SILK STREET, MANCHESTER

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

Job Number: LKC 18 1474
Date: April 2019
Client: Faithful + Gould

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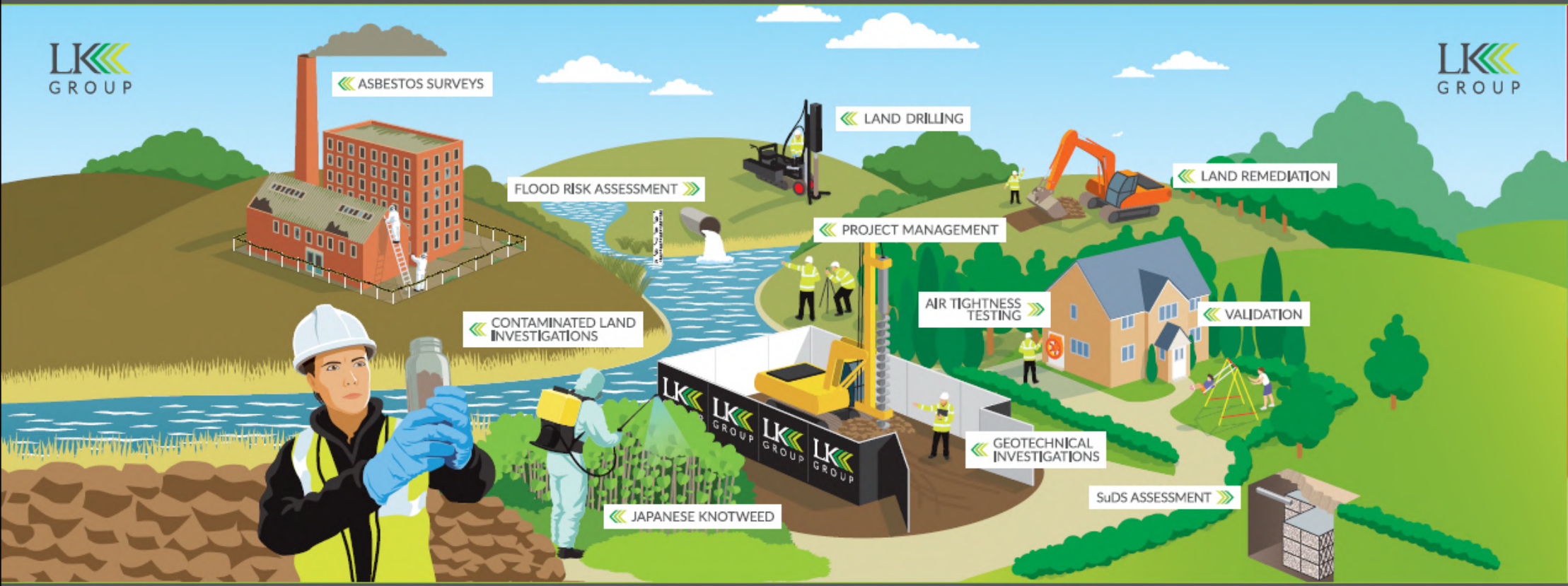

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EXECUTIVE SUMMARY

Site Details

Site Location:	Centred at approximate National Grid Reference 388180E 400550N, the study site comprises three areas, or parcels of land: ■ Northern Area - North of Silk Street and bordered by a canal towpath to the north. ■ Central Area - South of Silk Street and west of Cowley Street. ■ Eastern Area - East of Cowley Street.
Site Area:	7,300m^2
Current Land Use:	Rough ground in the east and tarmacadam / concrete car park in the west.
Proposed Development:	Mixed residential (houses with private gardens and apartments with shared landscaping) and public open space.
Purpose of Report:	Contamination and Geotechnical Assessment.

Preliminary Risk Assessment

PRA Details:	Undertaken by LKC in January 2019. Ref: LKC 18 1474.
History:	Manufactory in the west 1848-1975, Houses in the east 1893-1978, Market in the north 1893-2000, Police Station in the southeast 1983-2006, Car Park in the centre 2000-present.
Geology / Hydrogeology:	Glacial Till (Secondary Undifferentiated Aquifer) over Collyhurst Sandstone (Principal Aquifer).
Mining:	Within Coal Authority reporting area. Not within DHRA area.
Relevant Environmental Setting:	Rochdale Canal, adjacent to the northern boundary. Discharge consents: nearest 550m N. Moston Brook. Discharge of 'other matter'. Pollution incidents: nearest 403m W. Miscellaneous-unknown to Rochdale Canal. Category 3 – Minor Incident.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (asbestos, metals, PAHs), Low Risk (Petroleum Hydrocarbons). PL2 Inhalation of Vapours: Low Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous and ground gas). PL4 Controlled waters: Low Risk (mobile contaminants). PL5 Sulphate Attack: Moderate Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Low Risk (metals).
Recommendations:	Site Investigation was recommended to assess all the above pollutant linkages.

Ground Investigation Work Undertaken

Date of Investigation:	20th to 21st February 2019 and 25thto 29th March 2019.
Intrusive Investigation Work Undertaken:	10no. window sample boreholes (WS101-WS110). 8no. mechanically excavated trial pits (TP101-TP108). 5no. cable percussion boreholes (BH1-BH5).
Monitoring Wells:	Installed in all boreholes.
Soil Sampling:	11no. samples tested for metals, speciated PAHs, pH, sulphate, asbestos and SOM. 5no. samples tested suite as above plus phenol, TPHCWG and BTEX. 5no. samples tested for WAC.
Groundwater Sampling:	6no. samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG and BTEX.
Monitoring:	3no. groundwater level visits.
Insitu and Laboratory Geotechnical Testing:	SPTs, shear vanes, triaxial, plasticity, confining pressure, BRE short suite.

Ground Conditions and Geotechnical Assessment

Proposed Development:	- Redevelopment of site for residential housing including apartments and houses with gardens, soft landscaping and public open space.
General Ground conditions / Geotechnical Testing:	- Maximum investigation depth 12.42mbgl. - Made Ground encountered to depths of between 0.4-1.7mbgl. - Firm to stiff becoming very stiff CLAY was encountered to depths of between 5.90-8.60mbgl. WS105 near the eastern boundary of the site encountered loose silty SAND between 1.70-3.20mbgl. Organic CLAY was encountered between 0.40-2.20mbgl within BH1 in the north east corner of the site. - Very dense SAND encountered to the base of the cable percussive exploratory holes. - No bedrock encountered. - Groundwater encountered at varying depths across the site, considered perched within the Made Ground and deeper at 7.0mbgl where noted within deeper boreholes in BH2, BH3 and BH5. Subsequent level monitoring in deep boreholes indicates potential confined discontinuous groundwater is present within sand lenses within the Glacial Till.
Allowable Bearing Pressure:	- Based upon the in-situ and laboratory shear strength values obtained it is considered that an allowable bearing capacity (ABC) of 60kN/m^2 would be returned at 1m depth and 100kN/m^2 at 2.00mbgl within the firm to stiff CLAY. Extrapolating these values would give an ABC of 75kN/m^2 at a depth of 1.50mbgl.
Anticipated Foundation Type:	- For the two storey residential houses it is considered that shallow strip foundations, seated upon the natural firm to stiff CLAY will provide a suitable foundation option. Consideration may need to be given to extending the excavation through poor ground where encountered and utilising deep strip foundations. - The four storey apartment blocks will exert higher loadings and it is therefore considered that either a ground improvement or piled foundation option will provide a suitable foundation solution.
Shallow Groundwater:	- Shallow groundwater was not encountered during the advancing of the exploratory holes during siteworks but has subsequently been monitored at depths of between 0.5-2.0mbgl. The groundwater identified on the site during monitoring may present a constraint to the development. - Suitable drainage should be considered in the proposed development layout.
Concrete Requirements:	- Based on BRE Digest 2005 – DS-1 AC-1s recommended.
Temporary support of excavation:	- May be required; however, trial pits were generally recorded as stable. - Shallow groundwater has been recorded during subsequent monitoring visits and consideration may need to be given to the requirement for sump pumping.
Plasticity:	- Consideration will need to be given to the shrink / swell of the clay strata if it is to be used as founding strata, particularly where trees/hedges are present/proposed. Foundations may need to be deepened. A low to medium volume change potential has been calculated for the site.
Road / Pavement Design:	- A design CBR value of 2.5% should be adopted for the natural CLAY and <2% may be attributed to the Made Ground.

