

J Greenwood (Builders) Limited
Unit B9 Greengate Industrial Estate
Greenside Way
Chadderton
M24 1SW

Date: 12th April 2024

LKC Reference: LKC 23 1687-B2-GI

RE: FRANCIS ROAD, WITHINGTON POST-DEMOLITION SITE INVESTIGATION REPORT & REVISED REMEDIATION STRATEGY

1. Introduction

LK Consult Ltd (LKC) has been appointed by J Greenwood (Builders) Ltd to undertake a post-demolition site investigation for Francis Road, Withington. The investigation was undertaken in support of proposals to redevelop the site for residential use.

The following work has previously been undertaken by LKC and should be read in conjunction with this report:

- Preliminary Risk Assessment (PRA) report (Ref. CL-602-LKC 21 1501-01, dated September 2021).
- Phase 2 Geo-investigation and Risk Assessment and Remediation Strategy report, (Ref: CL-602-LKC 21 1501-02, dated November 2022).
- Geotechnical letter report titled Francis Road, Withington (Ref. LKC 23 1687-B1-G1, dated 19th January 2024).

This post demolition investigation has been undertaken to confirm the ground conditions below the former building on the site and to delineate an area of previously identified contamination to allow additional contamination assessment to be undertaken.

The findings of this investigation have also been used to provide an updated Remediation Strategy (Section 8).

The report should be read in conjunction with the above reports.

2. Site Details

A summary of the site details is presented in Table 2-1. Figure 1 indicates the site location and boundary plan. Figure 2 indicates the proposed development (Appendix A).

Location	North of Francis Road, northeast of Kingslea House, Withington, Manchester. Centred at approximate National Grid Reference 385318E 392339N.
Area	1,600m ² .
Topography	35 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Recently demolished employment building.
Proposed Development	Erection of three storey building to provide 24 apartments following demolition of existing buildings including creation of a new vehicular access from Francis Road, parking provision, landscaping and associated works

Table 2-1: Summary of site details.

3. Summary of Previous Work

3.1. Phase 1 Preliminary Risk Assessment (PRA)

Pertinent information has been summarised from the PRA in Table 3-1.

Main Historical Features	Onsite: Laundry from 1922 until 1958 mapping and works from 1992 mapping. Surrounding Area: Electrical substation, allotment gardens, residential development.
Geology / Hydrogeology	Artificial: No BGS recorded artificial. Superficial: Till, Devensian (Diamicton). Secondary Aquifer - Undifferentiated. Bedrock: Wilmslow Sandstone Formation (sandstone), Principal Aquifer.
Landfills / Infilled Ground	No recorded landfills. No potentially infilled ground identified.
Site Reconnaissance	The site comprises a vacant office and former works building with a car park to the southwest and car parking off Francis Road to the east. The existing building is two storey with an office space located on the first floor. The ground level is raised by around 0.3m in the northeast section compared to the southwest. The floor of the building is predominately concrete with varying degrees of staining and cracking. The south of the building contains limited stains and is in good condition. The floor in the north of the building is more heavily stained concrete. Evidence of below ground services and drains was noted.

Table 3-1: Summary of site details, historical review, environmental settings, and site reconnaissance.

3.2. Previous Site Investigations

A summary of the Phase 2 Geo-investigation and Risk Assessment undertaken by LKC in 2022 is provided below in Table 3-2.

Date of Ground Investigation:	21st October 2022.
Intrusive Investigation Work Undertaken:	4no. window sample boreholes (WS101-WS104).
Monitoring Wells:	Installed in all boreholes.
Soil Sampling:	1no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 4no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX, VOCs, SVOCs and SOM.
Groundwater Sampling:	Insufficient groundwater.
Monitoring:	1no. groundwater monitoring visit.

Insitu and Laboratory Geotechnical Testing:	SPTs, pocket penetrometer tests. 1no. Atterberg Limit test. 2no. PSD tests. 3no. samples tested for BRE SD1 Suite (pH and sulphate).
Ground Conditions:	Made Ground to approx. 0.9 – 1.40 metres below ground level (mbgl). Stiff CLAY to approx. 1.10m-2.10mbgl over medium dense, becoming very dense SAND to the completion depths of the boreholes. Groundwater not encountered during the investigation works.
Soil Risk Assessment:	Elevated results: - Arsenic (42mg/kg in WS101 0.50-1.00mbgl). - Lead (340mg/kg in WS103 0.20-1.00mbgl). - Aromatic TPH EC12-16 (3,500mg/kg in WS102 0.20-0.90mbgl). - Aromatic TPH EC16-21 (13,000 mg/kg in WS102 0.20-0.90mbgl). - Aromatic TPH EC21-35 (24,000 mg/kg in WS102 0.20-0.90mbgl).
Groundwater Risk Assessment:	Insufficient groundwater present within the boreholes. Groundwater testing during post demolition investigation or source removal of TPH required around WS102.
Gas Risk Assessment:	Gas monitoring not required due to no visible source within 250m of the site. Ground conditions identified limited made ground (average of 0.94m

Table 3-2: Summary of the previous Phase 2 Geo-investigation and Risk Assessment.

A summary of the Geotechnical investigation undertaken by LKC in January 2024 is provided below in Table 3-3.

Date of Ground Investigation:	4 th January 2024
Intrusive Investigation Work Undertaken:	1no. rotary boreholes (RH101)
Soil Sampling:	1no. sample tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX and SOM.
Laboratory Geotechnical Testing:	10 no. Point Load Tests.
Ground Conditions:	Made Ground to approx. 1.20mbgl. CLAY to approx. 2.50mbgl. SAND to approx.3.90mbgl. SANDSTONE to approx. 10.50mbgl.
Soil Risk Assessment:	No elevated contamination levels.

Table 3-3: Summary of the previous geotechnical investigation.

3.3. Previous Conceptual Model

A contamination conceptual model has been previously produced by LKC and is summarised in Table 3-4 below. Please refer to the previous reports for further information regarding pollutant linkages (PL).

PL	Contaminant	Risk	Recommendations
1	Heavy metals (arsenic, lead). Petroleum hydrocarbons (TPH EC12-35).	Moderate	Remediation likely required, to be confirmed with a post demolition investigation.
	ACMs. PAHs.	Low	No additional remediation likely to be required other than the above for metal and TPH.
2	Volatile contaminants.	Low	No remediation likely required, to be confirmed with a post demolition investigation.
3	Hazardous / ground gas: methane, carbon dioxide.	Moderate / Low	No remediation likely required, to be confirmed with a post demolition investigation.
4	Metals, PAHs, petroleum hydrocarbons, volatile compounds.	Moderate	Hydrocarbon contamination in WS102 needs to be removed or groundwater sampling during post demolition investigation.
5	Petroleum hydrocarbons (TPH EC12-35).	Moderate	UU Risk assessment to be undertaken. Barrier piping may be required, to be confirmed with a post demolition investigation.

Table 3-4: Summary of previous contamination conceptual model.

4. Post-Demolition Site Investigation

4.1. Site Investigation Design and Methodology

In order to identify the depth and composition of made ground beneath the demolished buildings and to delineate the hydrocarbon contamination previously identified around WS102, an intrusive investigation was undertaken.

The investigation was carried out on 6th March 2024 and comprised the following:

- 3no. trial pits excavated to 1.70-2.00mbgl (TP101-TP103).
- Delineation around former location WS102.

All site investigation locations are shown in Figure 3 (Appendix A). Table 4-1 details the site investigation locations.

Site Investigation Locations	Rationale
TP101 to TP103	Target beneath the building footprint post demolition and general site coverage.
Hotspot Excavation Area	Delineation around previous sampling location WS102.

Table 4-1: Summary of Sampling Locations.

All profile logs are provided in Appendix B and are in line with BS14688-1¹ and BS5930².

4.2. Soil Sampling Protocol – Post Demolition Trial Pits (TP101-TP103)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation³. Soil was collected for onsite testing. Soil was collected for onsite testing for total volatile organic compounds (TVOCs) using a photoionisation detector (PID) fitted with a 10.6eV lamp and moisture trap. The bag was sealed and stored for at least 20 minutes before being tested. Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665⁴ 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 sent to DETS laboratory for chemical testing.

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 4-2 shows the soil testing undertaken in the post demolition trial pits.

Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	4	TP101 0.00-0.90m TP102 0.00-1.30m TP103 0.00-0.50m TP103 0.50-0.90m	A basic suite with a broad selection of contaminants tested where no significant evidence of contamination was identified (with the exception of the anthropogenic inclusions noted in the logs) and no TVOCs identified from the PID tests.

Table 4-2: 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; PAH=polycyclic aromatic hydrocarbons, SOM=Soil Organic Matter.

4.3. Soil Sampling Protocol – Delineation Around WS102

Standard sampling protocol and preservation of samples and onsite PID testing was carried out as detailed in Section 4.2.

As part of the delineation and excavation works soil was initially screened using a 10ppm screening limit to represent the presence of significant hydrocarbon presence. Visual and olfactory evidence of hydrocarbon presence was also used. Any impacted material would be quarantined on banded plastic sheeting ready to be sampled and disposed of offsite, if necessary. Table 4-3 below details the PID sample readings from the delineation area.

