	0.25	2.85
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.24	< 0.1	< 0.1	0.95
Chrysene	mg/kg	< 0.1	MCERTS	0.27	< 0.1	< 0.1	1.31
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.29	< 0.1	< 0.1	1.12
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.31
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.20	< 0.1	< 0.1	0.99
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	0.41
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.36
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.5	< 1.6	< 1.6	15.2

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



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-10498	
LK Consult Limited	
Site Reference: Milwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 24/08/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
669898	WS101	None Supplied	0.50 - 1.00	19.5	Black sandy clay with stones
669900	WS103	None Supplied	1.70 - 1.90	42.8	Black sludge with stones
669901	WS104	None Supplied	0.30 - 1.00	20.6	Black sandy gravel with stones and concrete
669902	WS105	None Supplied	0.50 - 1.00	20.4	Black sandy clay

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

Insufficient Sample ^{1/5}

Unsuitable Sample ^{1/5}



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



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-10498

LK Consult Limited

Site Reference: Milwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 24/08/2023

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators

DETS Report No: 23-10498

LK Consult Limited

Site Reference: Milwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 24/08/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
—	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym

EPH (C10 - C40) - EH_1D_Total



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-10487

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Sample Receipt Date: 16/08/2023

Sample Scheduled Date: 16/08/2023

Report Issue Number: 1

Reporting Date: 21/08/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-10487	Date Sampled	10/08/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	WS101				
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied				
Order No: LKC231383-EK	Depth (m)	3.00 - 3.50				
Reporting Date: 21/08/2023	DETS Sample No	669850				

Determinand	Unit	RL	Accreditation				
Organic Matter (SOM)	%	< 0.1	MCERTS	2.8			
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.6			

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



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-10487	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 21/08/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
669850	WS101	None Supplied	3.00 - 3.50	16	Grey sandy clay

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

Insufficient Sample ¹/s

Unsuitable Sample ^u/s



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



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-10487

LK Consult Limited

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 21/08/2023

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators

DETS Report No: 23-10487

LK Consult Limited

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 21/08/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
—	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym

Appendix D

Certificates of Analysis - Geotechnical



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-11065

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Sample Receipt Date: 31/08/2023

Sample Scheduled Date: 31/08/2023

Report Issue Number: 1

Reporting Date: 05/09/2023

Authorised by:

Kevin Old
Operations Director

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-11065	Date Sampled	10/08/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	CP101				
Project / Job Ref: LKC 23 1383	Additional Refs	None Supplied				
Order No: LKC231383-EK	Depth (m)	4.50				
Reporting Date: 05/09/2023	DETS Sample No	672543				

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	7.0			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	23			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02			

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



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-11065	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 05/09/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
\$ 672543	CP101	None Supplied	4.50	6.9	Brown gravelly sand with stones

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

Insufficient Sample ^{1/S}

Unsuitable Sample ^{U/S}

\$ samples exceeded recommended holding times



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



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-11065

LK Consult Limited

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 05/09/2023

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators	
DETS Report No: 23-11065	
LK Consult Limited	
Site Reference: Millwood SEN School, Radcliffe	
Project / Job Ref: LKC 23 1383	
Order No: LKC231383-EK	
Reporting Date: 05/09/2023	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym

TEST REPORT

Client LK Consult Ltd

Address Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Greater Manchester
M26 2ZS

Contract LKC 23 1383 -
Millwood SEN School

Job Number MRN 4606/97
Date of Issue 15 September 2023
Page 1 of 8

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

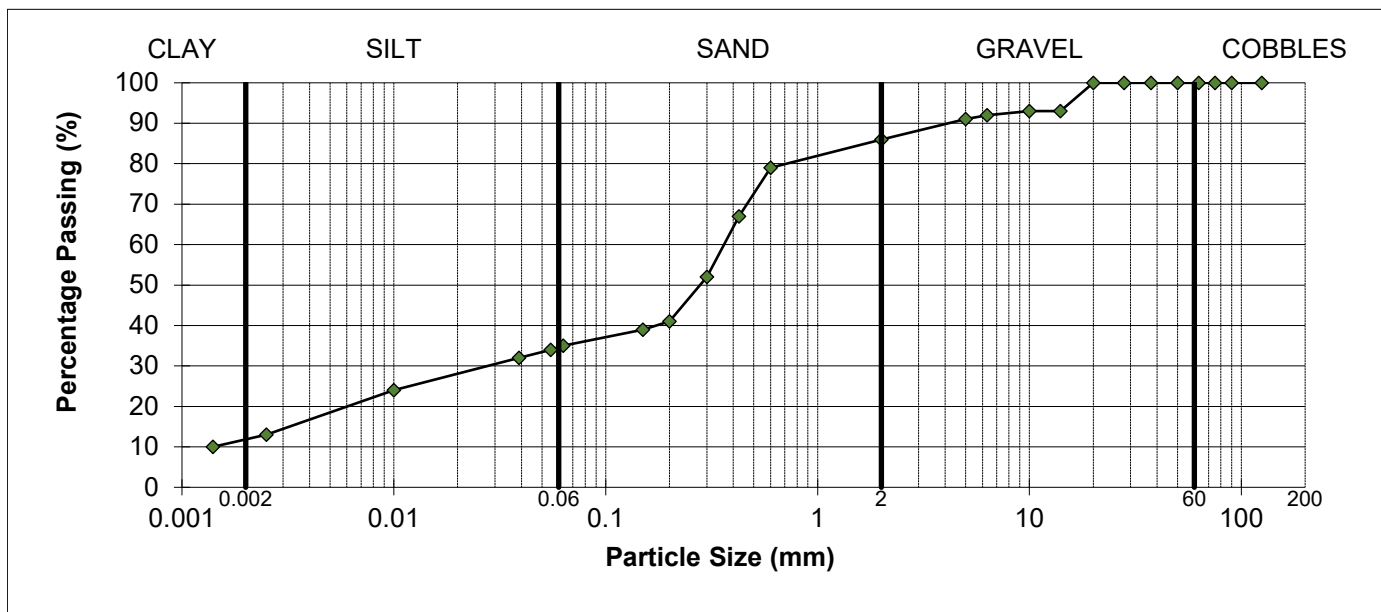
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	LK Consult Ltd		
SITE	LKC 23 1383 - Millwood SEN School		
JOB NUMBER	MRN 4606/97		

SAMPLE LABEL	CP101 6.00-6.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	130881	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	86	
90	100		0.6	79	
75	100		0.425	67	
63	100		0.3	52	
50	100		0.2	41	
37.5	100		0.15	39	
28	100		0.063	35	
20	100		0.055	34	
14	93		0.039	32	
10	93		0.01	24	
6.3	92		0.0025	13	
5	91		0.0014	10	



REMARKS

As received water content = 19.5%

SIGNED

NAME


O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

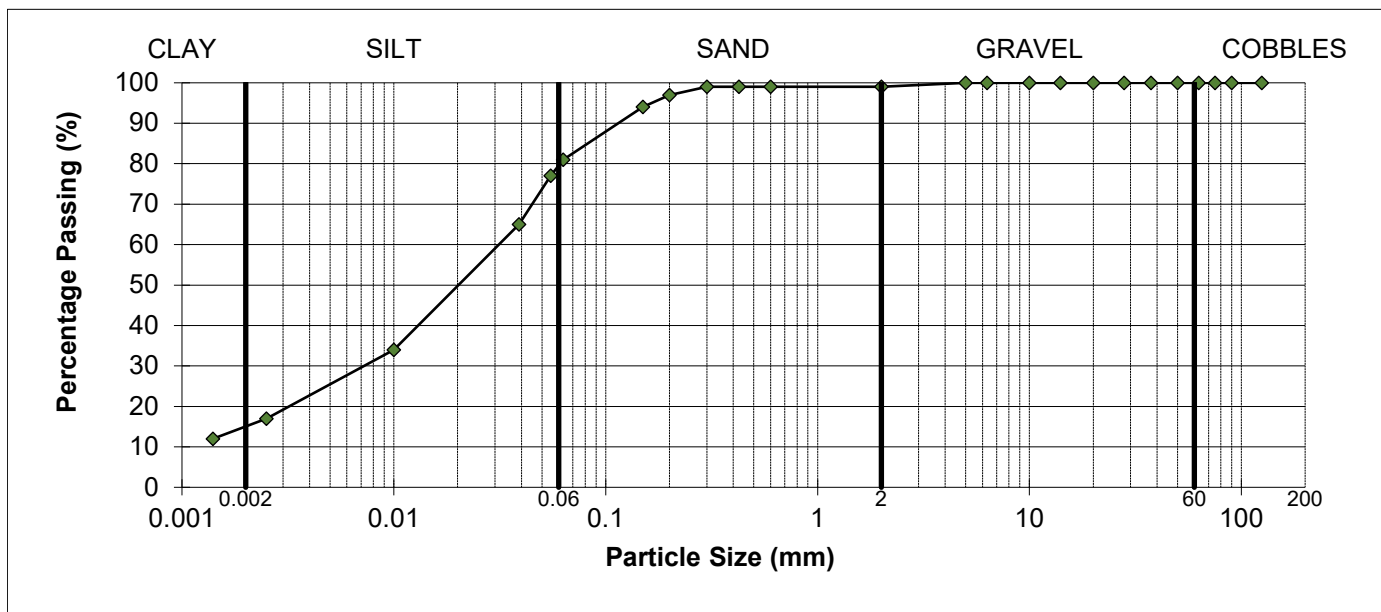
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP102 3.00-3.45m	DATE SAMPLED	Not advised
LAB SAMPLE No	130883	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	99	
90	100		0.6	99	
75	100		0.425	99	
63	100		0.3	99	
50	100		0.2	97	
37.5	100		0.15	94	
28	100		0.063	81	
20	100		0.055	77	
14	100		0.039	65	
10	100		0.01	34	
6.3	100		0.0025	17	
5	100		0.0014	12	