Contamination Risk Assessment

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

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	**Moderate** (PAHs, metals, ACM)	- Elevated PAHs, metals and ACM identified in made ground across site. - **Recommendation:** Remediation required.
		Low (hydrocarbons, other organic & inorganics)	- No elevated hydrocarbons present. No evidence of other contaminants identified. - **Recommendation**: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	- No elevated TVOCs and no olfactory indications of contamination identified. - **Recommendation:** No remediation required.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	Moderate / **Low**	- No source and no significant thickness of made ground identified. - **Recommendation:** No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	- Marginally elevated concentrations metals identified. Intervening clay and natural attenuation process will impede migration. - **Recommendation:** No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Low**	- No elevated sulphate or pH identified. - **Recommendation**: DS1 AC-1s considered suitable.
6	Organic contaminants posing a risk to water pipes.	**Moderate**	- Contamination may be present at pipeline depth (0.75-1.35m). - **Recommendation:** Water pipeline risk assessment should be completed. Barrier pipe may be required.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Low**	- Elevated Zn identified on site. - **Recommendation:** Remediation associated with PL1 sufficient.

Recommendations and Remedial Strategy

The table below shows the remediation and validation requirements for the site. This information should be documented in a Site Completion Report for submission to the local authority.

Phase	PL	Remediation Requirements	Validation Requirements
Pre-Construction	**ALL**	Earthworks Inspections / Unexpected Contamination The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
Build-Phase Construction	**1 and 7**	As the made ground is relatively shallow the following options are given: Option 1 Removal of all reworked topsoil / made ground from garden and soft landscaping and raise levels (as required) with suitably chemically validated subsoil and topsoil. If site levels allow, asbestos containing made ground may be placed in a suitably constructed borrow pit within an area of POS with suitably constructed cover system as per Option 2, below. Movements of materials on site should be done under suitable licensing/permitting in accordance with the CL:AIRE Code of Practice Option 2 If all or some of the made ground remains in place in gardens and soft landscaping areas, an environmental cover system will be required incorporating a suitable break layer or barrier to prevent mixing. The environmental cover system should be as follows: **Private Back Gardens: 600mm thick environmental cover system comprising:** **Either** 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 500mm comprising clean inert fill and sufficient topsoil for a growing medium. **Or** geotextile membrane and at least 600mm comprising clean inert fill and sufficient topsoil for a growing medium. **Private Front Gardens / Shared Landscaping: 300mm thick environmental cover system comprising:** **Either** 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 200mm comprising clean inert fill and sufficient topsoil for a growing medium. **Or** geotextile membrane and at least 300mm comprising clean inert fill and sufficient topsoil for a growing medium. The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix I.	Option 1 Consignment notes confirming the removal of made ground. Photographic evidence of natural strata. Chemical validation of imported soils: See Table 9-2. Option 2 Measuring depth of environmental cover system using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer will also be collected. Chemical validation of imported soils: See Table 9-2.
	5	Sulphate Resistant Concrete Sulphate Resistant Concrete in line with DS-1 AC-1s recommended.	N/A
	6	Potable Water Pipes 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 if located in made ground.	Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
	2, 3, 4, 7	No remediation anticipated with respect to PL2 (inhalation of vapours), PL3 (gas), PL4 (water) and PL7 (phytotoxicity); however, this needs to be confirmed once additional work has been completed.	

As asbestos has been identified within the soils on site, it is also recommended that an Asbestos Management Plan is adopted during enabling and construction work.

The remediation recommended in the table above should be validated to ensure it has been carried out appropriately. This should be documented in a Completion/Validation Report and submitted to the local authority for completion.

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1 Introduction

1.1 Background

LK Consult Ltd (LKC) has been commissioned by Faithful + Gould to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Silk Street, Manchester. The investigation was undertaken in support of a future planning application to develop the site for residential use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 18 1474-01, dated 20th January 2018).

This investigation has been undertaken to confirm the ground conditions below the site and to allow a contamination and geotechnical assessment to be undertaken.

The investigation will aim to confirm the risks of the potential pollutant linkages identified in the PRA and recommend further assessment / remediation, as required.

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

1.2 Site Details

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

Location	Centred at approximate National Grid Reference 388180E 400550N, the study site comprises three areas, or parcels of land: - Northern Area - North of Silk Street and bordered by a canal towpath to the north. - Central Area - South of Silk Street and west of Cowley Street. - Eastern Area - East of Cowley Street.
Approximate Area	7,300m^2.
Topography	Approximately 90 metres Above Ordnance Datum (AOD). Site is approximately level.
Current Land Use	Site - Northern Area – mainly hard stood with wooden knee rail fence. - Central Area – open area of compacted gravel used as an unofficial car park. - Eastern Area – former building foundation slab in the northern section and tarmac car park in the southern section. Surrounding Area - North: Rochdale canal with industrial units beyond. - East: Droylsden Road with houses beyond. - South: Offices, commercial premises and open space. - West: Shopping street.
Proposed Development	Mixed residential (houses with private gardens and apartments with shared landscaping) and public open space.

Table 1-1. Summary of site details.

[1] DCL (2018). "National Planning Policy Framework." Department of Communities and Local Government.

2 Previous Work

2.1 Summary of Existing Information

A PRA report (Ref: LKC 18 1474, dated 20th January 2018) has previously been undertaken by LKC and should be read in conjunction with this report.

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in CLR11[2] has been summarised in Table 2-1.

The aim of the conceptual model is to provide a preliminary assessment of the likelihood of a pollutant linkage for each potential combination of contaminant, pathway and receptor. A conceptual model can be used to make an informed decision on the contamination risks associated with the site and determine what site investigation work is required.

The preliminary contamination conceptual model has identified seven generic potential pollutant linkages. Each linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552[3].

In order to assess the potential risk for each pollutant linkage, an assessment of the magnitude of the potential consequence (severity) of the risk occurring and the magnitude of the probability (likelihood) of the risk occurring has been considered and classified. This is based on the guidance provided in CIRIA C552 and further details including a risk matrix is provided in Appendix A.

Where LKC identified a low to very low risk, limited intrusive investigation work, a watching brief (during construction work) or no investigation work will be recommended. This will be dependent on the nature of the site and the proposed development.

Where the risk falls into the moderate/low risk, LKC will undertake an assessment to establish what category the pollutant linkage will fall into (i.e. moderate or low risk will be chosen).