Sample Ref.	Sample Description	PID Reading (ppm)
PID 1	Made ground 0.2-0.8m at WS102 contains abundant ash and frequent tarmacadam fragments with hydrocarbon odour.	3.0
PID 2	Made ground 0.2-0.8m to the north of WS102 contains abundant ash and frequent tarmacadam fragments with hydrocarbon odour.	2.6
PID 3	Made ground 0.2-0.5m to the east WS102 contains abundant ash and frequent tarmacadam fragments with hydrocarbon odour.	1.5
PID 4	Made ground 0.2-0.6m south of WS102 contains abundant ash and frequent tarmacadam fragments with hydrocarbon odour.	1.2
PID 5	Lump of tarmacadam from made ground at WS102.	1.7
Base 1	Natural material at the base of WS102 with no odour.	0.8
Side 1	Made ground with no odour at the side of the excavation.	0.4
Side 2	Made ground with no odour at the side of the excavation.	1.5
Side 3	Made ground with no odour at the side of the excavation.	0.2
Side 4	Made ground with no odour at the side of the excavation.	0.7

Table 4-3: Summary of PID sample readings from the delineation area.

In addition, to establish if soil was impacted by petroleum hydrocarbons, validation samples were taken from the base and sides of the excavation following source removal. Photographs of the delineation area are provided in Appendix D.

Soil samples of approximately 500g were recovered in amber jars, amber vials for volatile analysis and plastic tubs. All the samples were sent to DETS laboratory for chemical testing.

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 4-4 shows the soil testing undertaken.

Contaminants	No. Samples	Location & Depth	Justification
TPHCWG, BTEX, MTBE, pH and SOM.	5	Base 1 Side 1 Side 2 Side 3 Side 4	Samples taken from the base and sides of the delineation excavation area and tested for a petroleum hydrocarbon suite to prove contamination is absent and that the extent of the contamination identified previously in WS102 has been proven.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	1	SP1	Detailed suite undertaken on stockpile samples representative of the material likely to be removed and disposed offsite.

Table 4-4: 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.

4.4. Ground Conditions

The ground conditions beneath the site are summarised below. Logs are provided in Appendix B.

4.4.1. Made Ground

Made ground was recorded in all trial pits to depths of 0.90-1.30mbgl.

The made ground comprised gravells silty sand with anthropogenic material including brick, ash, concrete and slate in TP101 and TP102.

The made ground in TP103 comprised sand with abundant brick to 0.50mbgl underlain by a slightly gravelly sandy clayey silt with ash to 0.90mbgl.

The strata around former borehole location WS102 comprised 0.20m of concrete underlain by black sandy gravel with abundant ash and tarmacadam fragments to 0.80mbgl. The tarmacadam fragments were noted to have a hydrocarbon odour.

4.4.2. Natural Strata

Superficial strata comprised firm sandy CLAY and / or slightly silty SAND to the bases of trial pits.

4.4.3. Contamination

Except for the anthropogenic material encountered in the made ground (as described above), no further contamination was identified.

There was no visual / olfactory evidence of hydrocarbons or volatile contaminants in TP101 to TP103. The PID recorded a maximum of 0.1ppm TVOC in the samples.

The tarmacadam fragments within the made ground around WS102 were noted to have a hydrocarbon odour.

4.4.4. Groundwater

Groundwater was not encountered in any investigation location.

5. Contamination Assessment

5.1. 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 (LCRM⁵).

5.2. Soil Risk Assessment Methodology

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

- Category 4 Screening Levels (C4SLs) ^{6, 7}.
- LQM Suitable 4 Use Levels (S4ULs) ^{8, 9, 10, 11}.

The proposed development is for construction of a three storey building to provide 24no. residential apartments with associated infrastructure and landscaping. The assessment criteria for residential without plant uptake has been used.

All criteria have been generated using the CLEA V1.06 model¹² 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 used in this assessment is provided in Appendix E.

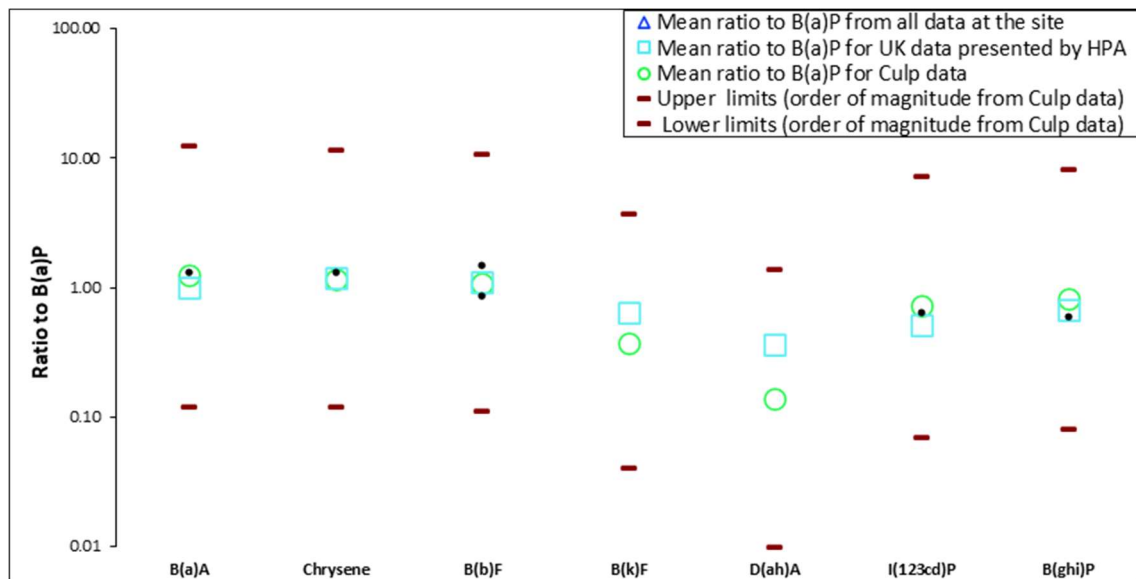
B(a)P as Surrogate Marker

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 PAHs^{13,14} and naphthalene the most volatile and soluble¹⁵.

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 negligible¹⁶. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)¹⁷ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

LKC undertook an assessment of the PAH 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*¹⁸, 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 5-1 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 5-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 2 out of 4 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.

5.3. Soil Results Comparison Against Assessment Criteria

Results from TP101 to TP103 and the base and sides of the validation excavation around WS102 have been compared to the relevant assessment criteria and no elevated contaminants were identified.

No asbestos was identified in any soil samples analysed.

5.3.1. Hazard Quotient

To examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions, a Hazard Index (HI) as described by the Environment Agency¹⁹ technical report was calculated for the samples. This should be undertaken when there are detectable petroleum hydrocarbons but not elevated when compared to appropriate assessment criteria.

The HI calculated for Side 1 (as this location had the highest total TPH) is less than 1, therefore no further consideration is required. Hazard Quotient output sheets are provided in Appendix F.

5.3.2. Updated Contamination Assessment

Results have been compared to the relevant assessment criteria and no elevated contaminants were identified and no asbestos was identified.

Table 5-1 below details the updated summary conceptual model for the site based on the results of the post demolition investigation and the removal of TPH impacted ground around WS102. Please refer to previous report for details on Pollutant Linkages.

PL	Contaminant	Risk	Recommendations
1	Heavy metals (arsenic, lead).	Moderate	Remediation required, likely to include an environmental cover system in soft landscaping areas.
	Petroleum hydrocarbons (TPH EC12-35).	Low	Elevated levels of TPH have been removed, therefore no additional remediation likely to be required other than the above for metals.
	ACMs. PAHs.	Low	No additional remediation likely to be required other than the above for metals.
2	Volatile contaminants.	Low	No remediation required.
3	Hazardous / ground gas: methane, carbon dioxide.	Moderate / Low	No remediation required.
4	Metals, PAHs, petroleum hydrocarbons, volatile compounds.	Low	Hydrocarbon contamination in WS102 has been removed. No further remediation required.
5	Petroleum hydrocarbons.	Moderate	UU Risk assessment to be undertaken. Barrier piping may be required.

Table 5-1: Summary of revised contamination conceptual model.

6. Waste Assessment

6.1.1. HazWaste Assessment

The soil contamination results for the stockpile of contaminated material for offsite disposal (sample ref. SP1) 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.

HazWasteOnline™. has been designed to cover, amongst other waste types, the 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, contaminants were selected based on observations during sampling, site history, ground conditions and likely species present in soils (e.g., metal oxides relating to an ash-based source).

The results show that all the samples tested are classified as non-hazardous for disposal. The HazWasteOnline™ output sheets are provided in Appendix G.

7. Conclusions

A post-demolition site investigation was undertaken in order to identify the depth and composition of made ground beneath the demolished buildings and to delineate an area of hydrocarbon contamination previously identified in WS102.