REMARKS

As received water content = 16.0%

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

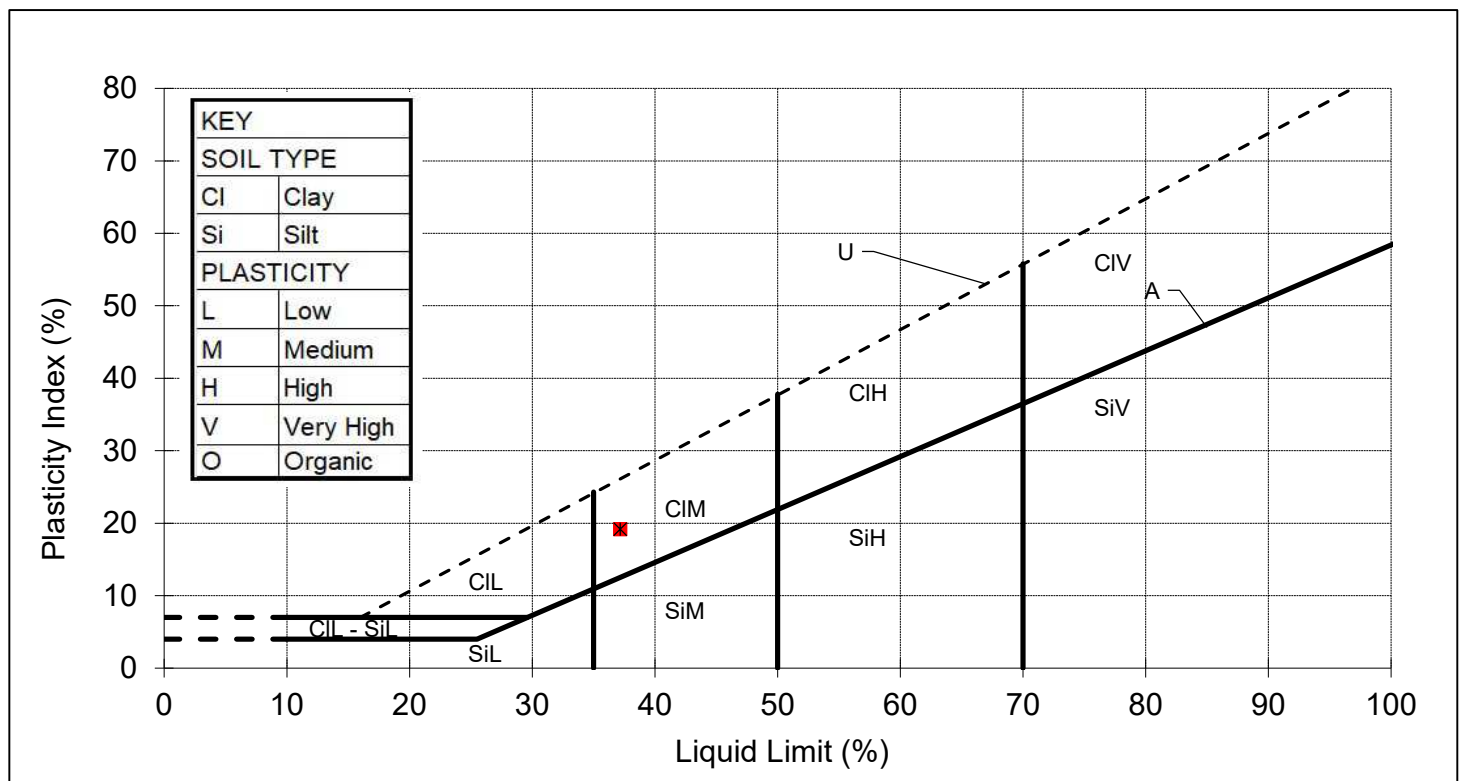
CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP101 3.00-3.45m	DATE SAMPLED	Not advised
SAMPLE No.	130879	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	23.7	39.3	0.954	
Determination 2 (avg)	22.9	38.6		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20.5	37	18	19	95



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

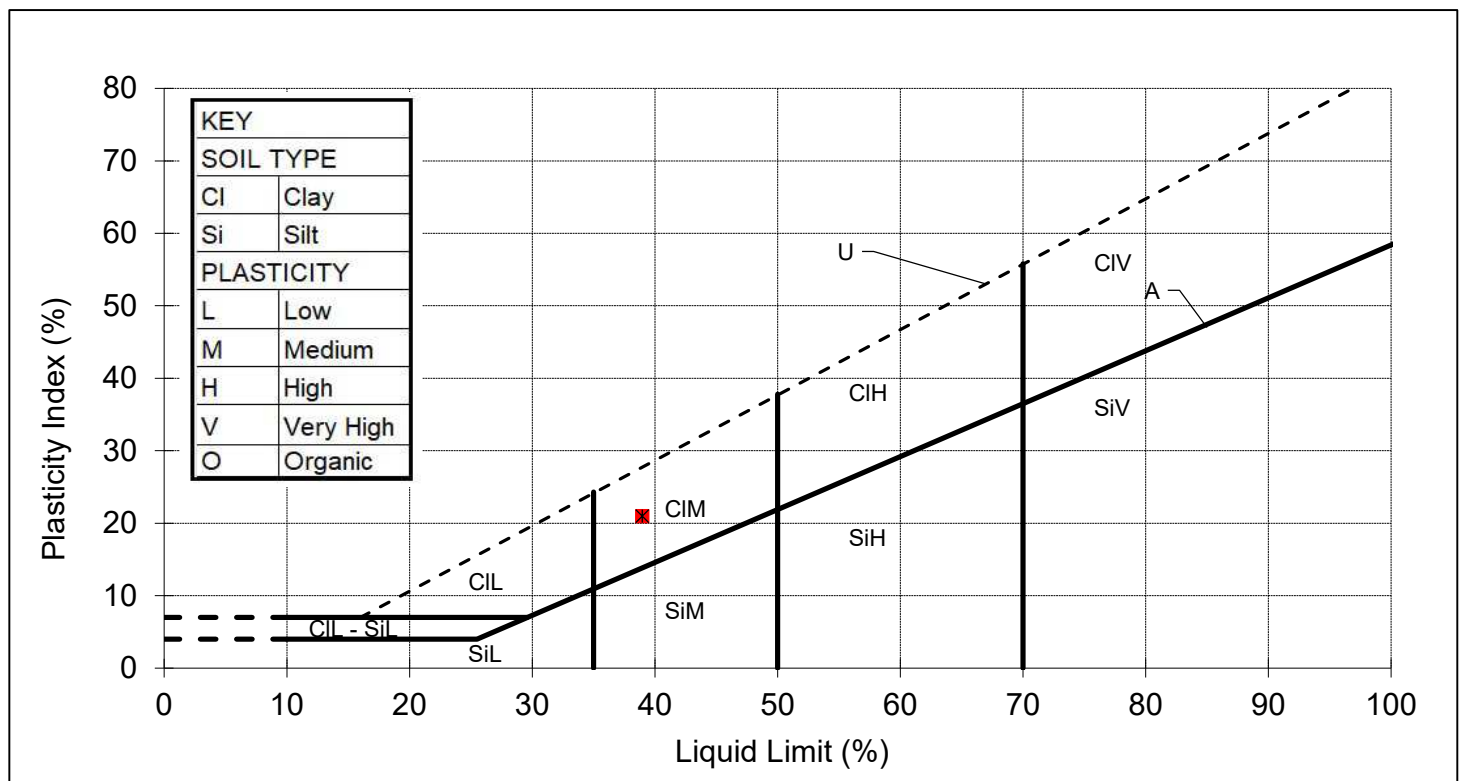
CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP101 4.00-4.45m	DATE SAMPLED	Not advised
SAMPLE No.	130880	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.8	40.1	0.976	
Determination 2 (avg)	21.5	39.8		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20.5	39	18	21	90



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

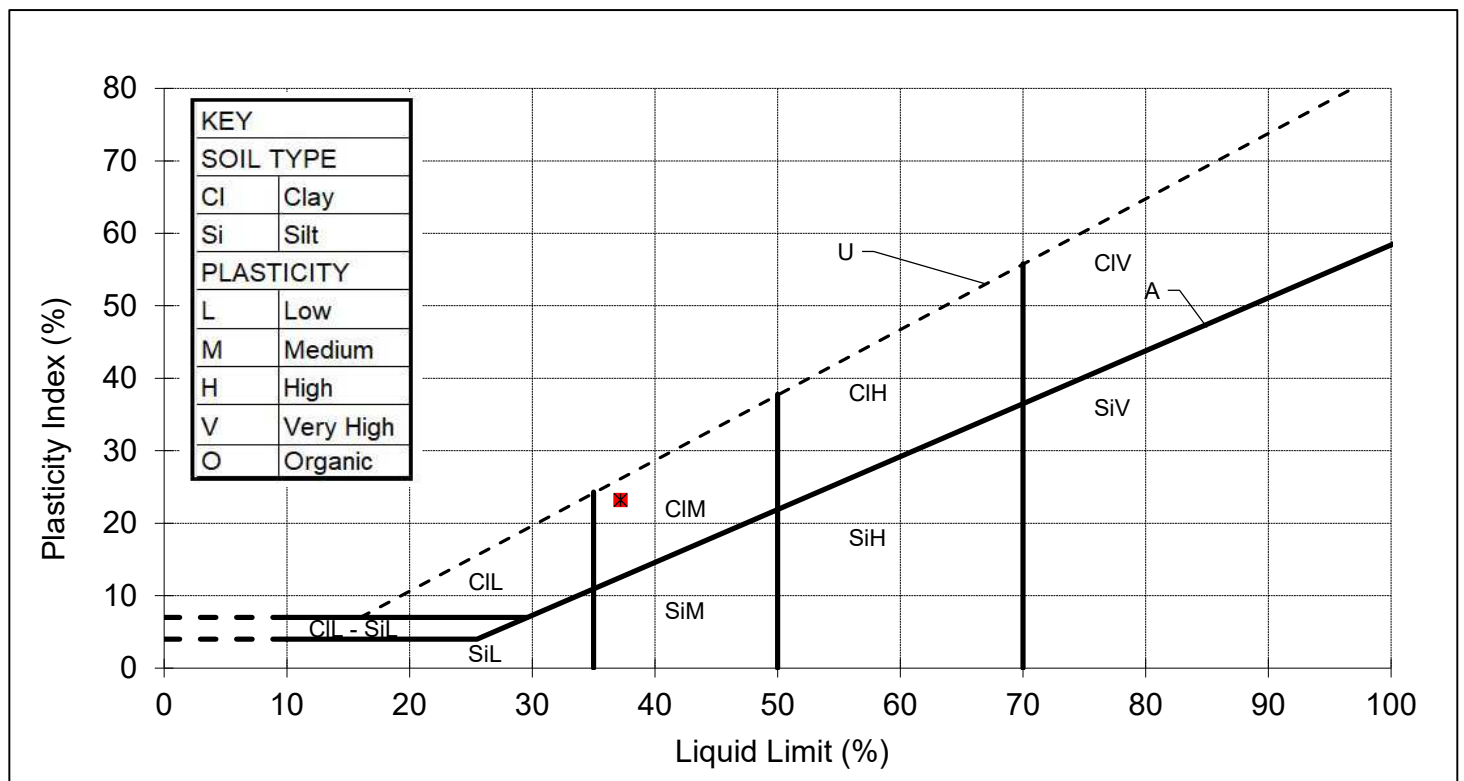
CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP101 10.50-10.95m	DATE SAMPLED	Not advised
SAMPLE No.	130882	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.2	37.2	1.001	
Determination 2 (avg)	19.8	37.1		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
11.5	37	14	23	84