Where LKC identifies a moderate or higher risk, intrusive work or precautionary remedial measures will be recommended.

Conceptual Model deals with long term exposure to key receptors associated with the future use of the site. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as per HSE guidance[4]) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

2.2 Recommendations

Based upon the Preliminary Contamination Conceptual Model a site investigation was recommended to assess the potential pollutant linkages further.

[2] EA (2004). "Model Procedures for the Management of Land Contamination." R&D Publication CLR 11.
[3] CIRIA (2001). "Contaminated land risk assessment: A guide to good practice". C552.
[4] HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

Pollutant Linkage	Pathway	Receptor	Contaminant (source)	Probability	Consequence	Risk	Assessment & Recommendations
PL1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, vegetables, soil attached to vegetables. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM (former buildings, potentially in made ground). - Heavy metals, PAHs (made ground).	Likely	Medium	**Moderate**	- Likely probability given history of site and potential pathway to receptors in gardens / landscaping. - **Recommendation**: Intrusive investigation required to include soil sampling.
			- Hydrocarbons, other inorganic and organic contaminants (made ground, manufactories).	Low likelihood	Medium	Moderate **/ Low**	- Low likelihood as minimal spills / leakages expected and age since land use. - However potential pathway exists to receptors in gardens / soft landscaping.
PL2	- Inhalation of vapours. - Migration through permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants such as hydrocarbons, solvents, (made ground, manufactories).	Low likelihood	Medium	Moderate **/ Low**	- Low risk assumed as significant source not expected. - **Recommendation**: Intrusive investigation required with testing if evidence of contamination identified.
PL3	- Inhalation of gas. - Migration through permeable strata and preferential pathways. - Explosion in confined spaces.	- Future site users. - Buildings. - Offsite land users.	- Hazardous Gas: - Methane, carbon dioxide (potentially infilled features 250m of the site).	Unlikely	Severe	**Moderate** / Low	- Unlikely probability as no significant source identified. - Moderate risk assumed at this stage due to unknown depth of made ground. - **Recommendation**: Gas monitoring may be required if significant thickness of made ground is identified.
PL4	- Surface run-off. - Migration through permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Aquifer).	- Mobile contaminants such as metals, PAHs, hydrocarbons (made ground, manufactories).	Low likelihood	Medium	Moderate **/ Low**	- Low likelihood as no significant source of potentially mobile contamination is anticipated. - Low risk assumed as underlying Glacial Till likely to impede migration. - **Recommendation**: Precautionary groundwater sampling recommended.
PL5	- Sulphate attack on concrete.	- Building structure.	- Sulphate (potential ash in made ground).	Likely	Mild	**Moderate** / Low	- Likely probability as ash anticipated in made ground, which may be in contact with concrete used in future buildings. - Moderate risk assumed at this stage. - **Recommendation**: Intrusive investigation required as part of PL1.
PL6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as hydrocarbons (made ground, manufactories).	Likely	Medium	**Moderate**	- Likely probability as significant contamination may be present at pipeline depth (0.75-1.35m). - Risk is considered moderate at this stage due to unknown depth of made ground. - **Recommendation**: Sampling required if made ground present at pipeline installation depths.
PL7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants (made ground).	Likely	Minor	**Low**	- Likely probability as contamination considered possible. - **Recommendation**: Investigation work as part of PL1.

Table 2-1: Preliminary Contamination Conceptual Model.

3 Ground Investigation

3.1 Site Investigation Design and Methodology

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

The investigation was carried out on 20th and 21st February 2019 and comprised the following:

- 10no. window sample boreholes drilled to 4.43-5.45 metres below ground level (mbgl) (ref. WS101 to WS110).
- 8no. trial pits (using JCB) excavated to 2.00-2.50mbgl (ref. TP101 to TP108).

All site investigation locations are shown in Figure 3.

The locations were chosen to allow non-targeted assessment of ground conditions across accessible areas of the site.

The number of site investigation points corresponds to approximately one location per 18m square centres. This is considered to be a conservative sampling density and is in line with BS10175[5] for a 'detailed investigation'.

A follow up geotechnical investigation was undertaken between 25th-29th March 2019 and comprised the following:

- 5no. cable percussion boreholes drilled to 9.5-12.5mbgl (ref.BH1-BH5).

All profile logs are provided in Appendix B and are in line with BS14688-1[6] and BS5930[7].

3.2 Well Installations

All of the boreholes were installed with monitoring wells for groundwater level monitoring and groundwater sampling. Monitoring wells were installed in accordance with BS10175 and CIRIA C665[8] and generally comprised a length of plain pipe over a length of slotted pipe surrounded by pea gravel and sealed at the top with bentonite and concrete.

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

3.3 Sampling Protocol

3.3.1 Soil Sampling (Contamination)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation[9].

[5] British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.
[6] British Standards (2002) Geotechnical investigation and testing – Identification and Classification of Soil. Part 1: Identification and description. BS EN ISO 14688-1:2002.
[7] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[8] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.
[9] EA (2000). "Technical Aspects of Site Investigation. Volumes 1 & 2 Text Supplements Research and Development Technical Report." P5-065/Tr.

Soil was collected for onsite testing. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for total volatile organic compounds (TVOCs) using a PhoCheck Tiger photoionisation detector (PID).

Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665[10] to aid in screening samples for volatile analysis.

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

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C. Table 3-1 shows the soil testing undertaken.

Suites and Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	11	WS102 D1 0.05-0.30m WS104 D1 0.00-0.30m WS105 D1 0.70-1.20m WS106 D1 0.00-0.30m WS107 D1 0.00-0.40m WS108 D1 0.00-0.30m WS109 D1 0.00-0.30m WS110 D1 0.00-0.30m TP102 0.1-0.8m TP105 0.1-0.6m TP106 0.1-0.6m	A basic suite with a broad selection of contaminants tested on samples across the site where no significant evidence of contamination was identified (with the exception of occasional ash, clinker and coal) and no TVOCs identified from the PID tests.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	5	TP101 0.1-0.6m TP102 0.1-0.8m TP103 0.1-0.4m TP107 0.1-0.4m TP108 0.1-0.4m	Extended suite to allow for waste classification for material which may be earmarked for off-site disposal.
Waste Acceptance Criteria			

Table 3-1. 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.

3.3.2 Water Sampling

To establish the condition of shallow groundwater LKC undertook 6no. groundwater samples.

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

The groundwater samples were collected a minimum of 1 week after drilling had finished and following well development. Sample collection was undertaken using a peristaltic pump. The borehole was purged of all standing water and the sample collected from the recharged water. The sample was collected in glass and plastic bottles and a glass vial. A water meter was used to test the pH, temperature and conductivity before sampling until equilibrium conditions were met, as per BS10175[11] guidelines.

All water samples were placed in glass bottles, plastic bottles and septum topped vials and stored in ice packed cool boxes. The samples were sent to Chemtest on the same day for analysis.

Sampling was carried out in accordance with BS5930[12] and BS5667-11[13].

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

Suites and Contaminants	No. Samples	Location	Justification
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol and hardness.	6	WS101 WS102 WS104 WS105 WS107 WS110	No significant contamination risk identified from the investigation. Samples selected from wells across the site to allow good spatial coverage in accessible locations.

Table 3-2. Summary of groundwater sampling tests 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.

3.4 Gas Monitoring

Gas monitoring was not carried out as part of this investigation.