Made ground was recorded to depths of 0.90-1.30mbgl mbgl. Apart from anthropogenic material identified including brick, ash and tarmacadam fragments, no visual / olfactory evidence of contamination was identified.

The area around WS102 was successfully delineated and all the TPH impacted material has been removed. Therefore, when compared to the relevant assessment criteria, no elevated contaminants were identified during the post demolition investigation.

The revised contamination conceptual model has identified that remediation will be required for Pollutant Linkage (PL) 1 (direct contact) and an environmental capping layer should be installed as detailed in the previous report. With regards to PL4 (controlled waters), as the source of TPH contamination has been removed, no further remediation is required. A UU risk assessment should be undertaken to confirm the requirement for barrier pipe at the site.

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

8. Updated Remediation Strategy

Table 8-1 details the further works and remedial requirements. It is recommended that regulatory approval is obtained prior to the commencement of remediation works.

8.1. Remediation and Validation Recommendations

PL	Remediation Requirements	Validation Requirements
All	<p><u>Earthworks Inspections / Unexpected Contamination</u></p> <p>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.</p> <p>Should asbestos be identified during groundworks, precautions should be taken to ensure the safety of the construction workers and nearby land users. It would be advisable to introduce an asbestos management strategy in line with CIRIA C733²⁰.</p>	<p>Log of work undertaken including photographs.</p> <p>Details of any sampling undertaken and validation of any potential additional remedial work.</p>

PL	Remediation Requirements	Validation Requirements
1	<p><u>Environmental Cover System</u></p> <p>As made ground is relatively deep, it is unlikely to be viable to remove the contaminated soils. Therefore, an environmental cover system is recommended. The environmental cover system should be as follows:</p> <p>Soft Landscaping Areas: 450mm thick environmental cover system comprising:</p> <p><u>Either</u> 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 350mm comprising clean inert fill and sufficient topsoil for a growing medium.</p> <p><u>Or</u> geotextile membrane and at least 450mm comprising clean inert fill and sufficient topsoil for a growing medium.</p> <p>The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix H.</p>	<p>Measuring depth of environmental cover system using a staff and providing photographic evidence.</p> <p>Photographic evidence of the granular physical break or geotextile layer will also be collected.</p> <p>Chemical validation of imported soils: See Table 8-2.</p>
5	<p><u>Potable Water Pipes</u></p> <p>It is recommended that a Water Pipeline Assessment is undertaken once the location and depth of potable water pipes are known. It is likely that barrier pipe will be required.</p>	<p>Delivery Notes of Pipe Material.</p> <p>Photographs of the Installed Pipe.</p>
2, 3, 4	No remediation anticipated with respect to PL2 (inhalation of vapours), PL3 (gas), PL4 (controlled waters).	N/A

Table 8-1: Remediation and validation requirements.

8.2. Validation of Subsoil / Topsoil

Chemical validation of all imported soils to be used on site in gardens and soft landscaping 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 8-2, based on MCC 'Guidelines to Developer' (2021)²¹. However, LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. However, 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 / soft landscaping to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate (min. 3 per source) *		
			Garden	Landscape	Other **
Topsoil / subsoil / Fill material	Greenfield	Suite A	200m ³	200m ³	200m ³
	Remediated	Suite A / B dependent upon original SI	100m ³	150m ³	200m ³
	Brownfield / Unknown	Suite B	50m ³	150m ³	200m ³
Quarried Fill	First Generation i.e. quarried sand (subsoil) or stone (break layer)	No testing is required. Certification of material provenance is required.			

Table 8-2: Sampling requirements for imported 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.

** Other assumed to be stone / 6F2 / mass fill etc.

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 BS3882²²). 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 residential without plant uptake criteria (as used in the contamination risk assessment). Appropriate remedial target criteria are presented in Appendix E.

8.3. Site Completion Report

It is recommended that any remediation carried out on the site is validated by a third party and suitable documentary evidence provided in a Site Completion Report, such as photographs, consignment documents and analytical results. This should include as a minimum:

- Waste Transfer Notes for soil disposal off site.
- Validation of environmental cover system.
- Verification testing of all imported soil for soft landscaping areas.
- Information on the installation of protective pipes.
- Details of any unexpected contamination identified onsite, suitably risk assessed and / or validated.

The Site Completion Report will assist the Local Authority in the discharge of any future relevant planning condition and will also be of use to solicitors acting on behalf of any prospective conveyancer who may have concerns over the former use of the site.

Report Prepared By:

Rachel Peart
Senior Geo-Environmental Consultant

Report Reviewed By:

Colin Crompton
Director

Enclosed:

Appendix A: Figures
Appendix B: Profile Logs
Appendix C: Certificates of Analysis
Appendix D: Photographs
Appendix E: Generic Assessment Criteria
Appendix F: Hazard Quotient
Appendix G: HazWasteOnline Output Sheets
Appendix H: Environmental Cover System Construction
References

DISCLAIMER

This report has been prepared by 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 on 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.

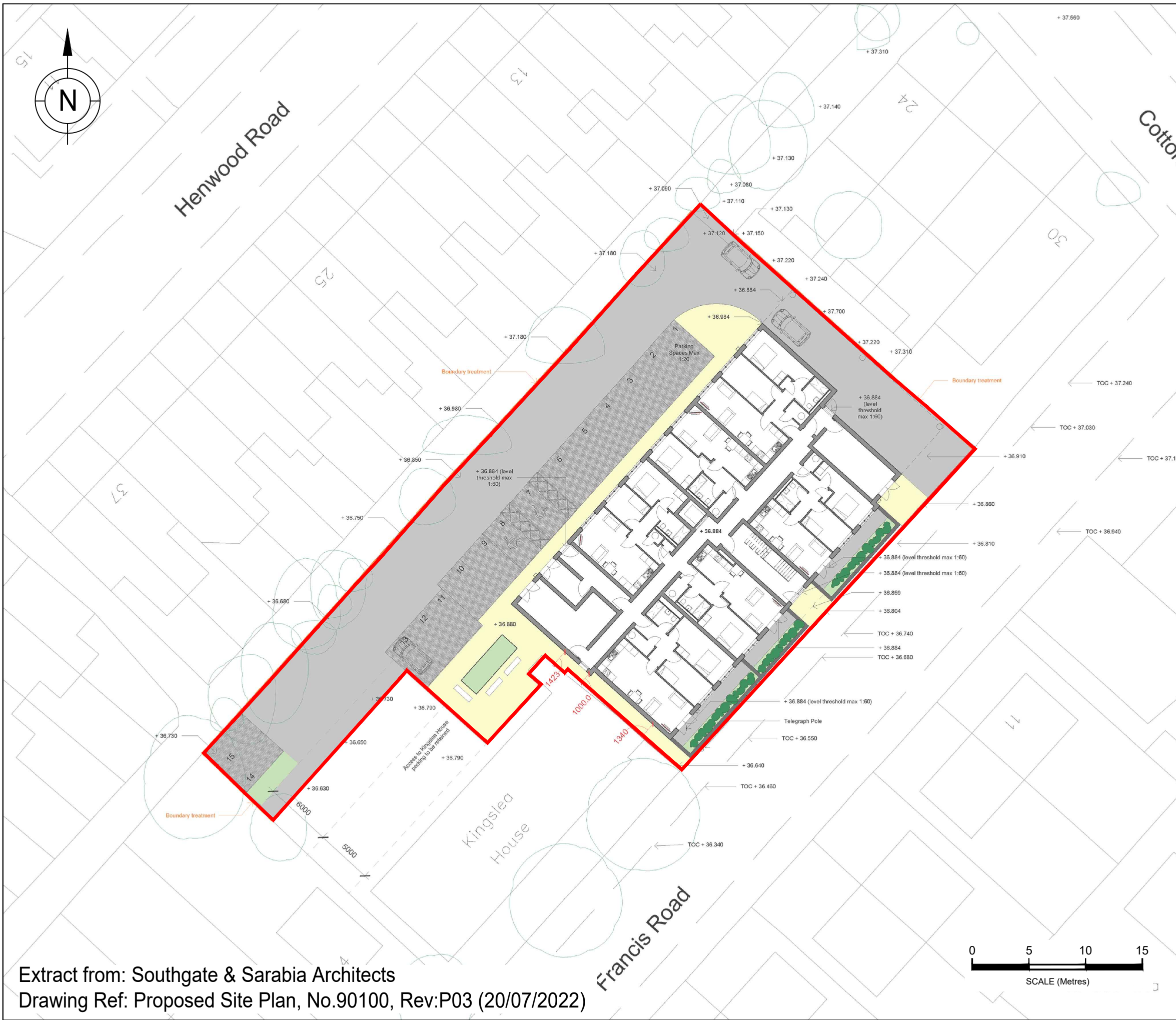
This report is issued on the condition that LKC will not be held liable for any loss arising from ground conditions between sampling points (i.e. boreholes/trial pits/hand augers/surface samples) which have not been shown by the sampling points or related testing carried out during the investigation,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

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Appendix A – Figures



Client: J Greenwood (Builders) Ltd				Title: Site Location & Boundary Plan		
Site: Francis Road, Withington				Scale (see scale bar): 1:25,000 & 1:1500 @ A4		
Job No.: LKC 23 1687	Drawn By: RW	Checked By: CC	Drawn: Jan 2024	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.