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

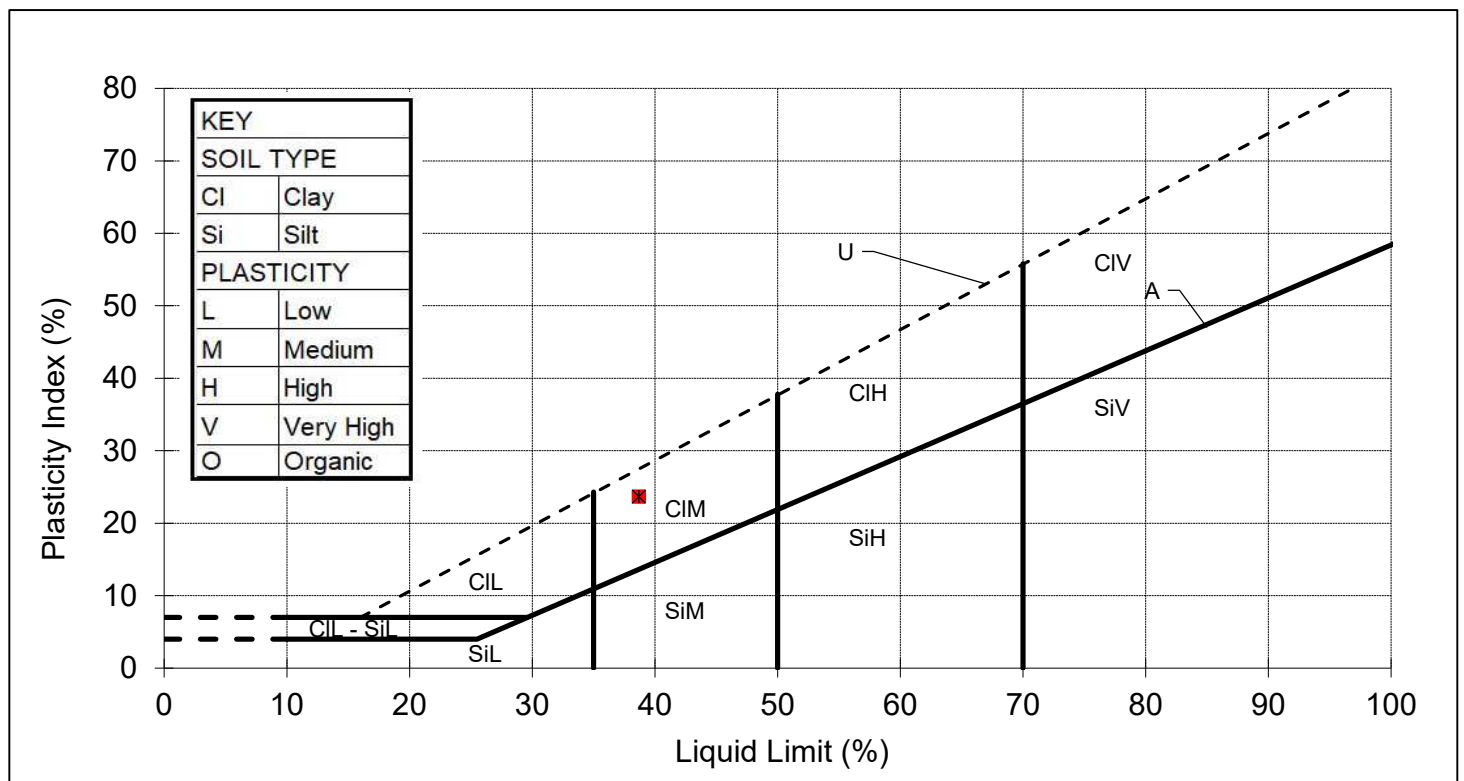
CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP102 3.00-3.45m	DATE SAMPLED	Not advised
SAMPLE No.	130883	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.1	39.5	0.986	
Determination 2 (avg)	20.7	39.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
16.0	39	15	24	99



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

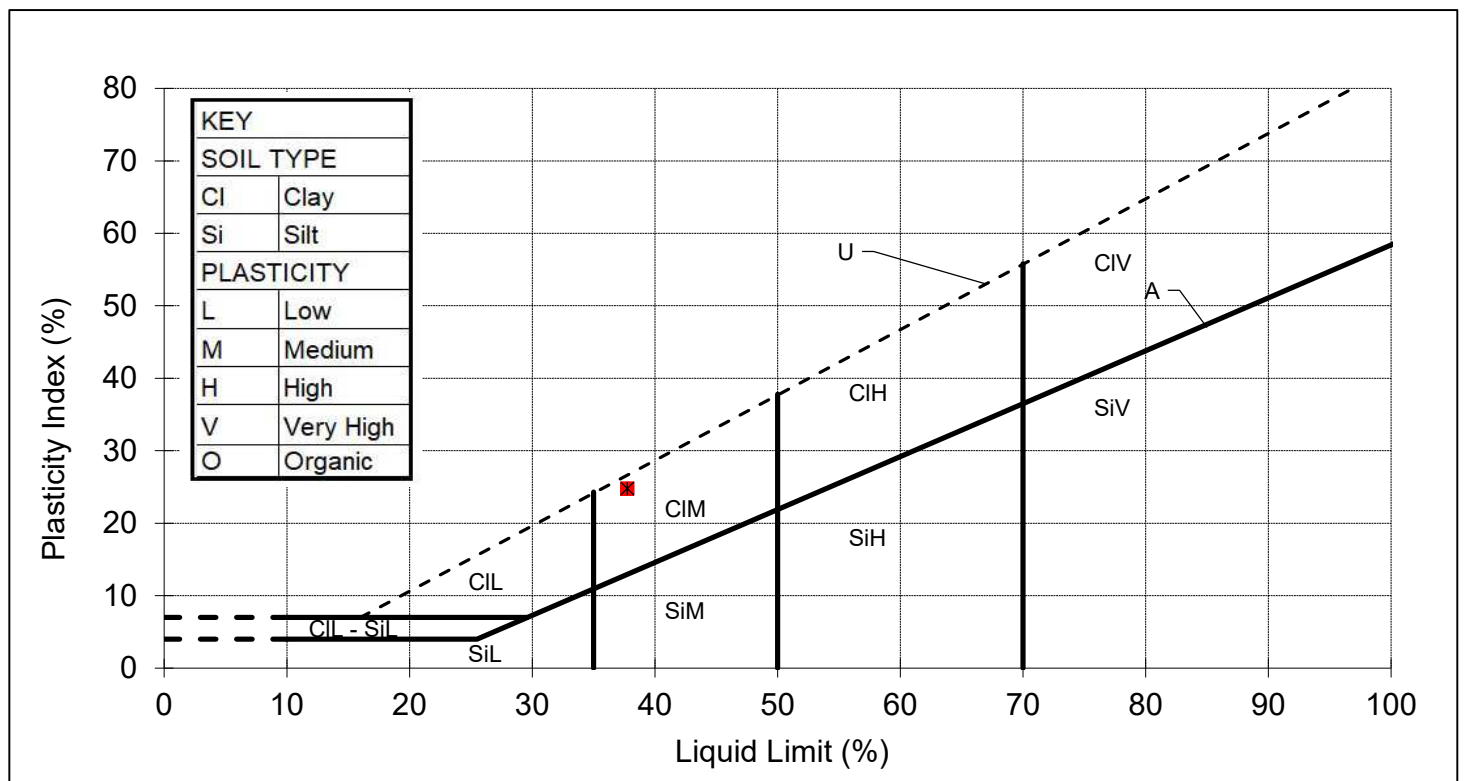
CLIENT	LK Consult Ltd
SITE	LKC 23 1383 - Millwood SEN School
JOB NUMBER	MRN 4606/97

SAMPLE LABEL	CP102 5.00-5.45m	DATE SAMPLED	Not advised
SAMPLE No.	130884	DATE RECEIVED	05-Sep-23
DATE TESTED	08-Sep-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.4	36.8	1.023	
Determination 2 (avg)	18.9	37.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
11.3	38	13	25	82



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

15-Sep-23

Site: Millwood SEN

Job Number: LKC 23 1383

Sample: WS101

Depth: 3.50-4.00m

Sample Description:	Grey brown gravelly SAND with pockets of silt.
---------------------	--

Weight of Container (g): 1335.0

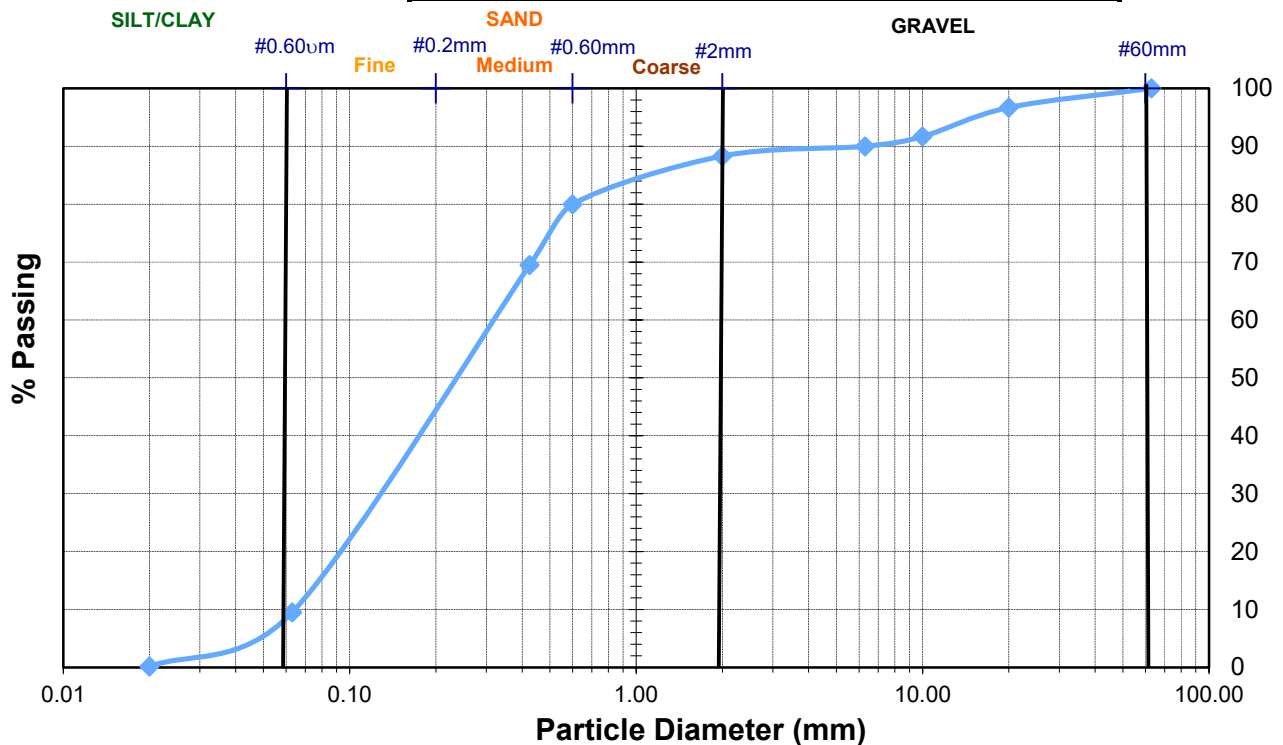
Weight of Container & Soil (g): 2833.0

Weight of Dry Container and Sample (g): 2574.0

Weight of dry sample (g): 1239.0

As received moisture content: 21%

Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)
63.00	2085.0	2085.0	0.0	0.0	100.0
20.00	1370.0	1411.0	41.0	3.3	96.7
10.00	1191.0	1253.0	62.0	5.0	91.7
6.30	1008.0	1029.0	21.0	1.7	90.0
2.00	550.0	571.0	21.0	1.7	88.3
0.60	496.0	599.0	103.0	8.3	80.0
0.43	465.0	595.0	130.0	10.5	69.5
0.06	428.0	1171.0	743.0	60.0	9.5
0.020	424.0	540.0	116.0	9.4	0.2
Pan	403.0	405.0	2.0	0.2	0.0
TOTAL:			1239	100.0	



Tested By:

CW

Checked By:

Date:

21/08/2023

Date:

Site: Millwood SEN

Job Number: LKC 23 1383

Sample: WS102

Depth: 3.50-4.00m

Sample Description:	Grey brown silty gravelly medium to coarse SAND (Saturated).
---------------------	--