A low risk was identified in the preliminary contamination conceptual model for gas (pollutant linkage 3) and further action was only recommended if significant organic / putrescible material was identified on site. Based on the ground conditions encountered, LKC did not consider gas monitoring to be required. This is discussed further in Section 6.3.

3.5 Site Investigation Scope

The scope of the contaminated land investigation was sent to Manchester City Council in an email dated 24th January 2019. No response was received. The investigation was in line with the scope; however, locations had to be altered slightly due to the presence of underground services.

2no. trial pits indicated adjacent to the Droylsden Road bridge were not undertaken due the presence of mature trees close to the footings of the bridge. LKC do not consider the changes to be significant and sufficient investigation work has been undertaken to allow a thorough assessment of the site.

[11] British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice." BS10175:2017.
[12] British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.
[13] British Standard (2009). "Water Quality – Sampling. Part 11: Guidance on Sampling of Groundwaters". BS ISO 5667-11:2009.

3.6 Geotechnical Testing

3.6.1 In-situ Onsite Geotechnical Testing

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

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

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

3.6.2 Laboratory Geotechnical Testing

Soil samples taken during the investigation were collected in bulk bags and sealed U100 tubes and sent to Murray Rix and PSL Laboratories for geotechnical testing. Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix D. Table 3-3 shows the geotechnical testing undertaken.

Testing	No. Samples	Location
Atterberg Limits (plasticity testing)	7	WS101 B4 (3.5-4.0) WS102 B3 (2.5-3.0) WS103 B3 (2.5-3.0) WS104 B3 (3.5-4.0) WS106 B3 (1.5-2.0) WS107 B3 (2.5-3.0) WS109 B3 (1.5-2.0) TP101 (0.1-0.6m) TP102 (1.0-2.0m) TP103 (1.0-2.0m) TP104 (1.0-2.0m) TP105 (1.0-2.0m) TP107 (1.0-1.5m) TP108 (0.5-1.0m)
BRE SD1 Short Suite*	5	WS101 D3 (1.2-2.0m) WS104 D2 (1.7-2.0m) WS107 D2 (1.5-1.7m) WS110 D2 (1.4-1.7m) WS102 D2 (1.5-2.0m)
Single Stage Triaxial	9	WS102 B4 (3.5-4.0) WS104 B3 (3.5-4.0) WS105 B4 (4.2-4.5) WS106 B4 (2.5-3.0) WS107 B3 (2.5-3.0) WS108 B3 (2.5-3.0) WS109 B5 (3.5-4.0) BH1 U4 (2.5-2.95) BH1 U10 (6.0-6.45)
Confining Pressure	2	BH1 U4 (2.5-2.95) BH1 U10 (6.0-6.45)

Table 3-3. Summary of geotechnical testing undertaken.
Notes:*SO_4 and pH also part of environmental testing suites.

4 Ground Conditions

4.1 Geology – Generalised Sequence

The ground conditions beneath the site comprised made ground underlain by Glacial Till comprising variously sandy gravelly clay and silty gravelly sand. A summary of ground conditions from selected logs is provided in Plate 4-1, with additional comments below.

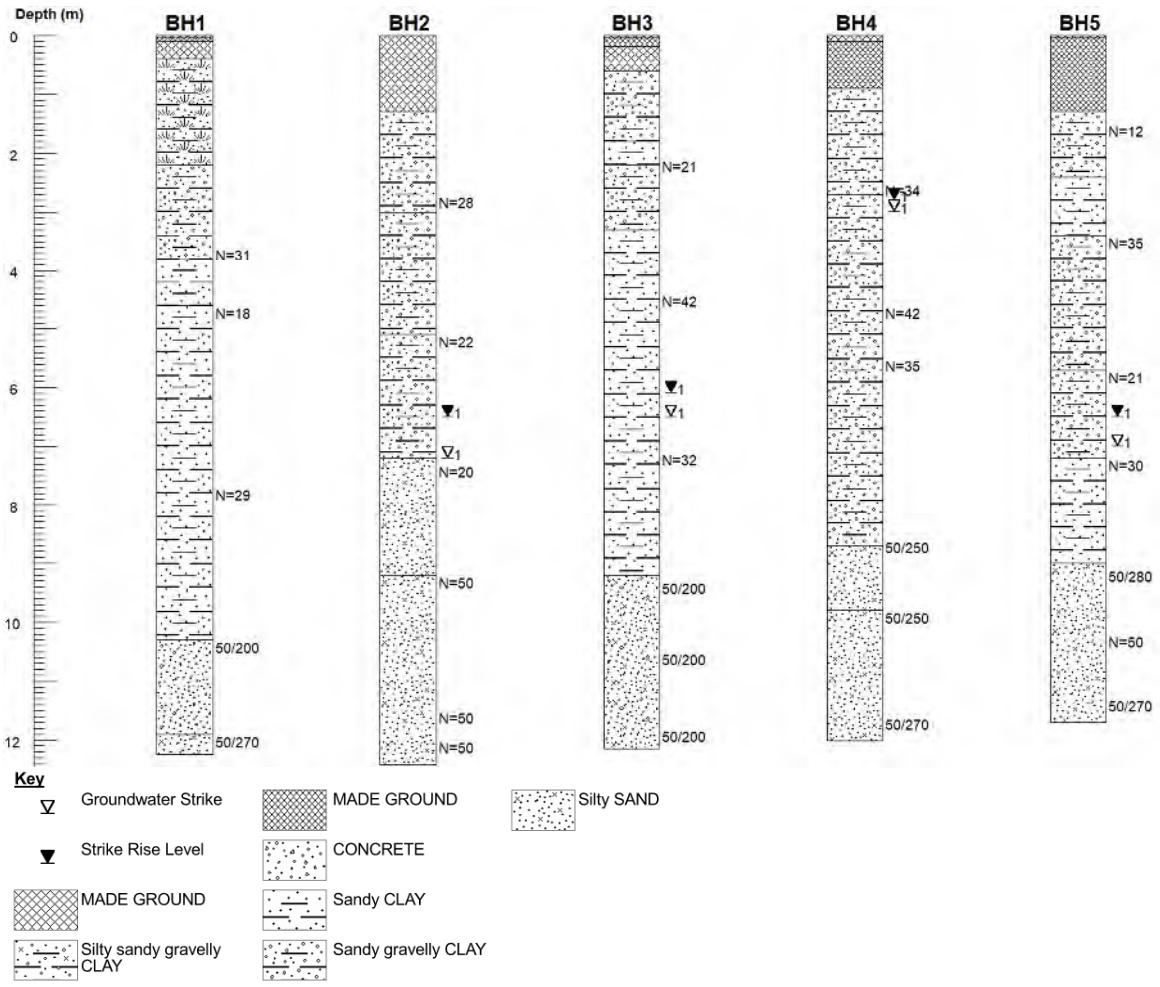


Plate 4-1: Summary of ground conditions.

Additional information on ground conditions:

- Made ground was recorded from depths of 0.6-1.7mbgl and generally consisted of variously sandy gravelly clay with various amounts of ash, clinker, concrete and bricks.
- In trial pits TP101, TP102 and TP103 made ground comprised sandy gravel of ash and clinker from 0.05 up to 0.8mbgl.
- Made ground was encountered to >2.4mbgl in the eastern end of TP105 comprising brick and stone. The base of the made ground could not be determined along the eastern edge of the pit due to the proximity to the adjacent roadway.
- No visual / olfactory evidence of hydrocarbons or volatile contaminants were noted in any locations.