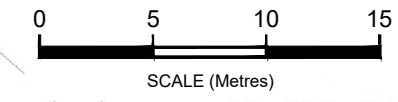
Client: J Greenwood (Builders) Limited

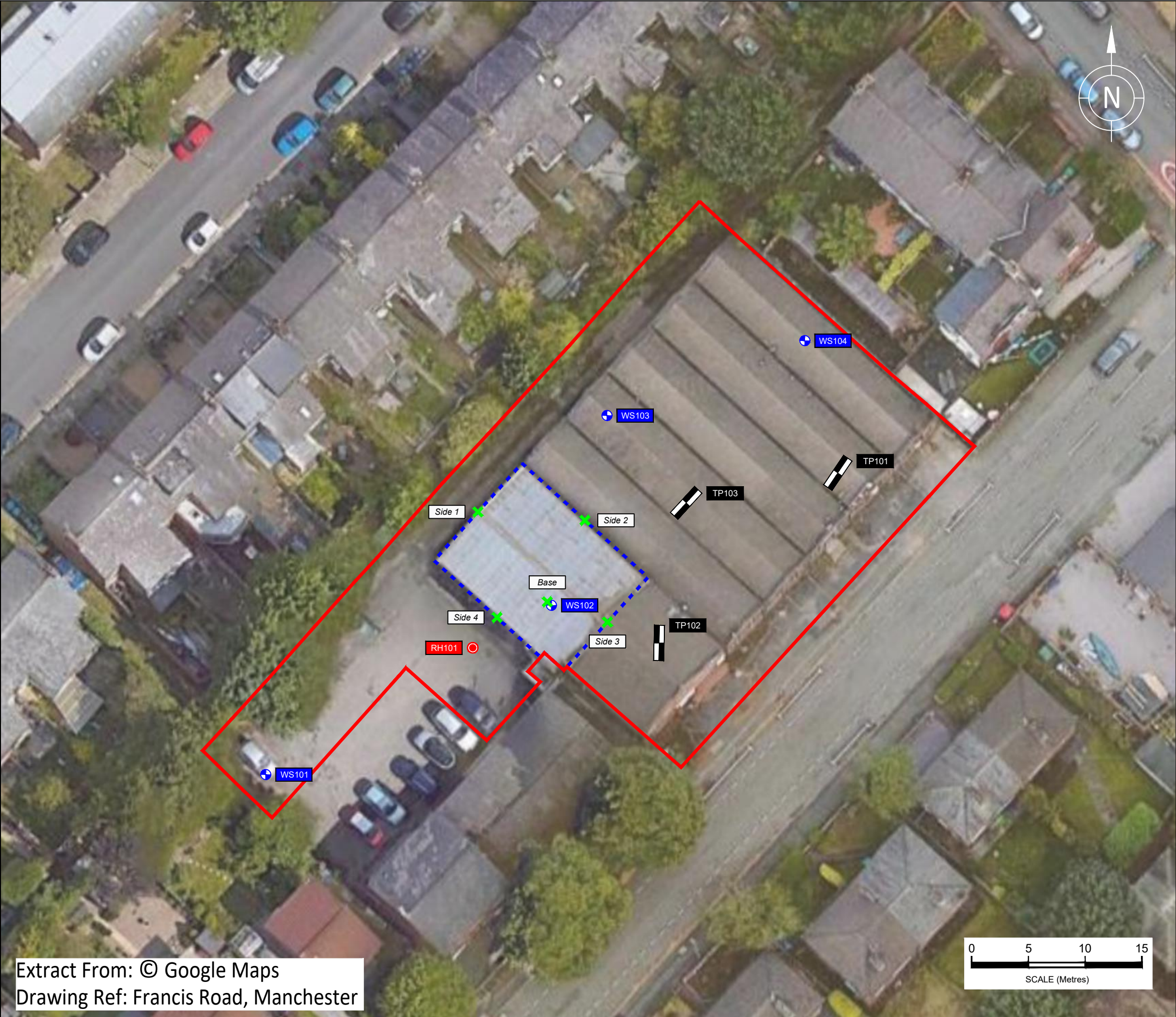
Site: Francis Road, Withington

Title: Proposed Layout Plan

Job No.: LKC 21 1501	Scale (See Scale Bar): See Scale Bar	Figure: 2	Revision: 4
Drawn By: AC	Checked By: MT	Drawn: Jul 2022	

Extract from: Southgate & Sarabia Architects
Drawing Ref: Proposed Site Plan, No.90100, Rev:P03 (20/07/2022)





KEY

Site Boundary

Post Demolition Trial Pit (TP)

Validation Sample Location (Side/Base)

Hotspot Excavation Area

PREVIOUS LK SI (JAN 2024):

Rotary Borehole (RH)

PREVIOUS LK SI (OCT 2022):

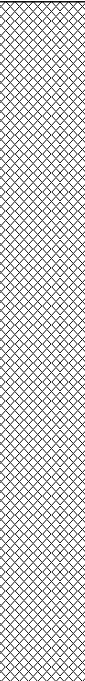
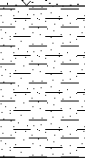
Window Sample Borehole (WS)

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: J Greenwood (Builders) Limited			
Site: Francis Road, Withington			
Title: Post Demolition Site Investigation Location Plan			
Job No.: LKC 23 1687	Scale (See Scale Bar): See Scale Bar	Figure: 3	Revision:
Drawn By: AC	Checked By: RP	Drawn: Apr 2024	

Extract From: © Google Maps
Drawing Ref: Francis Road, Manchester

Appendix B – Profile Logs

		<h1>Trial Pit Log</h1>					Location Number: TP101				
Project: Francis Road, Withington			Client: J Greenwood (Builders) Limited			Date: 06/03/2024					
Project No. : LKC 23 1687			Contractor: Booth Hill Demolition								
Equipment: 14T Tracked Excavator			Level		Logged By RP		Scale 1:10		Page Number Sheet 1 of 1		
Depth (m)		Samples / Tests		Depth (m)	Legend	Stratum Description					Level (m)
0.00 - 0.90 0.00 - 0.90		ES PID=0.0ppm				MADE GROUND: Orangish brown slightly gravelly silty SAND with occasional brick, rare ash and slate. Sand is fine to coarse. Gravel is fine to medium subangular to subrounded comprising sandstone.					
0.90 - 1.50		D		0.90		Grey, yellow and orange slightly silty SAND. Sand is fine to coarse.				0.5	1.0
1.50 - 1.70 1.50		D		1.50		Stiff consistency high strength orangish brown with grey mottles sandy CLAY. Sand is fine to coarse.				1.5	
1.60		PP=85.8kPa		1.70		End of Trial Pit at 1.70m					2.0
						Pit Dimensions			Pit Stability		
		Length (m)		Width (m)		Depth (m)		Stable			
		4.00		1.30		1.70					
						Remarks: Trial pit stable and dry.					

Trial pit stable and dry.

<div><div>LKCONSULT</div><div></div></div>		<div>Trial Pit Log</div>				<div>Location Number: TP103</div>	
Project: Francis Road, Withington			Client: J Greenwood (Builders) Limited		Date: 06/03/2024		
Project No. : LKC 23 1687			Contractor: Booth Hill Demolition				
Equipment: 14T tracked excavator			Level	Logged By RP	Scale 1:10	Page Number Sheet 1 of 1	
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description			Level (m)
0.00 - 0.50 0.00 - 0.50	ES PID=0.0ppm			MADE GROUND: Orange SAND with abundant brick Sand is fine to coarse.			
0.50 - 0.90 0.50 - 0.90	ES PID=0.1ppm	0.50		MADE GROUND: Dark grey organic slightly gravelly sandy clayey SILT with occasional ash. Sand is fine to coarse. Gravel is fine to medium subangular to angular comprising sandstone.			0.5
1.00 1.00	PP=36.8kPa	0.90		Firm consistency low strength orange mottled grey sandy CLAY. Sand is fine to coarse.			1.0
		1.20		Orange and grey slightly silty SAND. Sand is fine to coarse.			1.5
		2.00		End of Trial Pit at 2.00m			2.0
		Pit Dimensions			Pit Stability		
		Length (m)	Width (m)	Depth (m)	Stable		
		3.60	1.30	2.00			
		Remarks:					
Trial pit stable and dry.							

Appendix C – Certificates of Analysis



Colin Crompton
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-02462

Site Reference: Francis Road, Withington

Project / Job Ref: LKC 23 1687

Order No: LKC231687-CC

Sample Receipt Date: 08/03/2024

Sample Scheduled Date: 08/03/2024

Report Issue Number: 1

Reporting Date: 13/03/2024

Authorised by:

Steve Knight
Customer Support 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.