Weight of Container (g): 1238.0

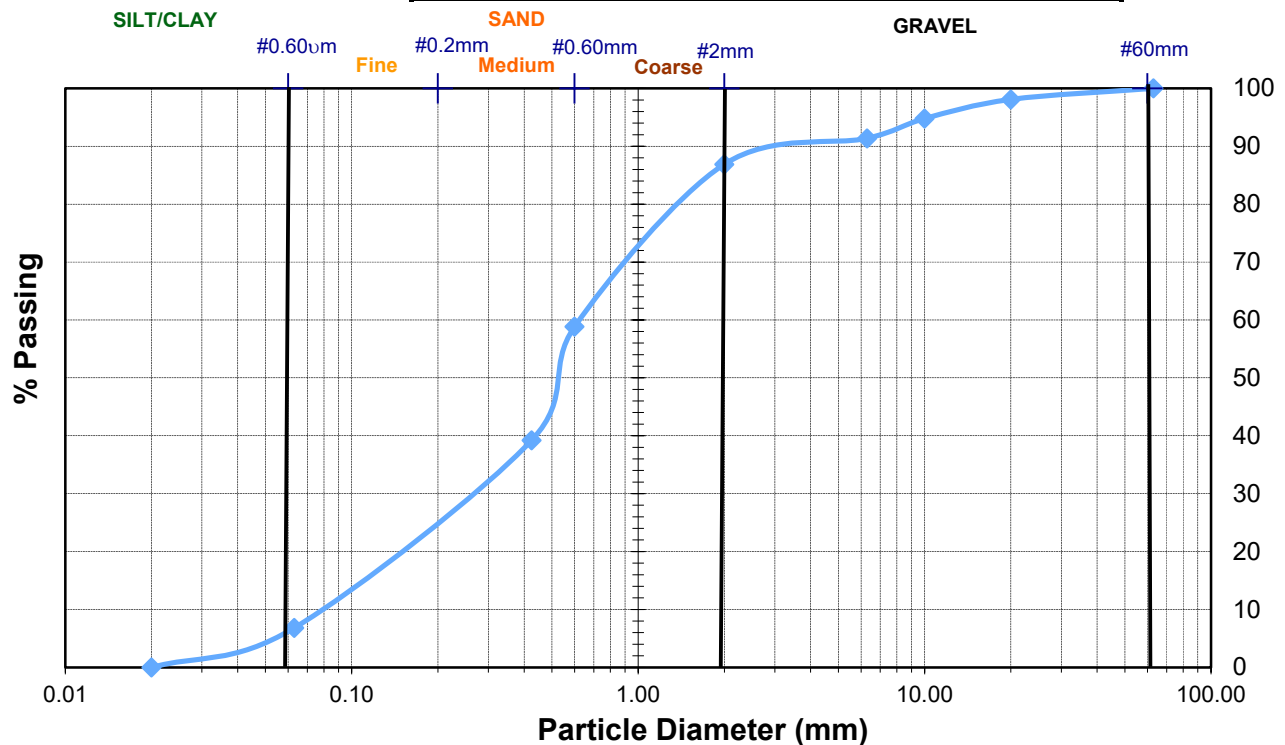
Weight of Container & Soil (g): 2366.0

Weight of Dry Container and Sample (g): 2176.0

Weight of dry sample (g): 938.0

As received moisture content: 20%

Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)
63.00	2085.0	2085.0	0.0	0.0	100.0
20.00	1370.0	1388.0	18.0	1.9	98.1
10.00	1191.0	1222.0	31.0	3.3	94.8
6.30	1008.0	1040.0	32.0	3.4	91.4
2.00	550.0	592.0	42.0	4.5	86.9
0.60	496.0	759.0	263.0	28.0	58.8
0.43	465.0	649.0	184.0	19.6	39.2
0.06	428.0	732.0	304.0	32.4	6.8
0.020	424.0	488.0	64.0	6.8	0.0
Pan	403.0	403.0	0.0	0.0	0.0
TOTAL:			938	100.0	



Tested By:

CW

Checked By:

Date:

21/08/2023

Date:

Site: Millwood SEN

Job Number: LKC 23 1383

Sample: WS103

Depth: 3.50-4.00m

Sample Description: Grey brown silty gravelly fine to coarse SAND with pockets (30-50mm) of fibrous PEAT.

Weight of Container (g): 1354.0

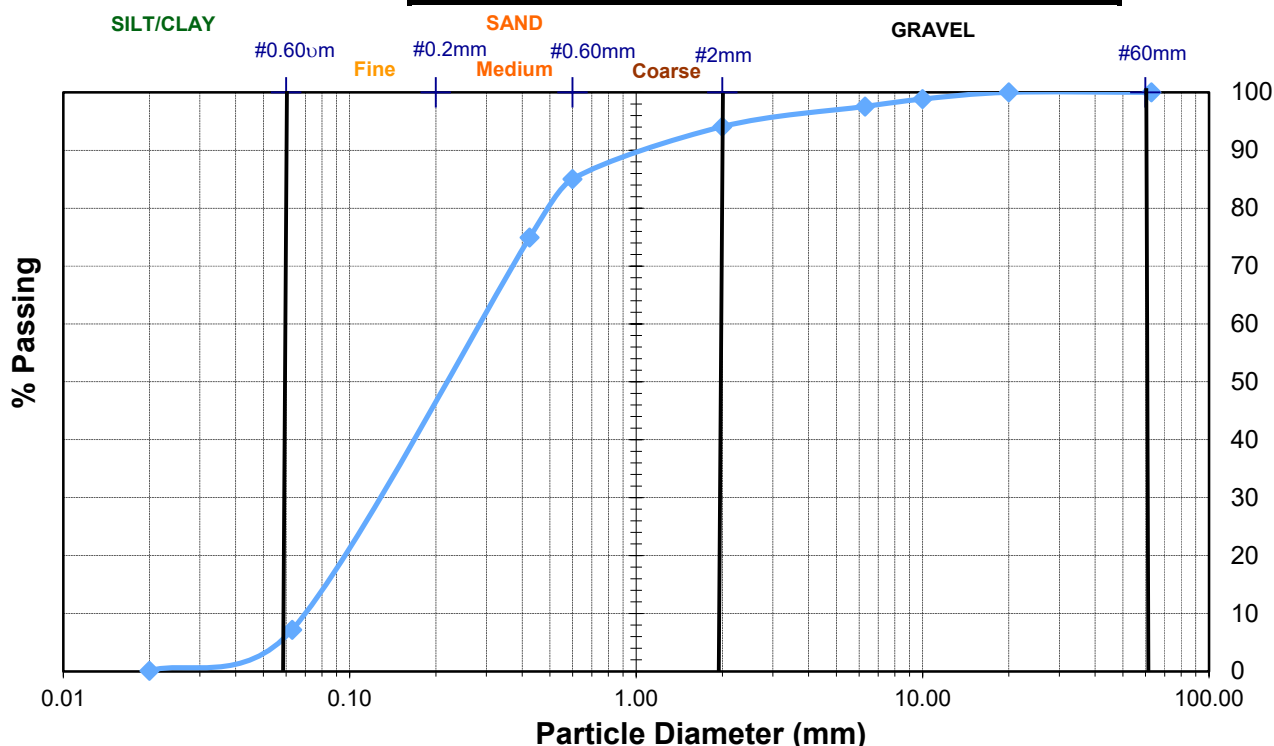
Weight of Container & Soil (g): 2436.0

Weight of Dry Container and Sample (g): 2216.0

Weight of dry sample (g): 862.0

As received moisture content: 26%

Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)
63.00	2085.0	2085.0	0.0	0.0	100.0
20.00	1370.0	1370.0	0.0	0.0	100.0
10.00	1191.0	1201.0	10.0	1.2	98.8
6.30	1008.0	1019.0	11.0	1.3	97.6
2.00	550.0	580.0	30.0	3.5	94.1
0.60	496.0	574.0	78.0	9.0	85.0
0.43	465.0	552.0	87.0	10.1	74.9
0.06	428.0	1012.0	584.0	67.7	7.2
0.020	424.0	485.0	61.0	7.1	0.1
Pan	403.0	404.0	1.0	0.1	0.0
TOTAL:			862	100.0	



Tested By:

CW

Checked By:

Date:

21/08/2023

Date:

Site: Millwood SEN

Job Number: LKC 23 1383

Sample: WS104

Depth: 2.50-3.00 & 4.50-5.00

Sample Description:	Grey brown very gravelly fine to coarse SAND with pockets (40-60mm) of soft brown laminated CLAY with rootlets.
----------------------------	--

Weight of Container (g): 1241.0

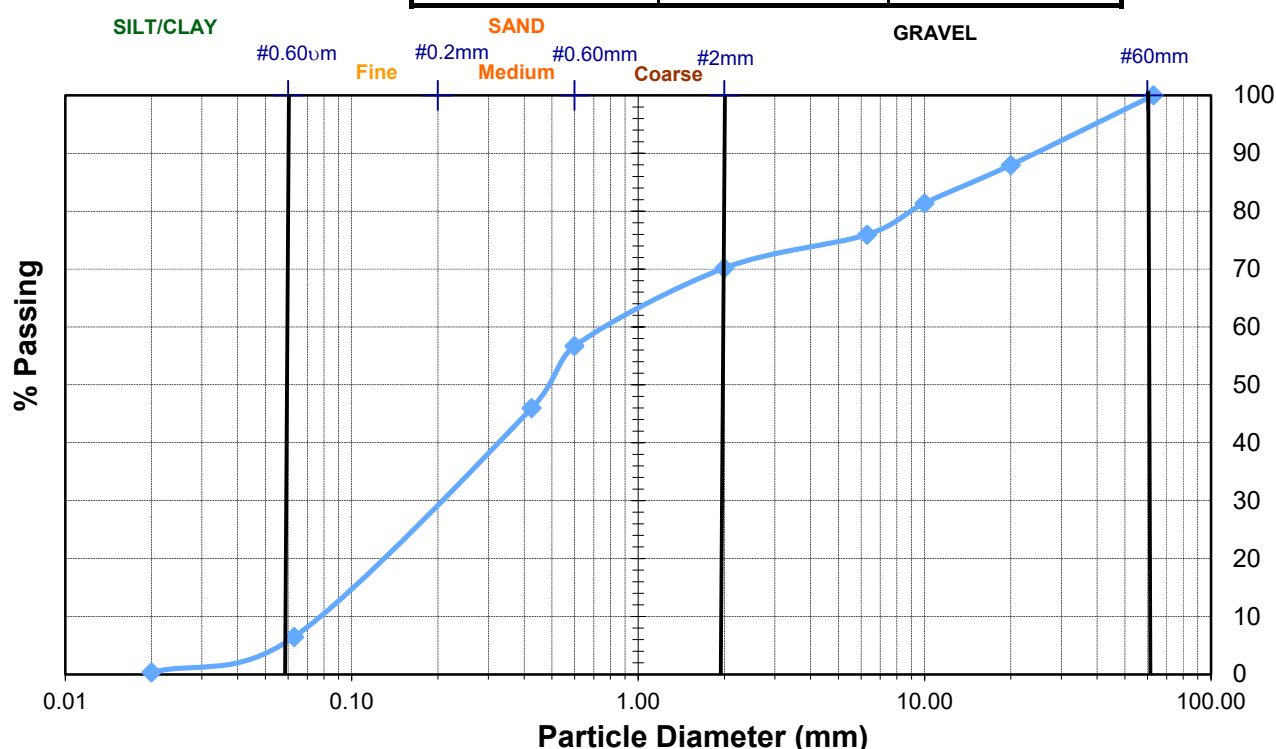
Weight of Container & Soil (g): 2247.0

Weight of Dry Container and Sample (g): 2089.0

Weight of dry sample (g): 848.0

As received moisture content: 19%

Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)
63.00	2085.0	2085.0	0.0	0.0	100.0
20.00	1370.0	1472.0	102.0	12.0	88.0
10.00	1191.0	1247.0	56.0	6.6	81.4
6.30	1008.0	1054.0	46.0	5.4	75.9
2.00	550.0	599.0	49.0	5.8	70.2
0.60	496.0	610.0	114.0	13.4	56.7
0.43	465.0	556.0	91.0	10.7	46.0
0.06	428.0	763.0	335.0	39.5	6.5
0.020	424.0	476.0	52.0	6.1	0.4
Pan	403.0	406.0	3.0	0.4	0.0
TOTAL:			848	100.0	



Tested By:

CW

Checked By:

Date:

21/08/2023

Date:

Site: Millwood SEN

Job Number: LKC 23 1383

Sample: WS104

Depth: 2.50-3.00 & 4.50-5.00

Sample Description:	Brown slightly silty, slightly gravelly fine to coarse SAND
---------------------	---