- Natural deposits comprised variously firm to stiff consistency sandy, gravelly clay to between 7.2 and 10.4mbgl. This in turn is underlain by dense to very dense gravelly silty sand to >12.4mbgl.
- The exceptions to the above were sandy organic clay encountered in BH1 from 0.4-2.2mbgl and loose silty sand from 1.7-3.2mbgl in WS105.

4.2 Groundwater

Groundwater strikes were recorded during the investigation in trial pits and boreholes. In addition, groundwater monitoring within the borehole wells has been undertaken on three occasions (1 occasion for cable percussion boreholes). Some locations were not accessible on each visit due to parked cars over the boreholes.

An oil-water interface probe (approximately 1cm detection limit) was used to detect the presence of free phase hydrocarbons within each borehole.

No groundwater was encountered in the trial pits. Results of the groundwater depths within the boreholes are summarised in Table 4-1.

BH	Water Strike Depths (mbgl)	Well Response Zone (mbgl)	No. of Monitoring Visits	Sample Taken?	Evidence of Contam?	Monitoring Depths (mbgl)	
						Min	Max
WS101	Dry	2.00-4.00 (C)	3	Y	N	0.31	0.48
WS102	Dry	2.00-4.00 (C)	3	Y	N	0.18	0.57
WS103	Dry	2.00-4.00 (C)	3	N	N	0.37	0.52
WS104	Dry	2.00-4.00 (C)	3	Y	N	1.64	2.19
WS105	Dry	0.70-4.70 (MG/C)	3	Y	N	1.86	2.14
WS106	Dry	1.00-4.00 (MG/C)	0	N	N	-	
WS107	Dry	1.5.0-3.50(C)	3	Y	N	0.1	1.1
WS108	Dry	1.00-4.00 (C)	1	N	N	0.93	
WS109	Dry	1.00-4.00 (C)	1	N	N	1.1	
WS110	Dry	1.00-4.00 (C)	3	Y	N	0.33	1.23
BH1	Dry	3.00-12.00 (S/C)	1	N	N	Dry	
BH2	7.20	2.00-11.00 (S/C)	1	N	N	Dry	
BH3	6.50	3.00-12.00 (S/C)	1	N	N	10.17	
BH4	3.00	4.00-12.00 (S/C)	1	N	N	Dry	
BH5	7.00	2.00-12.00 (S/C)	1	N	N	10.41	

Table 4-1: Summary of water strike depths within boreholes and trial pits.
Response Zones:
MG=Made Ground; S=Sand; C=Clay.
Notes:
G=Groundwater Sample

Monitoring data indicates there to be shallow perched water within the upper cohesive natural strata and made ground at depth ranges of approximately 0.5-2mbgl.

Groundwater strikes at approximately 7mbgl were noted within deeper boreholes in BH2, BH3 and BH5. Subsequent level monitoring in deep boreholes indicates potential confined discontinuous groundwater is present within sand lenses within the Glacial Till.

4.3 In-Situ Geotechnical Testing

4.3.1 Standard Penetration Tests

In-situ standard penetration tests (SPTs) were undertaken, predominantly in the natural ground. The results are summarised in Table 4-2 and provided within the profile logs in Appendix B.

Approx Depth (mbgl)	SPT 'N' Values									
	WS 101	WS 102	WS 103	WS 104	WS 105	WS 106	WS 107	WS 108	WS 109	WS 110
1-2	8(MG)	7(MG)	7(MG)	17 (MG)	8(MG)	9(MG)	11 (MG)	11 (MG)	10 (MG)	10 (MG)
2-3	20(C)	22(C)	16(C)	17(C)	6(S)	21(C)	12(C)	22(C)	21(C)	21(C)
3-4	34(C)	35(C)	27(C)	35(C)	12(S)	28(C)	28(C)	28(C)	32(C)	21(C)
4-5	50(C)	50/ 285(C)	50(C)	50(C)	23(C)	50(C)	25(C)	50/ 295(C)	50(C)	23(C)
5-6					12(C)		23(C)			24(C)
GW Level	-	-	-	-	-	-	-	-	-	-

Approx Depth (mbgl)	SPT 'N' Values				
	BH1	BH2	BH3	BH4	BH5
1-2	-	-	-	-	12 (C)
2-3	-	28 (C)	21 (C)	34 (C)	-
3-4	31 (C)	-	-	-	35 (C)
4-5	18 (C)	-	42 (C)	42 (C)	-
5-6	-	22 (C)	-	35 (C)	21 (C)
6-7	-	-	-	-	-
7-8	29 (C)	20 (S)	32 (C)	-	30 (C)
8-9	-	-	-	50 (S)	-
9-10	-	50 (S)	50 (S)	50 (S)	50 (S)
10-11	50 (S)	-	50 (S)	-	50 (S)
11-12	50 (S)	50 (S)	50 (S)	50 (S)	50 (S)
12-13	-	50 (S)	-	-	-
GW Level	-	7.20	6.50	3.00	7.00

Table 4-2: Summary of SPT (N) values.
Notes:
MG = Made Ground; S=Sand; C=Clay.
Groundwater level based on strikes during investigation and monitoring data.

4.3.2 Shear Vanes

Hand shear vane readings, recording undrained shear strength (c_u), were taken within the clay strata. The results are summarised in Table 4-3 and provided within the profile logs in Appendix B.

Approximate Depth (mbgl)	Average Undrained Shear Strength (kN/m^2)							
	TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
0-1	42.00	36.67	31.33	32.67	42.33	35.67	33.00	33.33
1-2	41.67	34.67	65.33	66.00	65.00	51.33	61.33	58.00
2-3	54.00	59.67	-	-	-	62.67	-	-
GW Level	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 4-3: Summary of average hand shear vane readings.
Notes:
Groundwater level based on strikes during investigation and monitoring data.
Shear vane readings can be influenced by coarse material including coarse silt.

4.4 Geotechnical Laboratory Testing

4.4.1 Single Stage Triaxial Test

Single stage triaxial testing has been undertaken on seven samples of the natural clay strata. The results are presented in Appendix D and summarised in Table 4-4.

Location	Depth (mbgl)	Material Description	Undrained Shear strength (kPa)
WS102	3.5-4.0	Stiff brown silty CLAY with rare gravel.	102
WS104	3.5-4.0	Stiff brown silty CLAY with rare gravel.	120
WS105	4.24.5	Stiff brown silty CLAY with rare gravel.	97
WS106	2.5-3.0	Stiff brown silty CLAY with rare gravel.	112
WS107	2.5-3.0	Stiff brown silty CLAY with rare gravel.	125
WS108	2.5-3.0	Stiff brown silty CLAY with rare gravel.	83
WS109	3.5-4.0	Stiff brown silty CLAY with rare gravel.	117
WS110	2.5-3.0	Stiff brown silty CLAY with rare gravel.	123

Table 4-4: Summary of single stage triaxial results.

4.4.2 Oedometer Test

The coefficient of compressibility (m_v) results indicate that the Clay tested is of medium compressibility, ranging between 0.047m^2/MN and 0.371m^2/MN, indicative of a firm Glacial Till Clay. The results are presented in Appendix D and summarised in Table 4-5.