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



Soil Analysis Certificate						
DETS Report No: 24-02462	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Francis Road, Withington	~TP / BH No	SP1	Base 1	Side 1	Side 2	Side 3
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: LKC231687-CC	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 13/03/2024	DETS Sample No	702945	702946	702947	702948	702949

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	MCERTS	7.7				
Total Cyanide	mg/kg	< 1	NONE	< 1				
Free Cyanide	mg/kg	< 1	NONE	< 1				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	841				
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.84				
Organic Matter (SOM)	%	< 0.1	MCERTS	11.4	6.1	6.3	6	5.9
Arsenic (As)	mg/kg	< 2	MCERTS	27				
W/S Boron	mg/kg	< 1	NONE	2				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4				
Chromium (Cr)	mg/kg	< 2	MCERTS	11				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	109				
Lead (Pb)	mg/kg	< 3	MCERTS	178				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	23				
Selenium (Se)	mg/kg	< 2	MCERTS	< 2				
Vanadium (V)	mg/kg	< 1	MCERTS	31				
Zinc (Zn)	mg/kg	< 3	MCERTS	113				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 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)

~ Sample details provided by the customer



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Soil Analysis Certificate						
DETS Report No: 24-02462	~Date Sampled	06/03/24				
LK Consult Limited	~Time Sampled	None Supplied				
~Site Reference: Francis Road, Withington	~TP / BH No	Side 4				
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied				
~Order No: LKC231687-CC	~Depth (m)	None Supplied				
Reporting Date: 13/03/2024	DETS Sample No	702950				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025				
pH	pH Units	N/a	MCERTS				
Total Cyanide	mg/kg	< 1	NONE				
Free Cyanide	mg/kg	< 1	NONE				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS				
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS				
Organic Matter (SOM)	%	< 0.1	MCERTS	2.1			
Arsenic (As)	mg/kg	< 2	MCERTS				
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS				
Chromium (Cr)	mg/kg	< 2	MCERTS				
Chromium (hexavalent)	mg/kg	< 2	NONE				
Copper (Cu)	mg/kg	< 4	MCERTS				
Lead (Pb)	mg/kg	< 3	MCERTS				
Mercury (Hg)	mg/kg	< 1	MCERTS				
Nickel (Ni)	mg/kg	< 3	MCERTS				
Selenium (Se)	mg/kg	< 2	MCERTS				
Vanadium (V)	mg/kg	< 1	MCERTS				
Zinc (Zn)	mg/kg	< 3	MCERTS				
Total Phenols (monohydric)	mg/kg	< 2	NONE				

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)
 ~ Sample details provided by the customer



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-02462	~Date Sampled	06/03/24				
LK Consult Limited	~Time Sampled	None Supplied				
~Site Reference: Francis Road, Withington	~TP / BH No	SP1				
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied				
~Order No: LKC231687-CC	~Depth (m)	None Supplied				
Reporting Date: 13/03/2024	DETS Sample No	702945				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	1.39			
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.32			
Acenaphthene	mg/kg	< 0.1	MCERTS	4.89			
Fluorene	mg/kg	< 0.1	MCERTS	3.78			
Phenanthrene	mg/kg	< 0.1	MCERTS	39.70			
Anthracene	mg/kg	< 0.1	MCERTS	9.38			
Fluoranthene	mg/kg	< 0.1	MCERTS	44.30			
Pyrene	mg/kg	< 0.1	MCERTS	42.70			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	18.90			
Chrysene	mg/kg	< 0.1	MCERTS	16.90			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	13.90			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	4.36			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	11.70			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	5.29			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	1.49			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	4.69			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	224			

~ Sample details provided by the customer



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 24-02462	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Francis Road, Withington	~TP / BH No	SP1	Base 1	Side 1	Side 2	Side 3
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: LKC231687-CC	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 13/03/2024	DETS Sample No	702945	702946	702947	702948	702949

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS 1D MS AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS 1D MS AL	mg/kg	< 0.05	NONE	0.20	0.09	0.07	0.18	0.09
Aliphatic >C8 - C10 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH CU 1D AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C34 - C44 : HS 1D MS+EH CU 1D AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34) : HS 1D MS+EH CU 1D AL	mg/kg	< 21	NONE		< 21	< 21	< 21	< 21
Aliphatic (C5 - C44) : HS 1D MS+EH CU 1D AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH CU 1D AR	mg/kg	< 2	MCERTS	5	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH CU 1D AR	mg/kg	< 2	MCERTS	56	< 2	10	5	< 2
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	289	< 3	71	20	8
Aromatic >C21 - C35 : EH CU 1D AR	mg/kg	< 10	MCERTS	346	< 10	94	30	< 10
Aromatic >C35 - C44 : HS 1D MS+EH CU 1D AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS 1D MS+EH CU 1D AR	mg/kg	< 21	NONE		< 21	175	54	< 21
Aromatic (C5 - C44) : HS 1D MS+EH CU 1D AR	mg/kg	< 21	NONE	696	< 21	175	54	< 21
Total >C5 - C44 : HS 1D MS+EH CU 1D Total	mg/kg	< 42	NONE	696	< 42	175	54	< 42
Total >C5 - C35 : HS 1D MS+EH CU 1D Total	mg/kg	< 42	NONE		< 42	175	54	< 42

~ Sample details provided by the customer



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



Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 24-02462	~Date Sampled	06/03/24				
LK Consult Limited	~Time Sampled	None Supplied				
~Site Reference: Francis Road, Withington	~TP / BH No	Side 4				
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied				
~Order No: LKC231687-CC	~Depth (m)	None Supplied				
Reporting Date: 13/03/2024	DETS Sample No	702950				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10			
Aliphatic >C34 - C44 : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 10	NONE	< 10			
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	6			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	23			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	21			
Aromatic >C35 - C44 : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 10	NONE	< 10			
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	50			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	50			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	50			
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	50			

~ Sample details provided by the customer



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



Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-02462	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Francis Road, Withington	~TP / BH No	SP1	Base 1	Side 1	Side 2	Side 3
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: LKC231687-CC	~Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 13/03/2024	DETS Sample No	702945	702946	702947	702948	702949

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

~ Sample details provided by the customer



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-02462	~Date Sampled	06/03/24				
LK Consult Limited	~Time Sampled	None Supplied				
~Site Reference: Francis Road, Withington	~TP / BH No	Side 4				
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied				
~Order No: LKC231687-CC	~Depth (m)	None Supplied				
Reporting Date: 13/03/2024	DETS Sample No	702950				

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

~ Sample details provided by the customer



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 24-02462	
LK Consult Limited	
~Site Reference: Francis Road, Withington	
~Project / Job Ref: LKC 23 1687	
~Order No: LKC231687-CC	
Reporting Date: 13/03/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
702945	SP1	None Supplied	None Supplied	11.7	Black sandy clay with stones and concrete
702946	Base 1	None Supplied	None Supplied	17.8	Brown sandy clay
702947	Side 1	None Supplied	None Supplied	11.7	Brown sandy clay with stones and concrete
702948	Side 2	None Supplied	None Supplied	15.4	Brown sandy clay with brick
702949	Side 3	None Supplied	None Supplied	18.4	Brown sandy clay
702950	Side 4	None Supplied	None Supplied	11.9	Brown sandy clay

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

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}

~ Sample details provided by the customer



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Rose Lane
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Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-02462

LK Consult Limited

~Site Reference: Francis Road, Withington

~Project / Job Ref: LKC 23 1687

~Order No: LKC231687-CC

Reporting Date: 13/03/2024

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

D Dried

AR As Received

~ Sample details provided by the customer



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List of HWOL Acronyms and Operators

DETS Report No: 24-02462

LK Consult Limited

~Site Reference: Francis Road, Withington

~Project / Job Ref: LKC 23 1687

~Order No: LKC231687-CC

Reporting Date: 13/03/2024

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

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 - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - 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 - C35 - HS_1D_MS+EH_CU_1D_Total
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



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Normec DETS Limited
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t: 01622 850410

DETS Report No: 24-02463

Site Reference: Francis Road , Withington

Project / Job Ref: LKC 23 1687

Order No: LKC231687-CC

Sample Receipt Date: 08/03/2024

Sample Scheduled Date: 08/03/2024

Report Issue Number: 1

Reporting Date: 13/03/2024

Authorised by:

Steve Knight
Customer Support 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.