Weight of Container (g): 1248.0

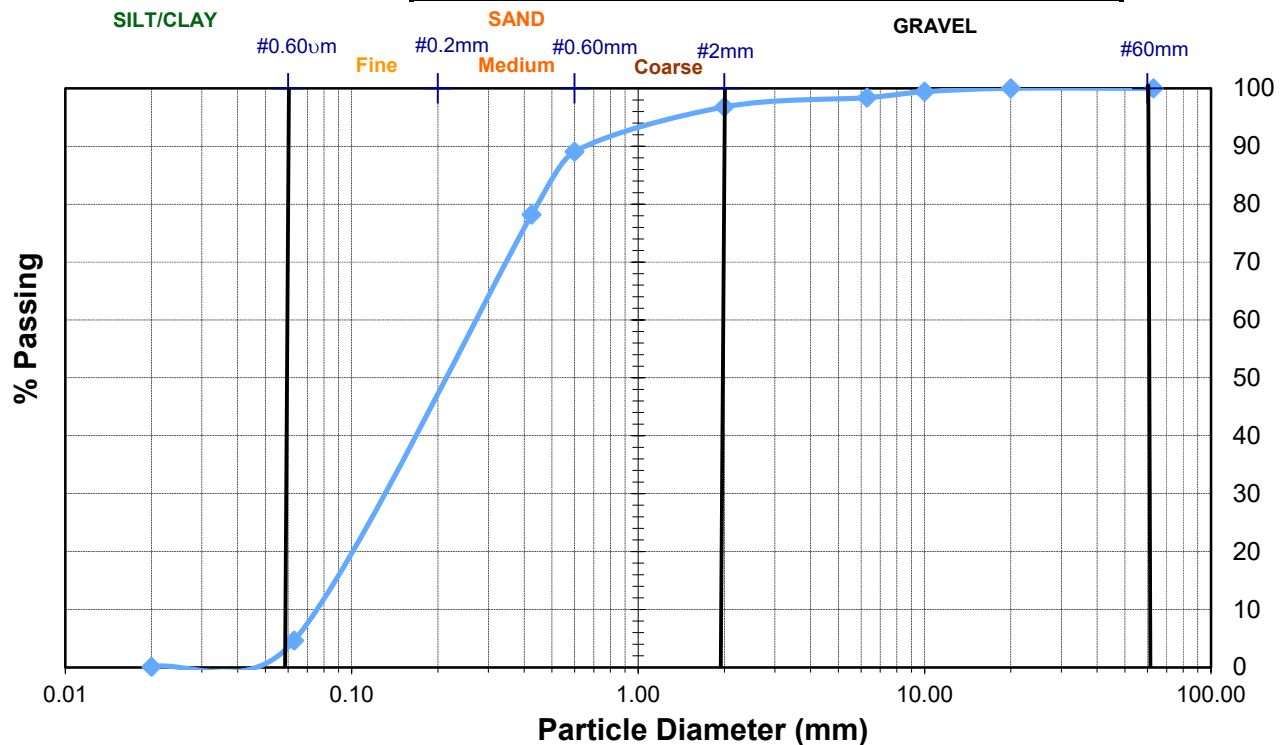
Weight of Container & Soil (g): 3309.0

Weight of Dry Container and Sample (g): 2995.0

Weight of dry sample (g): 1747.0

As received moisture content: 18%

Diameter (mm)	Mass of Sieve (g)	Mass of Sieve & Soil (g)	Soil Retained (g)	Soil Retained (%)	Soil Passing (%)
63.00	2085.0	2085.0	0.0	0.0	100.0
20.00	1370.0	1370.0	0.0	0.0	100.0
10.00	1191.0	1201.0	10.0	0.6	99.4
6.30	1008.0	1026.0	18.0	1.0	98.4
2.00	550.0	578.0	28.0	1.6	96.8
0.60	496.0	631.0	135.0	7.7	89.1
0.43	465.0	655.0	190.0	10.9	78.2
0.06	428.0	1713.0	1285.0	73.6	4.6
0.020	424.0	503.0	79.0	4.5	0.1
Pan	403.0	405.0	2.0	0.1	0.0
TOTAL:			1747	100.0	



Tested By: CW

Checked By:

Date: 21/08/2023

Date:

Appendix E

Certificates of Analysis – Water



Emma Khadun
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-11067

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Sample Receipt Date: 31/08/2023

Sample Scheduled Date: 31/08/2023

Report Issue Number: 1

Reporting Date: 05/09/2023

Authorised by:

Kevin Old
Operations Director

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

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



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



Water Analysis Certificate						
DETS Report No: 23-11067		Date Sampled	29/08/23	29/08/23		
LK Consult Limited		Time Sampled	None Supplied	None Supplied		
Site Reference: Millwood SEN School, Radcliffe		TP / BH No	CP101	WS105		
Project / Job Ref: LKC 23 1383		Additional Refs	GW	GW		
Order No: LKC231383-EK		Depth (m)	None Supplied	None Supplied		
Reporting Date: 05/09/2023		DETS Sample No	672547	672548		

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	6.5	6.2			
Total Cyanide	ug/l	< 5	ISO17025	< 5	< 5			
Free Cyanide	ug/l	< 5	ISO17025	< 5	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	25	38			
Dissolved Organic Carbon (DOC)	mg/l	<1.0	ISO17025	16.3	27			
Hardness - Total	mgCaCO ₃ /l	< 1	NONE	123	139			
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Boron (dissolved)	ug/l	< 5	ISO17025	64	200			
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	< 0.4			
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20			
Copper (dissolved)	ug/l	< 5	ISO17025	< 5	8			
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	< 0.05			
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5	11			
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Zinc (dissolved)	ug/l	< 2	ISO17025	7	15			
Calcium (dissolved)	mg/l	< 0.2	ISO17025	43.4	45.9			
Total Phenols (monohydric)	ug/l	< 10	ISO17025	< 10	< 10			

Subcontracted analysis ^(S)
Insufficient sample ^{I/S}
Unsuitable Sample ^{U/S}



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

Water Analysis Certificate - Speciated PAH						
DETS Report No: 23-11067	Date Sampled	29/08/23	29/08/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	CP101	WS105			
Project / Job Ref: LKC 23 1383	Additional Refs	GW	GW			
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied			
Reporting Date: 05/09/2023	DETS Sample No	672547	672548			

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	0.20	0.03			
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008			
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.20	< 0.16			



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

Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-11067	Date Sampled	29/08/23	29/08/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	CP101	WS105			
Project / Job Ref: LKC 23 1383	Additional Refs	GW	GW			
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied			
Reporting Date: 05/09/2023	DETS Sample No	672547	672548			

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS 1D MS AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C6 - C8 : HS 1D MS AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C8 - C10 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C10 - C12 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C12 - C16 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C16 - C21 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C21 - C34 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C34 - C44	ug/l	< 10	NONE	< 10	< 10			
Aliphatic (C5 - C44) : HS 1D MS+EH CU 1D AL	ug/l	< 70	NONE	< 70	< 70			
Aromatic >C5 - C7 : HS 1D MS AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C7 - C8 : HS 1D MS AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C8 - C10 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C10 - C12 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C12 - C16 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C16 - C21 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C21 - C35 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C35 - C44	ug/l	< 10	NONE	< 10	< 10			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	ug/l	< 70	NONE	< 70	< 70			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	ug/l	< 140	NONE	< 140	< 140			



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



Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-11067	Date Sampled	29/08/23	29/08/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Millwood SEN School, Radcliffe	TP / BH No	CP101	WS105			
Project / Job Ref: LKC 23 1383	Additional Refs	GW	GW			
Order No: LKC231383-EK	Depth (m)	None Supplied	None Supplied			
Reporting Date: 05/09/2023	DETS Sample No	672547	672548			

Determinand	Unit	RL	Accreditation				
Benzene : HS 1D MS	ug/l	< 1	ISO17025	< 1	< 1		
Toluene : HS 1D MS	ug/l	< 5	ISO17025	< 5	< 5		
Ethylbenzene : HS 1D MS	ug/l	< 5	ISO17025	< 5	< 5		
p & m-xylene : HS 1D MS	ug/l	< 10	ISO17025	< 10	< 10		
o-xylene : HS 1D MS	ug/l	< 5	ISO17025	< 5	< 5		
MTBE : HS 1D MS	ug/l	< 10	ISO17025	< 10	< 10		



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



Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-11067

LK Consult Limited

Site Reference: Millwood SEN School, Radcliffe

Project / Job Ref: LKC 23 1383

Order No: LKC231383-EK

Reporting Date: 05/09/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



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



List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Appendix F

Generic Assessment Criteria Values

Summary Table for the Generic Assessment Criteria for Human Health Risk Assessment Land Quality Management (LQM) S4ULs.

All GAC are based on sandy
loam soils with a pH 7.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Metals	Inorganic Arsenic	6%	37	40	43	640	79	170
	Beryllium	6%	1.7	1.7	35	12	2.2	63
	Boron	6%	290	11,000	45	240,000	21,000	46,000
	Cadmium	6%	11	85	1.9	190	120	532
	Chromium (III)	6%	910	910	18,000	8,600	1,500	33,000
	Chromium (VI)	6%	6.0	6.0	1.8	33	7.7	220
	Copper	6%	2,400	7,100	520	68,000	12,000	44,000
	Elemental Mercury	6%	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}
	Inorganic Mercury	6%	40	56	19	1,100	120	240
	Methylmercury	6%	11	15	6.0	320	40	68
	Nickel (update 2015)	6%	126	181	53	983	231	804
	Selenium	6%	250	430	88	12,000	1,100	1,800
	Vanadium	6%	410	1,200	91	9,000	2,000	5,000
Zinc	6%	3,700	40,000	620	730,000	81,000	170,000	
BTEX Compounds	Benzene	1%	0.087	0.38	0.017	27	72	90
		2.5%	0.17	0.70	0.034	47	72	100
		6%	0.37	1.4	0.075	90	73	110
	Toluene	1%	130	880 (869) ^{vap}	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
		2.5%	290	1,900	51	110,000 (1,920) ^{vap}	56,000	95,000 (1,920) ^{vap}
		6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
	Ethylbenzene	1%	47	83	16	5,700 (518) ^{vap}	24,000	17,000 (518) ^{vap}
		2.5%	110	190	39	13,000 (1,220) ^{vap}	24,000	22,000 (1,220) ^{vap}
		6%	260	440	91	27,000 (2,840) ^{vap}	25,000	27,000 (2,840) ^{vap}
	o-xylene	1%	60	88	28	6,600 (478) ^{sol}	41,000	17,000 (478) ^{sol}
		2.5%	140	210	67	15,000 (1,120) ^{sol}	42,000	24,000 (1,120) ^{sol}
		6%	330	480	160	33,000 (2,620) ^{sol}	43,000	33,000 (2,620) ^{sol}
	m-xylene	1%	59	82	31	6,200 (625) ^{vap}	41,000	17,000 (625) ^{vap}
		2.5%	140	190	74	14,000 (1,470) ^{vap}	42,000	24,000 (1,470) ^{vap}
		6%	320	450	170	31,000 (3,460) ^{vap}	43,000	32,000 (3,460) ^{vap}
	p-xylene	1%	56	79	29	5,900 (576) ^{sol}	41,000	17,000 (576) ^{sol}
		2.5%	130	180	69	14,000 (1,350) ^{sol}	42,000	23,000 (1,350) ^{sol}
		6%	310	430	160	30,000 (3,170) ^{sol}	43,000	31,000 (3,170) ^{sol}

NOTES

^{sol} / ^{vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

f = oral, dermal and inhalation exposures compared to oral HCV.