Location	Depth (mbgl)	Pressure (kN/m^2)	m_v value (m^2/MN)	Description of Compressibility
BH1	1.60 – 2.05	0 – 15	Swelling	-
		15 – 30	0.167	Medium Compressibility
		30 – 60	0.371	High Compressibility
		60 – 120	0.317	High Compressibility
		120 - 15	0.119	
BH4	3.60 – 4.05	0 - 35	0.239	Medium Compressibility
		35 – 70	0.106	Medium Compressibility
		70 – 140	0.154	Medium Compressibility
		140 – 280	0.112	Medium Compressibility
		280 - 35	0.060	
BH5	4.50 – 4.95	0 - 45	0.153	Medium Compressibility
		45 – 90	0.052	Low Compressibility
		90 – 180	0.091	Low Compressibility
		180 – 360	0.073	Low Compressibility
		360 - 45	0.047	
		Average	0.147	Medium Compressibility

Table 4-5: Summary of Consolidation (Oedometer) Test Results.

4.4.3 Atterberg Limits

Representative samples of natural clay were subjected to Atterberg Limits (plasticity) and Moisture Content testing. Results are presented in Appendix D and summarised in Table 4-6.

Table 4-6 also includes the modified plasticity index as detailed in Chapter 4.2-D5 of the NHBC standards (modified plasticity index = plasticity index x % less than 425µm sieve / 100%).

Location	Depth (mbgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Class	Passing 425 micron (%)	Modified Plasticity Index (%)
TP101	0.1-0.6	26	47	20	27	CI	96	25.92
TP102	1.5-2.0	23	45	19	26	CI	94	24.44
TP103	1.0-2.0	21	39	19	20	CI	95	19.00
TP104	1.0-2.0	24	39	20	19	CI	98	18.62
TP106	1.0-2.0	20	49	20	29	CI	92	26.68
TP108	0.5-1.0	38	63	25	38	CH	100	38.00
TP108	1.5-2.0	20	48	18	30	CI	97	29.10
WS101	3.5-4.0	19	45	16	29	CI	94	27.26
WS103	2.5-3.0	17	40	15	25	CI	90	22.50
WS104	3.5-4.0	19	46	18	28	CI	93	26.04
WS107	2.5-3.0	19	43	17	26	CI	94	24.44
WS109	1.5-2.0	20	46	16	30	CI	96	28.80

Table 4-6: Summary of plasticity index testing.

The modified plasticity index is between 19% and 38%. This characterises the clay as having a low to medium volume change potential.

4.4.4 Sulphate and pH

Water soluble sulphate and pH tests were carried out on soil and groundwater samples (magnesium as part of the BRE testing included in soils analysis). Full results are presented in Appendix C (soils) and Appendix E (groundwater) and summarised in Table 4-7.

Strata	pH		Magnesium (mg/kg)	Sulphate	
	Soil	Groundwater		Soil (g/l)	Groundwater (mg/l)
Made Ground	7.4-9.4	8.3-12.0	-	<0.01-0.22	16-350
Natural	6.5-7.7		<0.010-0.013	<0.01	

Table 4-7: Summary of pH and sulphate results.

5 Geotechnical Assessment

5.1 Proposed Development

It is understood that it is proposed to develop the site for a residential end use comprising of a mixture of two storey residential houses and four storey apartment blocks. Details of the proposed buildings and loadings are not known.

Given the nature of the proposed development it is considered that the project meets the criteria of Geotechnical Category 1 of Euro Code 7.

Given the nature of the development it is considered that acceptable risk from settlement is a total settlement value of 25mm for a masonry structure.

5.2 Summary of Ground Conditions

Ground conditions identified at the site are detailed in Section 4.1 and summarised in Table 5-1 below:

Strata	Typical Description	Min Depth to top of Strata (mbgl)	Max Depth to top of Strata (mbgl)	Thickness (m)
Made Ground	Tarmacadam over variably clayey silty sandy gravel containing ash, clinker, brick and concrete.	0.00	0.00	0.40 – 1.70
Cohesive	Firm to stiff becoming very stiff with depth, brown occasionally mottled grey, variably sandy gravelly CLAY.	0.40	1.70	5.90 - 8.60
Granular	Very dense brownish orange silty SAND.	7.20	10.30	Not proven

Table 5-1: Summary of ground conditions.

Although the site conditions are predominantly Made Ground over firm to stiff becoming very stiff Clay, WS105 near to the eastern boundary of the site recovered loose silty Sand immediately beneath the Made Ground at a depth of between 1.70m and 3.20mbgl. Within BH1 in the north east corner of the site a horizon of organic Clay was encountered beneath the Made Ground at a depth of between 0.40m and 2.20mbgl.

5.3 Site Preparation

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

- Buried structures and old foundations, such as those encountered in TP105, can be anticipated to be present. Where encountered these should be excavated from below the proposed development foot print with the resulting void suitably backfilled; and,
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill.

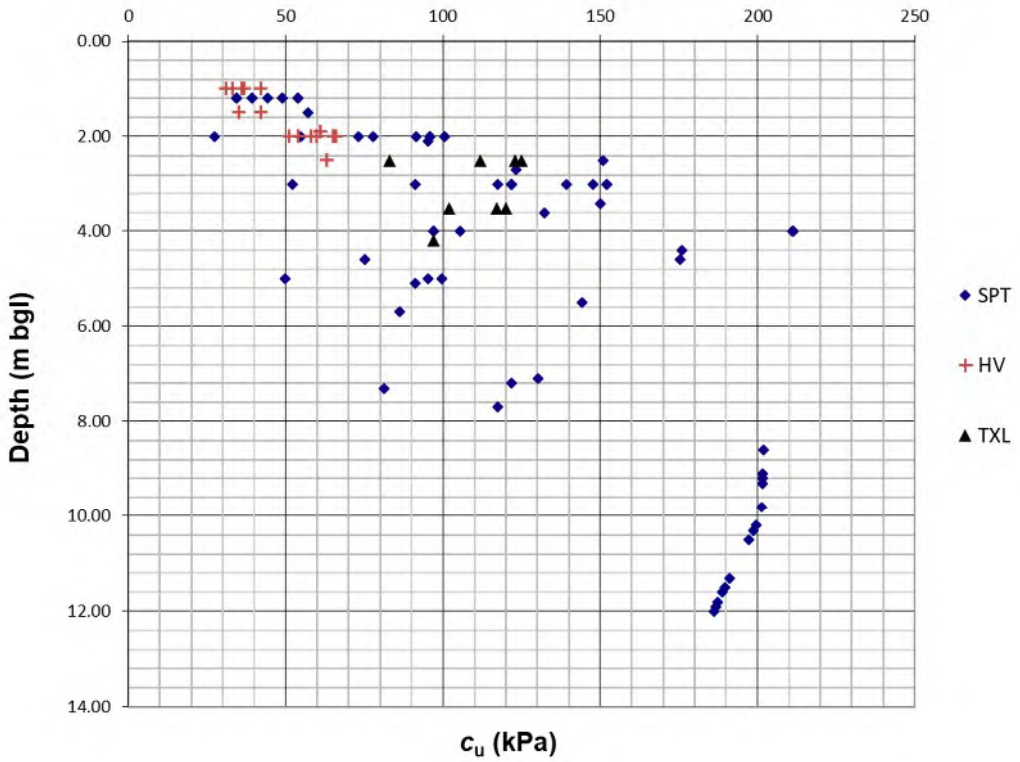
5.4 Foundation Conditions and Bearing Capacity

5.4.1 General

It is considered that the Made Ground, loose SAND and organic CLAY are not suitable for a founding material due to the inherent variability and poor bearing capacity of the material.