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Soil Analysis Certificate					
DETS Report No: 24-02463	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Francis Road , Withington	~TP / BH No	TP101	TP102	TP103	TP103
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: LKC231687-CC	~Depth (m)	0.00 - 0.90	0.00 - 1.30	0.00 - 0.50	0.50 - 0.90
Reporting Date: 13/03/2024	DETS Sample No	702951	702952	702953	702954

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.1	6.0	8.1	6.5
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	166	784	181	57
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.17	0.78	0.18	0.06
Organic Matter (SOM)	%	< 0.1	MCERTS	3	2.7	0.7	5.1
Arsenic (As)	mg/kg	< 2	MCERTS	11	11	4	14
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	15	10	10	11
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	20	25	7	29
Lead (Pb)	mg/kg	< 3	MCERTS	43	70	26	86
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	12	9	6	15
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	30	19	16	24
Zinc (Zn)	mg/kg	< 3	MCERTS	34	34	31	43

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)

~ Sample details provided by the customer



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-02463	~Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Francis Road , Withington	~TP / BH No	TP101	TP102	TP103	TP103	
~Project / Job Ref: LKC 23 1687	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: LKC231687-CC	~Depth (m)	0.00 - 0.90	0.00 - 1.30	0.00 - 0.50	0.50 - 0.90	
Reporting Date: 13/03/2024	DETS Sample No	702951	702952	702953	702954	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
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	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.28	0.16	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.64	0.25	< 0.1	
Pyrene	mg/kg	< 0.1	MCERTS	0.23	0.65	0.25	< 0.1	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.33	0.11	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.33	0.12	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.27	0.37	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.31	0.25	< 0.1	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.16	< 0.1	< 0.1	
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	0.15	< 0.1	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3.2	< 1.6	< 1.6	

~ Sample details provided by the customer



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 24-02463	
LK Consult Limited	
~Site Reference: Francis Road , Withington	
~Project / Job Ref: LKC 23 1687	
~Order No: LKC231687-CC	
Reporting Date: 13/03/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
702951	TP101	None Supplied	0.00 - 0.90	13.6	Light brown sandy clay with stones
702952	TP102	None Supplied	0.00 - 1.30	13	Brown sandy clay with stones
702953	TP103	None Supplied	0.00 - 0.50	10.6	Light brown sandy clay with stones
702954	TP103	None Supplied	0.50 - 0.90	17.1	Grey sandy clay with stones

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

Insufficient Sample ¹/s

Unsuitable Sample ^u/s

~ Sample details provided by the customer



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-02463

LK Consult Limited

~Site Reference: Francis Road, Withington

~Project / Job Ref: LKC 23 1687

~Order No: LKC231687-CC

Reporting Date: 13/03/2024

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

D Dried

AR As Received

~ Sample details provided by the customer



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List of HWOL Acronyms and Operators	
DETS Report No: 24-02463	
LK Consult Limited	
~Site Reference: Francis Road , Withington	
~Project / Job Ref: LKC 23 1687	
~Order No: LKC231687-CC	
Reporting Date: 13/03/2024	

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

Det - Acronym

Appendix D – Photographs



Initial excavation at WS102.



View of excavated delineation area around former WS102. All hydrocarbon contaminated material removed.



View of excavated contaminated material from around WS102 (referenced SP1).