All GAC are based on sandy loam soils with a pH 7.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	1%	210	3,000 (57.1) ^{sol}	34	84,000 (57.0) ^{sol}	15,000	29,000
		2.5%	510	4,700 (141) ^{sol}	85	97,000 (141) ^{sol}	15,000	30,000
		6%	1,100	6,000 (336) ^{sol}	200	100,000	15,000	30,000
	Acenaphthylene	1%	170	2,900 (86.1) ^{sol}	28	83,000 (86.1) ^{sol}	15,000	29,000
		2.5%	420	4,600 (212) ^{sol}	69	97,000 (212) ^{sol}	15,000	30,000
		6%	920	6,000 (506) ^{sol}	160	100,000	15,000	30,000
	Anthracene	1%	2,400	31,000 (1.17) ^{vap}	380	520,000	74,000	150,000
		2.5%	5,400	35,000	950	540,000	74,000	150,000
		6%	11,000	37,000	2,200	540,000	74,000	150,000
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49
		2.5%	11	14	6.5	170	29	56
		6%	13	15	13	180	29	62
	Benzo(a)pyrene (only)	1%	2.2	3.2	0.97	35	5.7	11
		2.5%	2.7	3.2	2.0	35	5.7	12
		6%	3.0	3.2	3.5	36	5.7	13
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13
		2.5%	3.3	4.0	2.1	44	7.2	15
		6%	3.7	4.0	3.9	45	7.2	16
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400
		2.5%	340	360	470	4,000	640	1,500
		6%	350	360	640	4,000	640	1,600
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370
		2.5%	93	110	75	1,200	190	410
		6%	100	110	130	1,200	190	440
	Chrysene	1%	15	30	4.1	350	57	93
		2.5%	22	31	9.4	350	57	110
		6%	27	32	19	350	57	120
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3
		6%	0.3	0.32	0.43	3.6	0.58	1.4
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300
		2.5%	560	1,600	130	23,000	3,100	6,300
		6%	890	1,600	290	23,000	3,100	6,400
	Fluorene	1%	170	2,800 (36.0) ^{sol}	27	63,000 (30.9) ^{sol}	9,900	20,000
		2.5%	400	3,800 (76.5) ^{sol}	67	68,000	9,900	20,000
		6%	860	4,500 (183) ^{sol}	160	71,000	9,900	20,000
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150
		2.5%	36	46	21	510	82	170
		6%	41	46	39	510	82	180
	Naphthalene	1%	2.3 ^f	2.3 ^f	4.1 ^f	190 ^f (76.4) ^{sol}	4,900 ^f	1,200 ^f (76.4) ^{sol}
		2.5%	5.6 ^f	5.6 ^f	10 ^f	460 ^f (183) ^{sol}	4,900 ^f	1,900 ^f (183) ^{sol}
		6%	13 ^f	13 ^f	24 ^f	1,100 ^f (432) ^{sol}	4,900 ^f	3,000
	Phenanthrene	1%	95	1,300 (36.0) ^{sol}	15	22,000	3,100	6,200
		2.5%	220	1,500	38	22,000	3,100	6,200
		6%	440	1,500	90	22,000	3,100	6,300
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000
		2.5%	1,200	3,800	270	54,000	7,400	15,000
		6%	2,000	3,800	620	54,000	7,400	15,000
Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	
	2.5%	0.98	1.2	0.67	15	2.2	4.7	
	6%	1.1	1.2	1.2	15	2.2	4.8	

NOTES

^{Sol / vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

^f = naphthalene is based on comparison of inhalation exposure with TDI_{inhal} for localised effect.

All GAC are based on sandy loam soils with a pH 7.

LQM Generic Assessment Criteria (mg/kg) Dry weight soil

Contaminant	SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Aliphatic							
EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}
EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}
EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}
EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}
EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}
EC>16-35	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
EC>35-44	1%	65,000 (8.48) ^{f, sol}	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f
Aliphatic							
EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}
EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}
EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}
EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}
EC>12-16	2.5%	2,400 (59) ^{sol}	2,400 (59) ^{sol}	13,000	82,000 (59) ^{sol}	13,000	25,000 (59) ^{sol}
EC>16-35	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
EC>35-44	2.5%	92,000 (21) ^{f, sol}	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f
Aliphatic							
EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150) ^{sol}
EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}
EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}
EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}
EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}
EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f
Aromatic							
EC5-7(benzene as non-threshold)	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}
EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}
EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}
EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}
EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000
EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f
EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}
EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}
EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}
EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}
EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000
EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f
EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f
Aromatic							
EC5-7(benzene as non-threshold)	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}
EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}
EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}
EC>10-12	6%	380	1,200	74	34,000 (2,150) ^{sol}	5,000	10,000
EC>12-16	6%	660	2,500	130	38,000	5,100	10,000
EC>16-21	6%	930 ^f	1,900 ^f	260 ^f	28,000 ^f	3,800 ^f	7,800 ^f
EC>21-35	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f
EC>35-44	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f
Aliphatic +Aromatic >EC44	1%	1,600 ^f	1,900 ^f	1,200 ^f	28,000 ^f	3,800 ^f	7,800 ^f
	2.5%	1,800 ^f	1,900 ^f	2,100 ^f	28,000 ^f	3,800 ^f	7,800 ^f
	6%	1,900 ^f	1,900 ^f	3,000 ^f	28,000 ^f	3,800 ^f	7,900 ^f

NOTES

Sol / vap = solubility / vapour limit (potentially use if free product identified, although highly conservative).

f = oral, dermal and inhalation exposures compared to oral HCV.

All GAC are based on sandy loam soils with a pH 7.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Chloalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	7.1E-03	9.2E-03	4.6E-03	0.67	29	21
		2.5%	1.1E-02	1.3E-02	8.3E-03	0.97	29	24
		6%	1.9E-02	2.3E-02	1.6E-02	1.7	29	28
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425) ^{vap}
		2.5%	18	18	110	1,300	140,000	76,000 (2,915) ^{vap}
		6%	39	40	240	3,000	140,000	100,000 (6,392) ^{vap}
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800
		2.5%	3.4	8.0	0.89	550	1,400	2,100
		6%	7.5	17	2.0	1,100	1,400	2,300
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500
		2.5%	2.8	3.5	1.9	250	1,400	1,800
		6%	6.4	8.2	4.4	560	1,400	2,100
	Tetrachloroethene (PCE)	1%	0.18	0.18	0.65	19	1,400	810 (424) ^{sol}
		2.5%	0.39	0.40	1.5	42	1,400	1,100 (951) ^{sol}
		6%	0.90	0.92	3.6	95	1,400	1,500
	Tetrachloromethane (carbon tetrachloride)	1%	2.6E-02	2.6E-02	0.45	2.9	890	190
		2.5%	5.6E-02	5.6E-02	1.0	6.3	920	270
		6%	0.13	0.13	2.4	14	950	400
	Trichloroethene (TCE)	1%	1.6E-02	1.7E-02	4.1E-02	1.2	120	70
		2.5%	3.4E-02	3.6E-02	9.1E-02	2.6	120	91
		6%	7.5E-02	8.0E-02	0.21	5.7	120	120
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600
		2.5%	1.7	2.1	0.83	170	2,500	2,800
		6%	3.4	4.2	1.7	350	2,500	3,100
	Chloroethene (vinyl chloride)	1%	6.4E-04	7.7E-04	5.5E-04	5.9E-02	3.5	4.8
		2.5%	8.7E-04	1.0E-03	1.0E-03	7.7E-02	3.5	5.0
		6%	1.4E-03	1.5E-03	1.8E-03	0.12	3.5	5.4
	2,4,6-Trinitrotoluene (TNT)	1%	1.6	65	0.24	1,000	130	260
		2.5%	3.7	66	0.58	1,000	130	270
		6%	8.1	66	1.4	1,000	130	270
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) ^{sol}
		2.5%	250	13,000	38	210,000	26,000	51,000
		6%	540	13,000	85	210,000	27,000	53,000
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) ^{vap}
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) ^{vap}
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) ^{vap}
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30
		2.5%	6.6	7.4	6.1	170	18	31
		6%	7.1	7.5	9.8	170	18	31
	Dieldrin	1%	0.97	7.0	0.17	170	18	30
		2.5%	2.0	7.3	0.41	170	18	30
		6%	3.5	7.4	0.96	170	18	31
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300
		2.5%	7.8	620	1.2	9,400	1,200	2,400
		6%	17.4	620	2.7	9,400	1,200	2,400
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26
		6%	0.14	6.6	2.2E-02	140	16	27
	Endosulfanns (2 isomers)	1%	7.4	160 (3.0E-03) ^{vap}	1.2	5,600 (3.0E-03) ^{vap}	1,200	2,300
		2.5%	18	280 (7.0E-03) ^{vap}	2.9	7,400 (7.0E-03) ^{vap}	1,200	2,400
		6%	41	410 (1.6E-02) ^{vap}	6.8	8,400 (1.6E-02) ^{vap}	1,200	2,500
	Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15
		2.5%	0.2	3.8	3.2E-02	65	8.1	15
		6%	0.46	3.8	7.7E-02	65	8.1	16

NOTES

Sol / vap = solubility / vapour limit (potentially use if free product identified, although highly conservative).

All GAC are based on
sandy loam soils with a pH
7.

LQM Generic Assessment Criteria (mg/kg) Dry weight soil

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}
		6%	2.4	2.4	32	290	14,000	2,900
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190
		6%	22	38	7.0	830	100	190
	Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30
		2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30
		6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100
		2.5%	2.0	150	0.30	4,000	620	1,100
		6%	4.5	210	0.70	4,300	620	1,100
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110
		2.5%	0.52	29	8.0E-02	400	60	120
		6%	1.2	31	0.19	400	60	120
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300
		2.5%	0.29	0.29	10	22	11,000	1,900
		6%	0.62	0.62	23	47	11,000	2,700
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48
		2.5%	0.7	0.78	0.61	66	25	50
		6%	1.6	1.8	1.4	120	25	51
	Phenol	1%	280	750	66	760 ^{dir} (31,000)	760 ^{dir} (11,000)	760 ^{dir} (8,600)
		2.5%	550	1,300	140	1,500 ^{dir} (35,000)	1,500 ^{dir} (11,000)	1,500 ^{dir} (9,700)
		6%	1,100	2,300	280	3,200 ^{dir} (37,000)	3,200 ^{dir} (11,000)	3,200 ^{dir} (11,000)

NOTES

^{Sol / vap} = solubility / vapour limit (potentially use if free product identified, although highly conservative).

^{dir} = S4uls based on threshold protective of direct skin contact with phenol (brackets long term exposure for illustration purposes).

^g = derived based on 2,3,4,6-tetrachlorophenol.