Foundation loadings should be transferred to the underlying strata of firm to stiff, becoming very stiff CLAY. An assessment of the undrained shear strength (c_u) has been undertaken using data obtained from in-situ and laboratory tests. This data is shown in Graph 5-1 (below):

The graph shows that a c_u of 30kPa can be expected at a depth of 1.00mbgl, increasing to 50kPa at a depth of 2.00mbgl. The natural Clay is likely to provide a suitable bearing stratum.



Graph 5-1: Undrained Shear Strength against Depth.

Foundation options are therefore:

- Conventional strip footings in to the underlying firm to stiff becoming very stiff CLAY;
- Conventional strip footings on vibro granular columns; and,
- Deeper pile foundations.

5.4.2 Strip Foundations

It is considered that shallow strip footings will be suitable for the two storey residential houses and these should be constructed at least 150mm in to the underlying natural firm to stiff CLAY. Based upon the in-situ and laboratory shear strength values

obtained it is considered that an allowable bearing capacity (ABC) of 60kN/m^2 would be returned at 1m depth and 100kN/m^2 at 2.00mbgl. Extrapolating these values would give an ABC of 75kN/m^2 at a depth of 1.50mbgl.

Atterberg limits determinations, summarised in Table 4-6 show the clay to be of low to intermediate plasticity and as such the sides of the foundations may require protection using clay board or similar.

Foundation depths should take account of the presence of existing and proposed trees with foundations deepened locally in accordance with the requirements of NHBC Standards[14] for a clay of intermediate plasticity. It is recommended that at working drawing stage a foundation schedule is prepared for the development taking account of the soil plasticity and the locations of trees.

5.4.3 Ground Improvement

Two of the intrusive locations tested recorded differing ground conditions, loose SAND at the location of WS105 and organic CLAY at the location of BH1. It is feasible that these variable ground conditions may be encountered beneath the foundation footprint of the properties at these and other locations on the site which have not been investigated.

Loadings of the four storey apartment blocks are expected to be in excess of 100kN/m^2 and therefore shallow strip foundations are not considered to be a suitable foundation option. It is considered that the use of ground improvement techniques such as vibro granular columns will allow shallow foundations to be utilised across the site. The vibro granular columns should provide a bearing capacity of around 150kN/m² but will also remove variability within the Made Ground, loose SAND, organic CLAY and the predominant strata of firm to stiff CLAY. Specialist advice should be sought from a suitably experienced contractor with regard to allowable bearing capacity and settlements.

5.4.4 Piled Foundations

As an alternative, consideration maybe given to the use of piled foundations. For preliminary purposes the following initial pile carrying capacities have been calculated and summarised in Table 5-2. When undertaking these preliminary calculations the following parameters have been used:

- Undrained shear strength values from Tables 4-3 and 4-4 and Graph 5-1;
- Adhesion Factor of 0.45 based on CFA piles;
- Factors of safety of 1.5 on side resistance and 3 on base resistance; and,
- Global Factor of safety of 2.5.

Depth (mbgl)	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
3	18	36	59
5	45	76	115
7	115	186	267

Table 5-2: Preliminary Pile Carrying Capacity.

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

[14] NHBC Standards “NHBC Standards 2018”.

Made Ground was encountered within several of the exploratory hole locations to depths of up to 1.70mbgl along with organic CLAY (2.20mbgl) and loose SAND (3.20mbgl). Consideration should be given to the potential for negative skin friction.

5.4.5 Recommendations

For the two storey residential houses it is considered that shallow strip foundations, seated upon the natural firm to stiff CLAY, will provide a suitable foundation option. Consideration may need to be given to extending the excavation through poor ground where encountered and utilising deep strip foundations.

The four storey apartment blocks will exert higher loadings and it is therefore considered that either a ground improvement or piled foundation will provide a safe, reliable and cost effective solution.

5.5 Ground Floor Slabs

Due to the presence of Made Ground in excess of 600mm thickness across the site it is considered that ground bearing floor slabs, whilst viable, will require detailed design to accommodate variability of the formation and account for differential settlement. It is therefore recommended that suspended floor slabs are used in accordance with NHBC guidance[15].

5.6 Pavement Construction

An assessment of the likely California Bearing Ratio (CBR) for the Made Ground has been assessed from the following sources:

- Correlations with undrained shear strength (summarised in Table 4-4 and Graph 5-1);
- Correlations with plasticity index (summarised in Table 4-6) and from Table 5-1 of IAN 73/06[15]; and
- Description of the materials encountered in the exploratory holes.

Based on the above it is considered that a CBR of 2.5% may be required to account for the Glacial Till. In other areas where made ground is prevalent a CBR value of <2% may be required to account for the variability of the Made Ground. It is, however, recommended that this be re-assessed using on site plate tests of the formation. It is possible that a higher design CBR may then be achievable.

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

Based on the plasticity index the soils are not considered frost susceptible in accordance with the former Road Note 29[16]. Also, the PI of the CLAY material is typically greater than 20% indicating that the soils are not frost susceptible.

[15] IAN 73/06 “Interim Advice Note 73/06 Revision 1 (2009), Design Guidance for Road Pavement Foundations (Draft HD25)”.
[16] Road Note 29 “Transport and Road Research Laboratory, TRRL Laboratory Report 1132, The Structural Design of Bituminous Roads”.

5.7 Drainage

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

5.8 Concrete Durability

Based upon the results of the chemical analyses summarised in Appendices C and E, it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE SD1 (2005)[17].

5.9 Excavations

Site observations indicated that excavations should be feasible in the near surface with normal plant. It is anticipated that any obstructions encountered will be grubbed out during the reduced level dig.

Groundwater seepage was recorded in a number of the deeper window sample boreholes and monitoring data indicates there to be shallow perched water within the upper cohesive natural strata and made ground at depth ranges of approximately 0.5-2.0mbgl.

Generally, trial pits were stable with no evidence of collapse during the short stand open times. However, due to the variability of the Made Ground it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97[18]. Shallow groundwater noted during the monitoring period are considered to be perched and conventional sump pumping should be adequate.

5.10 Minerals

There are no minerals of economic value underlying the site at shallow depth and mining is considered to be very unlikely. There are no mine entries recorded or likely at this site.

The site is considered to be minerally stable.

5.11 Further Works

Further works to assist in reducing development costs and risk should include:

- CBR assessment of sub-grade by plate load test or dynamic cone penetrometer.
- BRE 365 Soakaways or variable head permeability testing.

5.12 Construction Activity and Inspection

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

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction;

[17] BRE SD1 " BRE Special Digest 1:2005, *third edition*, Concrete in Aggressive Ground".
[18] CIRIA R97 "Trenching Practice (second edition) (R97)".

- Excavations where access is required should be subject to a risk assessment from a competent person and appropriate mitigation measures (such as benching back the sides or use of support systems) in accordance with CIRIA R97[19] should be utilised;
- It is considered that de-watering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond;
- Where access to confined spaces is required appropriate mitigation measures should be addressed within the Construction Stage Health and Safety Plan.
- The presence of potential contamination and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan.

6 Generic Risk Assessment

6.1 Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (CLR11[19]). Information gathered from the risk assessment has been collated in the revised contamination conceptual model in Section 6.6.