Appendix E – Generia Assessment Criteria

Generic Assessment Criteria Values

Contaminant	SOM	Res +	Res -	Allot.	Comm.	pos resi	pos park	Source	
Metals	Inorganic Arsenic	N/A	37	40	49	640	79	168	DEFRA C4SL
	Beryllium	N/A	1.7	1.7	35	12	2.2	63	LQM S4UL
	Boron	N/A	290	11,000	45	240,000	21,000	46,000	LQM S4UL
	Cadmium	N/A	26	149	4.9	410	220	880	DEFRA C4SL
	Chromium (III)	N/A	910	910	18,000	8,600	1,500	33,000	LQM S4UL
	Chromium (VI)	N/A	21.0	21.0	170.0	49	23.0	250	DEFRA C4SL
	Copper	N/A	2,400	7,100	520	68,000	12,000	44,000	LQM S4UL
	Lead	N/A	200	310	80	2,330	630	1,300	DEFRA C4SL
	Elemental Mercury	N/A	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}	LQM S4UL
	Inorganic Mercury	N/A	40	56	19	1,100	120	240	LQM S4UL
	Methylmercury	N/A	11	15	6.0	320	40	68	LQM S4UL
	Nickel	N/A	180	180	230	980	230	3,400	LQM S4UL
	Selenium	N/A	250	430	88	12,000	1,100	1,800	LQM S4UL
	Vanadium	N/A	410	1,200	91	9,000	2,000	5,000	LQM S4UL
	Zinc	N/A	3,700	40,000	620	730,000	81,000	170,000	LQM S4UL
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	1%	210	3,000 (57.1) ^{sol}	34	84,000 (57.0) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	510	4,700 (141) ^{sol}	85	97,000 (141) ^{sol}	15,000	30,000	LQM S4UL
		6%	1,100	6,000 (336) ^{sol}	200	100,000	15,000	30,000	LQM S4UL
	Acenaphthylene	1%	170	2,900 (86.1) ^{sol}	28	83,000 (86.1) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	420	4,600 (212) ^{sol}	69	97,000 (212) ^{sol}	15,000	30,000	LQM S4UL
		6%	920	6,000 (506) ^{sol}	160	100,000	15,000	30,000	LQM S4UL
	Anthracene	1%	2,400	31,000 (1.17) ^{vap}	380	520,000	74,000	150,000	LQM S4UL
		2.5%	5,400	35,000	950	540,000	74,000	150,000	LQM S4UL
		6%	11,000	37,000	2,200	540,000	74,000	150,000	LQM S4UL
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49	LQM S4UL
		2.5%	11	14	6.5	170	29	56	LQM S4UL
		6%	13	15	13	180	29	62	LQM S4UL
	Benzo(a)pyrene (only)	1%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		2.5%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		6%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13	LQM S4UL
		2.5%	3.3	4.0	2.1	44	7.2	15	LQM S4UL
		6%	3.7	4.0	3.9	45	7.2	16	LQM S4UL
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400	LQM S4UL
		2.5%	340	360	470	4,000	640	1,500	LQM S4UL
		6%	350	360	640	4,000	640	1,600	LQM S4UL
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370	LQM S4UL
		2.5%	93	110	75	1,200	190	410	LQM S4UL
		6%	100	110	130	1,200	190	440	LQM S4UL
	Chrysene	1%	15	30	4.1	350	57	93	LQM S4UL
		2.5%	22	31	9.4	350	57	110	LQM S4UL
		6%	27	32	19	350	57	120	LQM S4UL
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1	LQM S4UL
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3	LQM S4UL
		6%	0.3	0.32	0.43	3.6	0.58	1.4	LQM S4UL
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300	LQM S4UL
		2.5%	560	1,600	130	23,000	3,100	6,300	LQM S4UL
		6%	890	1,600	290	23,000	3,100	6,400	LQM S4UL
	Fluorene	1%	170	2,800 (36.0) ^{sol}	27	63,000 (30.9) ^{sol}	9,900	20,000	LQM S4UL
		2.5%	400	3,800 (76.5) ^{sol}	67	68,000	9,900	20,000	LQM S4UL
		6%	860	4,500 (183) ^{sol}	160	71,000	9,900	20,000	LQM S4UL
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150	LQM S4UL
		2.5%	36	46	21	510	82	170	LQM S4UL
		6%	41	46	39	510	82	180	LQM S4UL
	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}	LQM S4UL
		2.5%	5.6 ^f	5.6 ^f	10 ^f	460 ^f (183) ^{sol}	4,900 ^f	1,900 ^f (183) ^{sol}	LQM S4UL
		6%	13 ^f	13 ^f	24 ^f	1,100 ^f (432) ^{sol}	4,900 ^f	3,000	LQM S4UL
	Phenanthrene	1%	95	1,300 (36.0) ^{sol}	15	22,000	3,100	6,200	LQM S4UL
		2.5%	220	1,500	38	22,000	3,100	6,200	LQM S4UL
		6%	440	1,500	90	22,000	3,100	6,300	LQM S4UL
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000	LQM S4UL
		2.5%	1,200	3,800	270	54,000	7,400	15,000	LQM S4UL
		6%	2,000	3,800	620	54,000	7,400	15,000	LQM S4UL
	Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	LQM S4UL
		2.5%	0.98	1.2	0.67	15	2.2	4.7	LQM S4UL
		6%	1.1	1.2	1.2	15	2.2	4.8	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
BTEX Compounds	Benzene	1%	0.087	0.38	0.017	27	72	90	LQM S4UL
		2.5%	0.17	0.70	0.034	47	72	100	LQM S4UL
		6%	0.37	1.4	0.075	90	73	110	LQM S4UL
	Toluene	1%	130	880 (869) ^{vap}	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}	LQM S4UL
		2.5%	290	1,900	51	110,000 (1,920) ^{vap}	56,000	95,000 (1,920)	LQM S4UL
		6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360)	LQM S4UL
	Ethylbenzene	1%	47	83	16	5,700 (518) ^{vap}	24,000	17,000 (518) ^{vap}	LQM S4UL
		2.5%	110	190	39	13,000 (1,220) ^{vap}	24,000	22,000 (1,220)	LQM S4UL
		6%	260	440	91	27,000 (2,840) ^{vap}	25,000	27,000 (2,840)	LQM S4UL
	o-xylene	1%	60	88	28	6,600 (478) ^{sol}	41,000	17,000 (478) ^{sol}	LQM S4UL
		2.5%	140	210	67	15,000 (1,120) ^{sol}	42,000	24,000 (1,120) ^{sol}	LQM S4UL
		6%	330	480	160	33,000 (2,620) ^{sol}	43,000	33,000 (2,620) ^{sol}	LQM S4UL
	m-xylene	1%	59	82	31	6,200 (625) ^{vap}	41,000	17,000 (625) ^{vap}	LQM S4UL
		2.5%	140	190	74	14,000 (1,470) ^{vap}	42,000	24,000 (1,470)	LQM S4UL
		6%	320	450	170	31,000 (3,460) ^{vap}	43,000	32,000 (3,460)	LQM S4UL
	p-xylene	1%	56	79	29	5,900 (576) ^{sol}	41,000	17,000 (576) ^{sol}	LQM S4UL
		2.5%	130	180	69	14,000 (1,350) ^{sol}	42,000	23,000 (1,350) ^{sol}	LQM S4UL
		6%	310	430	160	30,000 (3,170) ^{sol}	43,000	31,000 (3,170) ^{sol}	LQM S4UL
Petroleum Hydrocarbons	Aliphatic								
	EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}	LQM S4UL
	EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}	LQM S4UL
	EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}	LQM S4UL
	EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}	LQM S4UL
	EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}	LQM S4UL
	EC>16-35	1%	65,000 (8.48)	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f	LQM S4UL
	EC>35-44	1%	65,000 (8.48)	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f	LQM S4UL
	Aliphatic								
	EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}	LQM S4UL
	EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}	LQM S4UL
	EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}	LQM S4UL
	EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}	LQM S4UL
	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}	LQM S4UL
	EC>16-35	2.5%	92,000 (21)	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f	LQM S4UL
	EC>35-44	2.5%	92,000 (21)	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f	LQM S4UL
	Aliphatic								
	EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150)	LQM S4UL
	EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}	LQM S4UL
	EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}	LQM S4UL
	EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}	LQM S4UL
	EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}	LQM S4UL
	EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f	LQM S4UL
	EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}	LQM S4UL
	EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}	LQM S4UL
	EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}	LQM S4UL
	EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}	LQM S4UL
	EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000	LQM S4UL
	EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f	LQM S4UL
	EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}	LQM S4UL
	EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}	LQM S4UL
	EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}	LQM S4UL
	EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}	LQM S4UL
	EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000	LQM S4UL
	EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f	LQM S4UL
	EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}	LQM S4UL
	EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360)	LQM S4UL
	EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}	LQM S4UL
	EC>10-12	6%	380	1,200	4	34,000 (2,150) ^{sol}	5,000	10,000	LQM S4UL
	EC>12-16	6%	660	2,500	130	38,000	5,100	10,000	LQM S4UL
	EC>16-21	6%	930 ^f	1,900 ^f	260 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>21-35	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL
	EC>35-44	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL
	Aliphatic +Aromatic >EC44	1%	1,600 ^f	1,900 ^f	1,200 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
		2.5%	1,800 ^f	1,900 ^f	2,100 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
		6%	1,900 ^f	1,900 ^f	3,000 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
Chloalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	0.0071	0.0092	0.0046	0.67	29	21	LQM S4UL
		2.5%	0.0110	0.0130	0.0083	0.97	29	24	LQM S4UL
		6%	0.0190	0.0230	0.0160	1.7	29	28	LQM S4UL
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425)	LQM S4UL
	Trichloroethane (TCA)	2.5%	18	18	110	1,300	140,000	76,000 (2,915)	LQM S4UL
		6%	39	40	240	3,000	140,000	100,000 (6,392)	LQM S4UL
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800	LQM S4UL
		2.5%	3.4	8.0	0.89	550	1,400	2,100	LQM S4UL
		6%	7.5	17	2.0	1,100	1,400	2,300	LQM S4UL
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500	LQM S4UL
		2.5%	2.8	3.5	1.9	250	1,400	1,800	LQM S4UL
		6%	6.4	8.2	4.4	560	1,400	2,100	LQM S4UL
	Tetrachloroethene (PCE)	1%	0.31	0.32	2.00	24	3,200	1400	DEFRA C4SL
		2.5%	0.70	0.71	4.8	55	3,300	1900	DEFRA C4SL
		6%	1.60	1.60	11.0	130	3,400	2,500	DEFRA C4SL
	Tetrachloromethane (carbon tetrachloride)	1%	0.03	0.03	0.45	2.9	890	190	LQM S4UL
		2.5%	0.06	0.06	1.0	6.3	920	270	LQM S4UL
		6%	0.13	0.13	2.4	14	950	400	LQM S4UL
	Trichloroethene (TCE)	1%	0.009	0.010	0.032	0.7	76.0	41.0	DEFRA C4SL
		2.5%	0.020	0.020	0.072	1.5	78.0	51.0	DEFRA C4SL
		6%	0.043	0.045	0.160	3.4	79.0	69.0	DEFRA C4SL
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600	LQM S4UL
		2.5%	1.7	2.1	0.83	170	2,500	2,800	LQM S4UL
		6%	3.4	4.2	1.7	350	2,500	3,100	LQM S4UL
	Chloroethene (vinyl chloride)	1%	0.006	0.015	0.0017	1.1E+00	7.8	18.0	DEFRA C4SL
		2.5%	0.010	0.019	0.0031	1.4E+00	7.8	19.0	DEFRA C4SL
		6%	0.017	0.029	0.0058	2.20	7.8	19.0	DEFRA C4SL
	2,4,6-Trinitrotoluene (TNT)	1%	1.6	65	0.24	1,000	130	260	LQM S4UL
		2.5%	3.7	66	0.58	1,000	130	270	LQM S4UL
		6%	8.1	66	1.4	1,000	130	270	LQM S4UL
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) ^{sol}	LQM S4UL
		2.5%	250	13,000	38	210,000	26,000	51,000	LQM S4UL
		6%	540	13,000	85	210,000	27,000	53,000	LQM S4UL
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) ^{vap}	LQM S4UL
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) ^{vap}	LQM S4UL
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) ^{vap}	LQM S4UL
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30	LQM S4UL
		2.5%	6.6	7.4	6.1	170	18	31	LQM S4UL
		6%	7.1	7.5	9.8	170	18	31	LQM S4UL
	Dieldrin	1%	0.97	7.0	0.17	170	18	30	LQM S4UL
		2.5%	2.0	7.3	0.41	170	18	30	LQM S4UL
		6%	3.5	7.4	0.96	170	18	31	LQM S4UL
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300	LQM S4UL
		2.5%	7.8	620	1.2	9,400	1,200	2,400	LQM S4UL
		6%	17.4	620	2.7	9,400	1,200	2,400	LQM S4UL
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26	LQM S4UL
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26	LQM S4UL
		6%	0.14	6.6	2.2E-02	140	16	27	LQM S4UL
	Endosulfanns (2 isomers)	1%	7.4	160 (3.0E-03) ^{vap}	1.2	5,600 (3.0E-03) ^{vap}	1,200	2,300	LQM S4UL
		2.5%	18	280 (7.0E-03) ^{vap}	2.9	7,400 (7.0E-03) ^{vap}	1,200	2,400	LQM S4UL
		6%	41	410 (1.6E-02) ^{vap}	6.8	8,400 (1.6E-02) ^{vap}	1,200	2,500	LQM S4UL
Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15	LQM S4UL	
	2.5%	0.2	3.8	3.2E-02	65	8.1	15	LQM S4UL	
	6%	0.46	3.8	7.7E-02	65	8.1	16	LQM S4UL	
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}	LQM S4UL
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}	LQM S4UL
		6%	2.4	2.4	32	290	14,000	2,900	LQM S4UL
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}	LQM S4UL
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}	LQM S4UL
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}	LQM S4UL
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}	LQM S4UL
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}	LQM S4UL
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}	LQM S4UL
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}	LQM S4UL
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120	LQM S4UL
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130	LQM S4UL
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190	LQM S4UL
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190	LQM S4UL
		6%	22	38	7.0	830	100	190	LQM S4UL
Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30	LQM S4UL	
	2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30	LQM S4UL	
	6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30	LQM S4UL	

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	^{POS} resi	^{POS} park	Source
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100	LQM S4UL
		2.5%	2.0	150	0.30	4,000	620	1,100	LQM S4UL
		6%	4.5	210	0.70	4,300	620	1,100	LQM S4UL
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110	LQM S4UL
		2.5%	0.52	29	8.0E-02	400	60	120	LQM S4UL
		6%	1.2	31	0.19	400	60	120	LQM S4UL
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300	LQM S4UL
		2.5%	0.29	0.29	10	22	11,000	1,900	LQM S4UL
		6%	0.62	0.62	23	47	11,000	2,700	LQM S4UL
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48	LQM S4UL
		2.5%	0.7	0.78	0.61	66	25	50	LQM S4UL
		6%	1.6	1.8	1.4	120	25	51	LQM S4UL
	Phenol	1%	280	750	66	760 ^{dir} (31,000)	760 ^{dir} (11,000)	760 ^{dir} (8,600)	LQM S4UL
		2.5%	550	1,300	140	1,500 ^{dir} (35,000)	1,500 ^{dir}	1,500 ^{dir} (9,700)	LQM S4UL
		6%	1,100	2,300	280	3,200 ^{dir} (37,000)	3,200 ^{dir}	3,200 ^{dir} (11,000)	LQM S4UL
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									
f = oral, dermal and inhalation exposures compared to oral HCV									
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-tetrachlorophenol									