CATEGORY 4 SCREENING LEVELS

Substance	Residential (with home- grown produce)	Residential (without home- grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37 mg/kg	40 mg/kg	49 mg/kg	640 mg/kg	79 mg/kg	170 mg/kg
Benzene	0.87 mg/kg	3.3 mg/kg	0.18 mg/kg	98 mg/kg	140 mg/kg	230 mg/kg
Benzo(a)pyrene	5.0 mg/kg	5.3 mg/kg	5.7 mg/kg	77 mg/kg	10 mg/kg	21 mg/kg
Cadmium	22 mg/kg	150 mg/kg	3.9 mg/kg	410 mg/kg	220 mg/kg	880 mg/kg
Chromium VI	21 mg/kg	21 mg/kg	170 mg/kg	49 mg/kg	21 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2300 mg/kg	630 mg/kg	1300 mg/kg

Tetrachlorethene (PCE) – 1% SOM	0.31 mg/kg	0.32 mg/kg	2.0 mg/kg	24 mg/kg	3,200 mg/kg	1,400 mg/kg
Tetrachlorethene (PCE) – 2.5% SOM	0.70 mg/kg	0.71 mg/kg	4.8 mg/kg	55 mg/kg	3,300 mg/kg	1,900 mg/kg
Tetrachlorethene (PCE) – 6% SOM	1.6 mg/kg	1.6 mg/kg	11 mg/kg	130 mg/kg	3,400 mg/kg	2,500 mg/kg
Trichlorethene (TCE) – 1% SOM	0.0093 mg/kg	0.0097 mg/kg	0.032 mg/kg	0.73 mg/kg	76 mg/kg	41 mg/kg
Trichlorethene (TCE) – 2.5% SOM	0.020 mg/kg	0.020 mg/kg	0.072 mg/kg	1.5 mg/kg	78 mg/kg	54 mg/kg
Trichlorethene (TCE) – 6% SOM	0.043 mg/kg	0.045 mg/kg	0.16 mg/kg	3.4 mg/kg	79 mg/kg	69 mg/kg
Vinyl Chloride (VC) – 1% SOM	0.0064 mg/kg	0.015 mg/kg	0.0017 mg/kg	1.1 mg/kg	7.8 mg/kg	18 mg/kg
Vinyl Chloride (VC) – 2.5% SOM	0.010 mg/kg	0.019 mg/kg	0.0031 mg/kg	1.4 mg/kg	7.8 mg/kg	19 mg/kg
Vinyl Chloride (VC) – 6% SOM	0.017 mg/kg	0.029 mg/kg	0.0058 mg/kg	2.2 mg/kg	7.8 mg/kg	19 mg/kg
1,2-Dichloroethane 1% SOM	0.11 mg/kg	0.16 mg/kg	0.054 mg/kg	12 mg/kg	300 mg/kg	300 mg/kg
1,2-Dichloroethane 2.5% SOM	0.18 mg/kg	0.24 mg/kg	0.10 mg/kg	17 mg/kg	310 mg/kg	330 mg/kg
1,2-Dichloroethane 6% SOM	0.31 mg/kg	0.41 mg/kg	0.19 mg/kg	29 mg/kg	310 mg/kg	380 mg/kg

Appendix G

HazWasteOnline Assessment Output Sheets

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:

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



QPXK7-CZMHI-RLN8J

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

Job name

LKC 23 1383

Description/Comments

Project

LKC 23 1383

Site

Millwood SEN, Radcliffe

Classified by

Name: **Peter Dunn**
 Date: **20 Sep 2023 09:48 GMT**
 Telephone: **0161 763 7200**

Company: **LK Group**

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:

CERTIFIED

Course

Hazardous Waste Classification
 Most recent 3 year Refresher

Date

18 Sep 2019
 02 Aug 2022

Next 3 year Refresher due by Aug 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

Millwood SEN School, Radcliffe

Post Code **M26 3BW**

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development of brownfield

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

Construction

Description of the waste

Made ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS102-0.70 - 1.00-	0.70 - 1.00	Non Hazardous		3
2	TS101--16/08/2023		Non Hazardous		5
3	TS102--16/08/2023		Non Hazardous		7
4	TS103--16/08/2023		Non Hazardous		9
5	WS101-0.50 - 1.00-10/08/2023	0.50 - 1.00	Non Hazardous		11
6	WS103-1.70 - 1.90-10/08/2023	1.70 - 1.90	Non Hazardous		13
7	WS104-0.30 - 1.00-10/08/2023	0.30 - 1.00	Non Hazardous		15
8	WS105-0.50 - 1.00-10/08/2023	0.50 - 1.00	Non Hazardous		17

Related documents

#	Name	Description
1	23-10600.1.hwol	DETS South .hwol file used to populate the Job
2	23-10585.1.hwol	DETS South .hwol file used to populate the Job
3	23-10498.1.hwol	DETS South .hwol file used to populate the Job
4	LK SUITE 1 - 5	waste stream template used to create this Job

Report

Created by: Peter Dunn

Created date: 20 Sep 2023 09:48 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	19
Appendix B: Rationale for selection of metal species	20
Appendix C: Version	21

Classification of sample: WS102-0.70 - 1.00-

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

Sample details

Sample name:	LoW Code:
WS102-0.70 - 1.00-	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.70 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14.5% Wet Weight Moisture Correction applied (MC)

#	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							
1	arsenic { arsenic trioxide }				5 mg/kg	1.32	5.644 mg/kg	0.000564 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10 mg/kg	1.462	12.496 mg/kg	0.00125 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				22 mg/kg	1.126	21.178 mg/kg	0.00212 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				13 mg/kg	1.273	14.145 mg/kg	0.00141 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	14 mg/kg		11.97 mg/kg	0.0012 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				12 mg/kg	1.785	18.316 mg/kg	0.00183 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				66 mg/kg	1.245	70.239 mg/kg	0.00702 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH				8.1 pH		8.1 pH	8.1 pH		
			PH							
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	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							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	• pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0164 %		

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 Determinand - 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: TS101--16/08/2023

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

Sample details

Sample name:	LoW Code:
TS101--16/08/2023	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
16.5% (wet weight correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16.5% Wet Weight Moisture Correction applied (MC)

#	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							
1	arsenic { arsenic trioxide }				14 mg/kg	1.32	15.435 mg/kg	0.00154 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.191 mg/kg	0.0000191 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10 mg/kg	1.462	12.204 mg/kg	0.00122 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				43 mg/kg	1.126	40.425 mg/kg	0.00404 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				12 mg/kg	1.273	12.751 mg/kg	0.00128 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	82 mg/kg		68.47 mg/kg	0.00685 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				19 mg/kg	1.785	28.322 mg/kg	0.00283 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				61 mg/kg	1.245	63.4 mg/kg	0.00634 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
14	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-020-00-8	200-753-7	71-43-2							

#	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	toluene 601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
17	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]		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
18	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
19	pH		PH		7.3 pH		7.3 pH	7.3 pH		
20	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	acenaphthylene 205-917-1	208-96-8			<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	acenaphthene 201-469-6	83-32-9			0.16 mg/kg		0.134 mg/kg	0.0000134 %	✓	
23	fluorene 201-695-5	86-73-7			<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	phenanthrene 201-581-5	85-01-8			0.85 mg/kg		0.71 mg/kg	0.000071 %	✓	
25	anthracene 204-371-1	120-12-7			0.18 mg/kg		0.15 mg/kg	0.000015 %	✓	
26	fluoranthene 205-912-4	206-44-0			1.15 mg/kg		0.96 mg/kg	0.000096 %	✓	
27	pyrene 204-927-3	129-00-0			1.04 mg/kg		0.868 mg/kg	0.0000868 %	✓	
28	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.44 mg/kg		0.367 mg/kg	0.0000367 %	✓	
29	chrysene 601-048-00-0	205-923-4	218-01-9		0.48 mg/kg		0.401 mg/kg	0.0000401 %	✓	
30	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.43 mg/kg		0.359 mg/kg	0.0000359 %	✓	
31	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.13 mg/kg		0.109 mg/kg	0.0000109 %	✓	
32	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.36 mg/kg		0.301 mg/kg	0.0000301 %	✓	
33	indeno[123-cd]pyrene 205-893-2	193-39-5			0.19 mg/kg		0.159 mg/kg	0.0000159 %	✓	
34	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35	benzo[ghi]perylene 205-883-8	191-24-2			0.16 mg/kg		0.134 mg/kg	0.0000134 %	✓	
36	monohydric phenols P1186				<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
Total:								0.0261 %		

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 Determinand - 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: TS102--16/08/2023

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

Sample details

Sample name:	LoW Code:
TS102--16/08/2023	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
17.7%	Entry:
(wet weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.7% Wet Weight Moisture Correction applied (MC)

#	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								
1	arsenic { arsenic trioxide }				10 mg/kg	1.32	10.866	mg/kg	0.00109 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228	mg/kg	<0.0000228 %		<LOD
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				9 mg/kg	1.462	10.826	mg/kg	0.00108 %	✓	
		215-160-9	1308-38-9								
4	copper { dicopper oxide; copper (I) oxide }				30 mg/kg	1.126	27.798	mg/kg	0.00278 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel(II) oxide (nickel monoxide) }				8 mg/kg	1.273	8.379	mg/kg	0.000838 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	57 mg/kg		46.911	mg/kg	0.00469 %	✓	
	082-001-00-6										
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81	mg/kg	<0.000281 %		<LOD
	034-002-00-8										
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				15 mg/kg	1.785	22.038	mg/kg	0.0022 %	✓	
	023-001-00-8	215-239-8	1314-62-1								
10	zinc { zinc oxide }				50 mg/kg	1.245	51.22	mg/kg	0.00512 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2								
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4								
14	benzene				<0.002 mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
	601-020-00-8	200-753-7	71-43-2								

#	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	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
16	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
17	xylene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<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]							
18	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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
19	pH				7.1 pH		7.1 pH	7.1 pH		
			PH							
20	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				0.88 mg/kg		0.724 mg/kg	0.0000724 %	✓	
		201-581-5	85-01-8							
25	anthracene				0.15 mg/kg		0.123 mg/kg	0.0000123 %	✓	
		204-371-1	120-12-7							
26	fluoranthene				1.3 mg/kg		1.07 mg/kg	0.000107 %	✓	
		205-912-4	206-44-0							
27	pyrene				1.2 mg/kg		0.988 mg/kg	0.0000988 %	✓	
		204-927-3	129-00-0							
28	benzo[a]anthracene				0.5 mg/kg		0.412 mg/kg	0.0000412 %	✓	
	601-033-00-9	200-280-6	56-55-3							
29	chrysene				0.51 mg/kg		0.42 mg/kg	0.000042 %	✓	
	601-048-00-0	205-923-4	218-01-9							
30	benzo[b]fluoranthene				0.46 mg/kg		0.379 mg/kg	0.0000379 %	✓	
	601-034-00-4	205-911-9	205-99-2							
31	benzo[k]fluoranthene				0.15 mg/kg		0.123 mg/kg	0.0000123 %	✓	
	601-036-00-5	205-916-6	207-08-9							
32	benzo[a]pyrene; benzo[def]chrysene				0.38 mg/kg		0.313 mg/kg	0.0000313 %	✓	
	601-032-00-3	200-028-5	50-32-8							
33	indeno[123-cd]pyrene				0.18 mg/kg		0.148 mg/kg	0.0000148 %	✓	
		205-893-2	193-39-5							
34	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
35	benzo[ghi]perylene				0.16 mg/kg		0.132 mg/kg	0.0000132 %	✓	
		205-883-8	191-24-2							
36	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
			P1186							
Total:								0.0199 %		

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 Determinand - 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: TS103--16/08/2023

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

Sample details

Sample name:	LoW Code:
TS103--16/08/2023	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
18.5% (wet weight correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.5% Wet Weight Moisture Correction applied (MC)

#	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							
1	arsenic { arsenic trioxide }				7 mg/kg	1.32	7.532 mg/kg	0.000753 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				7 mg/kg	1.462	8.338 mg/kg	0.000834 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				25 mg/kg	1.126	22.94 mg/kg	0.00229 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				7 mg/kg	1.273	7.26 mg/kg	0.000726 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	48 mg/kg		39.12 mg/kg	0.00391 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium selenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				12 mg/kg	1.785	17.459 mg/kg	0.00175 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				45 mg/kg	1.245	45.65 mg/kg	0.00456 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
14	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-020-00-8	200-753-7	71-43-2							

#	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	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
16	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
17	xylene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<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]							
18	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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
19	pH				6.8 pH		6.8 pH	6.8 pH		
			PH							
20	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				0.13 mg/kg		0.106 mg/kg	0.0000106 %	✓	
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				0.76 mg/kg		0.619 mg/kg	0.0000619 %	✓	
		201-581-5	85-01-8							
25	anthracene				0.16 mg/kg		0.13 mg/kg	0.000013 %	✓	
		204-371-1	120-12-7							
26	fluoranthene				1.07 mg/kg		0.872 mg/kg	0.0000872 %	✓	
		205-912-4	206-44-0							
27	pyrene				0.97 mg/kg		0.791 mg/kg	0.0000791 %	✓	
		204-927-3	129-00-0							
28	benzo[a]anthracene				0.42 mg/kg		0.342 mg/kg	0.0000342 %	✓	
	601-033-00-9	200-280-6	56-55-3							
29	chrysene				0.43 mg/kg		0.35 mg/kg	0.000035 %	✓	
	601-048-00-0	205-923-4	218-01-9							
30	benzo[b]fluoranthene				0.4 mg/kg		0.326 mg/kg	0.0000326 %	✓	
	601-034-00-4	205-911-9	205-99-2							
31	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
32	benzo[a]pyrene; benzo[def]chrysene				0.33 mg/kg		0.269 mg/kg	0.0000269 %	✓	
	601-032-00-3	200-028-5	50-32-8							
33	indeno[123-cd]pyrene				0.17 mg/kg		0.139 mg/kg	0.0000139 %	✓	
		205-893-2	193-39-5							
34	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
35	benzo[ghi]perylene				0.16 mg/kg		0.13 mg/kg	0.000013 %	✓	
		205-883-8	191-24-2							
36	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
			P1186							
Total:								0.0168 %		

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 Determinand - 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: WS101-0.50 - 1.00-10/08/2023

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

Sample details

Sample name:	LoW Code:
WS101-0.50 - 1.00-10/08/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19.5% Wet Weight Moisture Correction applied (MC)

#		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							
1		arsenic { arsenic trioxide }				52 mg/kg	1.32	55.269 mg/kg	0.00553 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.368 mg/kg	0.0000368 %	✓	
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16 mg/kg	1.462	18.825 mg/kg	0.00188 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }				114 mg/kg	1.126	103.323 mg/kg	0.0103 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
6		nickel { nickel(II) oxide (nickel monoxide) }				26 mg/kg	1.273	26.635 mg/kg	0.00266 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	182 mg/kg		146.51 mg/kg	0.0147 %	✓	
		082-001-00-6									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
		034-002-00-8									
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				44 mg/kg	1.785	63.231 mg/kg	0.00632 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }				92 mg/kg	1.245	92.184 mg/kg	0.00922 %	✓	
		030-013-00-7	215-222-5	1314-13-2							
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
12		pH		PH		7.5 pH		7.5 pH	7.5 pH		
13		naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3							

#	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							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		0.35 mg/kg		0.282 mg/kg	0.0000282 %	✓	
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		0.51 mg/kg		0.411 mg/kg	0.0000411 %	✓	
20	pyrene	204-927-3	129-00-0		0.48 mg/kg		0.386 mg/kg	0.0000386 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.24 mg/kg		0.193 mg/kg	0.0000193 %	✓	
22	chrysene	601-048-00-0	205-923-4		0.27 mg/kg		0.217 mg/kg	0.0000217 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.29 mg/kg		0.233 mg/kg	0.0000233 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.2 mg/kg		0.161 mg/kg	0.0000161 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.12 mg/kg		0.0966 mg/kg	0.00000966 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0517 %		

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 Determinand - 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: WS103-1.70 - 1.90-10/08/2023

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

Sample details

Sample name:	LoW Code:
WS103-1.70 - 1.90-10/08/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.70 - 1.90 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
42.8%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 42.8% Wet Weight Moisture Correction applied (MC)

#		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								
1		arsenic { arsenic trioxide }				241 mg/kg	1.32	182.009 mg/kg	0.0182 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD	
		048-002-00-0	215-146-2	1306-19-0								
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				32 mg/kg	1.462	26.752 mg/kg	0.00268 %	✓		
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }				442 mg/kg	1.126	284.652 mg/kg	0.0285 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
6		nickel { nickel(II) oxide (nickel monoxide) }				76 mg/kg	1.273	55.322 mg/kg	0.00553 %	✓		
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	873 mg/kg		499.356 mg/kg	0.0499 %	✓		
		082-001-00-6										
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD	
		034-002-00-8										
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				150 mg/kg	1.785	153.169 mg/kg	0.0153 %	✓		
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }				279 mg/kg	1.245	198.641 mg/kg	0.0199 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD	
		024-001-00-0	215-607-8	1333-82-0								
12		pH				6.7 pH		6.7 pH	6.7 pH			
				PH								
13		naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD	
		601-052-00-2	202-049-5	91-20-3								

#	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							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	• pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.141 %		

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 Determinand - 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: WS104-0.30 - 1.00-10/08/2023

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

Sample details

Sample name:	LoW Code:
WS104-0.30 - 1.00-10/08/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20.6%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20.6% Wet Weight Moisture Correction applied (MC)

#		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							
1		arsenic { arsenic trioxide }				172 mg/kg	1.32	180.314 mg/kg	0.018 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				0.6 mg/kg	1.142	0.544 mg/kg	0.0000544 %	✓	
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				33 mg/kg	1.462	38.296 mg/kg	0.00383 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }				277 mg/kg	1.126	247.626 mg/kg	0.0248 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
6		nickel { nickel(II) oxide (nickel monoxide) }				93 mg/kg	1.273	93.971 mg/kg	0.0094 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	547 mg/kg		434.318 mg/kg	0.0434 %	✓	
		082-001-00-6									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
		034-002-00-8									
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				167 mg/kg	1.785	236.712 mg/kg	0.0237 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }				279 mg/kg	1.245	275.737 mg/kg	0.0276 %	✓	
		030-013-00-7	215-222-5	1314-13-2							
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
12		pH		PH		6.2 pH		6.2 pH	6.2 pH		
13		naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3							

#	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							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		0.2 mg/kg		0.159 mg/kg	0.0000159 %	✓	
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		0.28 mg/kg		0.222 mg/kg	0.0000222 %	✓	
20	• pyrene	204-927-3	129-00-0		0.25 mg/kg		0.199 mg/kg	0.0000199 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.152 %		

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 Determinand - 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: WS105-0.50 - 1.00-10/08/2023

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

Sample details

Sample name:	LoW Code:
WS105-0.50 - 1.00-10/08/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20.4%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20.4% Wet Weight Moisture Correction applied (MC)

#		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								
1		arsenic { arsenic trioxide }				39 mg/kg	1.32	40.988 mg/kg	0.0041 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.364 mg/kg	0.0000364 %	✓		
		048-002-00-0	215-146-2	1306-19-0								
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	20.941 mg/kg	0.00209 %	✓		
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }				111 mg/kg	1.126	99.479 mg/kg	0.00995 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
5		mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7								
6		nickel { nickel(II) oxide (nickel monoxide) }				23 mg/kg	1.273	23.299 mg/kg	0.00233 %	✓		
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	242 mg/kg		192.632 mg/kg	0.0193 %	✓		
		082-001-00-6										
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD	
		034-002-00-8										
9		vanadium { divanadium pentaoxide; vanadium pentoxide }				40 mg/kg	1.785	56.84 mg/kg	0.00568 %	✓		
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }				142 mg/kg	1.245	140.693 mg/kg	0.0141 %	✓		
		030-013-00-7	215-222-5	1314-13-2								
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD	
		024-001-00-0	215-607-8	1333-82-0								
12		pH		PH		7.2 pH		7.2 pH	7.2 pH			
13		naphthalene				0.15 mg/kg		0.119 mg/kg	0.0000119 %	✓		
		601-052-00-2	202-049-5	91-20-3								

#	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							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		0.41 mg/kg		0.326 mg/kg	0.0000326 %	✓	
16	• fluorene	201-695-5	86-73-7		0.23 mg/kg		0.183 mg/kg	0.0000183 %	✓	
17	• phenanthrene	201-581-5	85-01-8		2.4 mg/kg		1.91 mg/kg	0.000191 %	✓	
18	• anthracene	204-371-1	120-12-7		0.49 mg/kg		0.39 mg/kg	0.000039 %	✓	
19	• fluoranthene	205-912-4	206-44-0		3.2 mg/kg		2.547 mg/kg	0.000255 %	✓	
20	• pyrene	204-927-3	129-00-0		2.85 mg/kg		2.269 mg/kg	0.000227 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.95 mg/kg		0.756 mg/kg	0.0000756 %	✓	
22	chrysene	601-048-00-0	205-923-4		1.31 mg/kg		1.043 mg/kg	0.000104 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.12 mg/kg		0.892 mg/kg	0.0000892 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.31 mg/kg		0.247 mg/kg	0.0000247 %	✓	
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.99 mg/kg		0.788 mg/kg	0.0000788 %	✓	
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		0.41 mg/kg		0.326 mg/kg	0.0000326 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		0.36 mg/kg		0.287 mg/kg	0.0000287 %	✓	
Total:								0.0596 %		

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 Determinand - 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

• **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

• **lead compounds with the exception of those specified elsewhere in this Annex**

GB MCL index number: 082-001-00-6

Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2

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 2A (Sup 7, 87) 2006; Lead REACH Consortium

www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• **divanadium pentaoxide; vanadium pentoxide** (EC Number: 215-239-8, CAS Number: 1314-62-1)

GB MCL index number: 023-001-00-8

Description/Comments: Hazard statements H301, H330, H350 added by HazWasteOnline due to ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formally make this change to the MCL List]. Substance has therefore been self-classified.

Additional Hazard Statement(s): Carc. 1B; H350 , Acute Tox. 3; H301 , Acute Tox. 2; H330

Reason for additional Hazards Statement(s):

20 Sep 2022 - Carc. 1B; H350 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formally make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 3; H301 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 3; H301". The GB MCL Agency has reached the same opinion [but is yet to formally make this change to the MCL List].

Substance has therefore been self-classified.

28 Sep 2022 - Acute Tox. 2; H330 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 2; H330". The GB MCL Agency has reached the same opinion [but is yet to formally make this change to the MCL List].

Substance has therefore been self-classified.

• **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

■ **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

■ **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314, Skin Corr. 1B; H314 >= 3 %, Skin Irrit. 2; H315 1 £ conc. < 3 %, Eye Irrit. 2; H319 1 £ conc. < 3 %, Aquatic Chronic 2; H411

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

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.

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

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. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel(II) oxide (nickel monoxide)}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

selenium {selenium compounds with the exception of cadmium sulposelenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulposelenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most conservative species.

zinc {zinc oxide}

Worst case compound based on absence of CrVI and assumed metal oxides from a combustion, ash based source.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass.

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}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2023.237.5731.10565 (25 Aug 2023)

HazWasteOnline Database: 2023.237.5731.10565 (25 Aug 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

Based across the UK with
offices in Manchester,
London, Liverpool and Glasgow.

Manchester (Head Office)

Unit 29,
Eton Business Park
Eton Hill Rd, Radcliffe
M26 2ZS

t: 0161 763 7200
e: info@thelkgroup.com

London

Brooklands Business Park
Wellington Way
Weybridge
KT13 0TT

t: 01932 871872
e: info@thelkgroup.com

Glasgow

Wright Business Centre
1 Lonmay Road
Glasgow
G33 4EL

t: 0141 773 6269
e: info@thelkgroup.com

Liverpool

The Corn Exchange
Fenwick Street
Liverpool
L2 7QL

t: 0151 235 8716
e: info@thelkgroup.com

Swindon

39 Bowman House Business Centre
Bowman Court
Whitehill Lane
Royal Wootton Bassett
Swindon
SN4 7DB

t : 01793 987 390
e : info@thelkgroup.com



- » Geotechnical
- » Contaminated Land
- » Flood Risk and Drainage
- » Asbestos
- » Invasive Species
- » Land Remediation
- » Project Management
- » Land Drilling