Appendix F– Hazard Quotient

$$HI = \sum_{Fi=1}^{16} HQ_{Fi} = \frac{\text{Measured concentration } Fi \text{ (mg/kg)}}{S4UL \text{ } Fi \text{ (mg/kg)}}$$

where: HI = Hazard Index
 HQ = Hazard Quotient
 Fi = Fraction I
 S4UL = LQM Sutable 4 Use Levels (S4ULs)

Job Francis Road, Withington
Job No. LKC 23 1687-B2
SOM 6.3%
Comment Side 1

Residential Without Plant Uptake

	1% S4UL	2.50% S4UL	6% S4UL	Max Soil concn.	HQ (1%SOM)	HQ (2.5%SOM)	HQ (6% SOM)
Aliphatic							
EC5-EC6	42	78	160	0.01			0.0000625
EC6-EC8	100	230	530	0.07			0.0001321
EC8-EC10	27	65	150	2			0.0133333
EC10-EC12	130	330	760	2			0.0026316
EC12-EC16	1100	2400	4300	3			0.0006977
EC16-EC21	65000	92000	110000	13			0.0001182
EC21-EC35							
EC35-EC44	65000	92000	110000	10			9.091E-05
Aromatic							
EC5-EC7 (benzene)	370	690	1400	0.01			7.143E-06
EC7-EC8 (tolulene)	860	1800	3900	0.05			1.282E-05
EC8-EC10	47	110	270	2			0.0074074
EC10-EC12	250	590	1200	2			0.0016667
EC12-EC16	1800	2300	2500	10			0.004
EC16-EC21	1900	1900	1900	71			0.0373684
EC21-EC35	1900	1900	1900	94			0.0494737
EC35-EC44	1900	1900	1900	10			0.0052632

HI			0.12
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Appendix G - HazWaste Online 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)



31JRA-P00YK-48AA4

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

Job name

LKC 23 1687

Description/Comments

Project

LKC 23 1687

Site

Francis Road Stockpile

Classified by

Name: **Peter Dunn**
 Date: **19 Mar 2024 15:59 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

26 Mar 2015 *
 02 Aug 2022

Next 3 year Refresher due by Aug 2025
 * training course booked

Purpose of classification

2 - Material Characterisation

Address of the waste

Francis Road, Withington, Manchester

Post Code **M20 4XP**

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development of brownfield land

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	SP1--06/03/2024		Non Hazardous		3

Related documents

#	Name	Description
1	24-02462.1.hwol	DETS South .hwol file used to populate the Job
2	LK SUITE 1 - 5	waste stream template used to create this Job

Report

Created by: Peter Dunn

Created date: 19 Mar 2024 15:59 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	6
Appendix B: Rationale for selection of metal species	7
Appendix C: Version	8

Classification of sample: SP1--06/03/2024

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

Sample details

Sample name:	LoW Code:
SP1--06/03/2024	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
11.7%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11.7% 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 }				27 mg/kg	1.32	31.478 mg/kg	0.00315 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.403 mg/kg	0.0000403 %	✓		
		048-002-00-0	215-146-2	1306-19-0								
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				11 mg/kg	1.462	14.196 mg/kg	0.00142 %	✓		
			215-160-9	1308-38-9								
4		copper { dicopper oxide ; copper (I) oxide }				109 mg/kg	1.126	108.363 mg/kg	0.0108 %	✓		
		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	25.845 mg/kg	0.00258 %	✓		
		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	178 mg/kg		157.174 mg/kg	0.0157 %	✓		
		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 }				31 mg/kg	1.785	48.866 mg/kg	0.00489 %	✓		
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }				113 mg/kg	1.245	124.196 mg/kg	0.0124 %	✓		
		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 }				2 mg/kg	3.22	5.686 mg/kg	0.000569 %	✓		
		005-008-00-8	215-125-8	1303-86-2								
13		TPH (C6 to C40) petroleum group				696 mg/kg		614.568 mg/kg	0.0615 %	✓		
				TPH								
14		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								

#	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	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
16	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
17	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
18	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]							
19	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									
20	pH		PH		7.7 pH		7.7 pH	7.7 pH		
21	naphthalene				1.39 mg/kg		1.227 mg/kg	0.000123 %	✓	
	601-052-00-2	202-049-5	91-20-3							
22	acenaphthylene				0.32 mg/kg		0.283 mg/kg	0.0000283 %	✓	
		205-917-1	208-96-8							
23	acenaphthene				4.89 mg/kg		4.318 mg/kg	0.000432 %	✓	
		201-469-6	83-32-9							
24	fluorene				3.78 mg/kg		3.338 mg/kg	0.000334 %	✓	
		201-695-5	86-73-7							
25	phenanthrene				39.7 mg/kg		35.055 mg/kg	0.00351 %	✓	
		201-581-5	85-01-8							
26	anthracene				9.38 mg/kg		8.283 mg/kg	0.000828 %	✓	
		204-371-1	120-12-7							
27	fluoranthene				44.3 mg/kg		39.117 mg/kg	0.00391 %	✓	
		205-912-4	206-44-0							
28	pyrene				42.7 mg/kg		37.704 mg/kg	0.00377 %	✓	
		204-927-3	129-00-0							
29	benzo[a]anthracene				18.9 mg/kg		16.689 mg/kg	0.00167 %	✓	
	601-033-00-9	200-280-6	56-55-3							
30	chrysene				16.9 mg/kg		14.923 mg/kg	0.00149 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				13.9 mg/kg		12.274 mg/kg	0.00123 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				4.36 mg/kg		3.85 mg/kg	0.000385 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				11.7 mg/kg		10.331 mg/kg	0.00103 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				5.29 mg/kg		4.671 mg/kg	0.000467 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				1.49 mg/kg		1.316 mg/kg	0.000132 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				4.69 mg/kg		4.141 mg/kg	0.000414 %	✓	
		205-883-8	191-24-2							
37	monohydric phenols		P1186		<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
Total:								0.134 %		

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentrations at less than 1.0% are "unlikely to be flammable". Flammability of soils is unlikely to result in a hazardous classification in soils (AGS Waste Classification – A Practitioner's Guide).

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0615%)

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

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

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

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

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

▪ **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 sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide 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}

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: 2024.73.5982.11058 (13 Mar 2024)

HazWasteOnline Database: 2024.68.5980.11054 (09 Mar 2024)

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

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Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

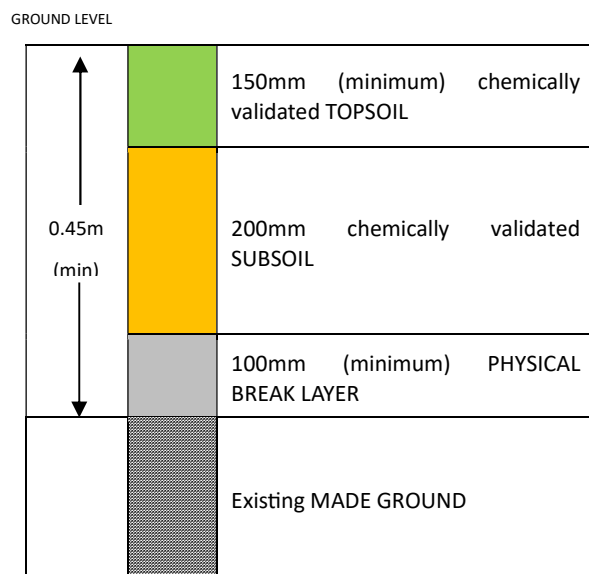
GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

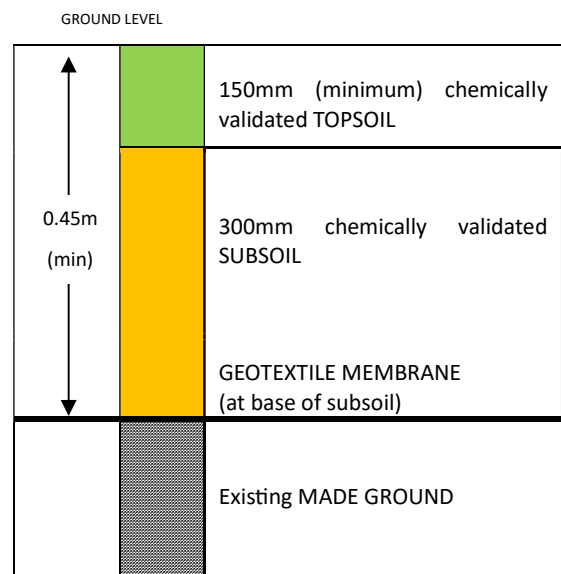
Appendix H - Environmental Cover System Construction

SOFT LANDSCAPING AREAS:

Either (physical break layer)



Or (geotextile membrane)



Hardstood Areas – No Remediation Required

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