6.2 Soil Risk Assessment

6.2.1 Methodology

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

- Category 4 Screening Levels (C4SLs).
- LQM Suitable 4 Use Levels (S4ULs).
- ATRISK Soil Screening Values (SSVs) and CL:AIRE Generic Assessment Criteria (GACs).

C4SLs were published in 2013[20,21]. The contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))[22] used to generate Soil Guideline Values (SGVs) to 'low' (referred to as Lowest Level of Toxicological Concern (LLTCs)). The policy companion document and supporting letter by Defra, dated 3rd September 2014, states that C4SLs *'could be used under the planning regime, as well as within Part 2A'.* Based on these comments LKC considers the justifications and assumptions used to generate 'low' risk are suitable for the planning regime.

Where no C4SLs have been generated LKC will use the LQM S4ULs[23]. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions[24,25,26,27].

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[28,29] and naphthalene the most volatile and soluble[30]. The new C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, if it falls within appropriate limits,

[19] EA (2004). "Model Procedures for the Management of Land Contamination." R&D Publication CLR 11.
[20] Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."
[21] CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."
[22] EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.
[23] LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."
[24] EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.
[25] EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.
[26] EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.
[27] EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.
[28] EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.
[29] USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."
[30] EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5- 079/TR1.

since the risk from other non-carcinogenic PAHs are considered negligible[31]. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)[32] and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

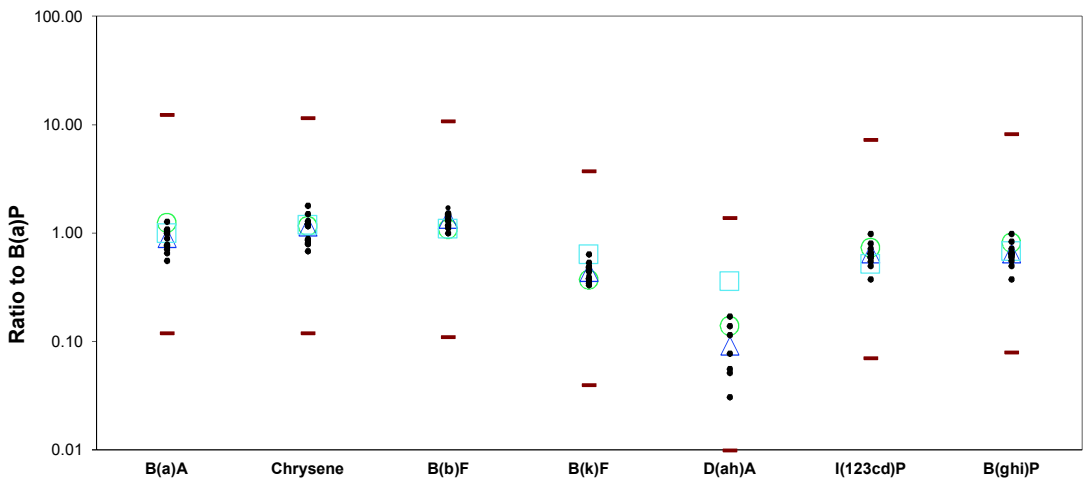
Although no confirmed layouts have been provided, it is understood that the proposed development will comprise mixed residential houses with gardens, apartments with shared landscaping and an area of Public Open Space. Adopting a precautionary approach, the assessment criteria for residential with plant uptake has been used.

All criteria have been generated using the CLEA V1.06 model[33] based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM. ATRISK SSVs and CL:AIRE GACs were not required for this dataset and have not been included.

B(a)P as Surrogate Marker

Based on the above assumption for PAHs, LKC undertook an assessment of the data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et.al*[34], which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

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



Graph 6-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 14 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; ● = Ratio to B(a)P for all data ○ = Mean ratio to B(a)P for Culp data △ = Mean ratio to B(a)P from all data at the site; □ = Mean ratio to B(a)P for UK data presented by HPA ▬ = Upper and Lower limits (order of magnitude from Culp data).

[31] CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."
[32] HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.
[33] EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.
[34] Culp, S; Gaylor, D; Sheldon, W; Goldstein, L and Beland, F (1998). " A Comparison of Tumours Induced by Coal Tar and Benzo-a-pyrene in a 2-Year Bioassay." Carcinogenesis. **Vol 19**, no. 1, pp. 117-124.

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

6.2.2 *Soil Results Comparison against Assessment Criteria*

All analysis sheets are presented in Appendix C. Elevated and pertinent results are presented in Table 6-1.

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria (1%/2.5 %/6%)	Source of Criteria
Metals						
Arsenic	mg/kg	16	76	WS110 D1 (0.0-0.3m)	37	C4SL
			48	TP103 (0.1-0.7m)		
Lead	mg/kg	16	250	WS102 D1 (0.05-0.3m)	200	C4SL
			3,100	WS106 D1 (0.0-0.3m)		
			840	WS107 D1 (0.0-0.4m)		
			380	WS110 D1 (0.0-0.3m)		
			460	TP103 (0.1-0.4m)		
			240	TP104 (0.1-0.7m)		
			270	TP105 (0.1-0.6m)		
			230	TP106 (0.1-0.6m)		
			230	TP107 (0.1-0.4m)		
PAHs						
Benzo(a)pyrene	mg/kg	16	9.3	WS102 D1 (0.05-0.3m)	5	C4SL
			9.0	TP102 (0.1-0.8m)		
			17	TP105 (0.1-0.6m)		
			5.2	TP106 (0.1-0.6m)		
GENERAL						
pH	pH	16	Range 6.5 to 9.3			
SOM	%	16	Range 3.3 to 28			
Asbestos	N/A	16	Detected (see Table 6-2)			

Table 6-1: Summary of elevated and pertinent analytical results.
Notes:
Only results that exceeded assessment criteria have been shown and results from **all depths** are noted.
Results have been compared to the nearest appropriate SOM.

Asbestos was identified, as detailed in Table 6-2.

Sample Location	ID	Type	Total Asbestos (%)
WS106 D1 (0.0-0.3m)	Chrysotile	Fibres/Clumps	0.006
TP102 (0.1-0.8m)	Amosite	Fibres/Clumps	0.003
TP103 (0.1-0.4m)	Amosite	Fibres/Clumps	0.003
TP106 (0.1-0.6m)	Amosite & Chrysotile	Insulation	0.120
TP107 (0.1-0.4m)	Amosite & Chrysotile	Fibres/Clumps	0.006

Table 6-2: Details of asbestos identified.

6.2.3 *Hazard Quotient*

To examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions, a Hazard Index (HI) as described by the Environment Agency[35] technical report was calculated for the samples. This should be undertaken when there

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

are no elevated petroleum hydrocarbons, when compared to assessment criteria of individual fractions. A HI was calculated for each individual TPH result (See Appendix F) and are summarised in Table 6-3.

Sample Location	Hazard Index	Further consideration required?
TP101	0.04	N
TP103	0.47	N
TP104	0.12	N
TP107	0.14	N
TP108	0.10	N

Table 6-3: Summary of Hazard Quotient findings.

6.2.4 Direct Contact Risk – Pollutant Linkage 1

Metals and PAHs

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

The source of the contamination is expected to the ash and clinker noted in the made ground.

At the concentrations identified, the contaminants are considered to pose a potential risk to future site users (residents) in gardens and soft landscaped areas, where made ground may be exposed / in contact with vegetables. The principal pathways are the ingestion pathways (soil, dust and vegetables) and dermal contact.

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

Hydrocarbons & Other Organic and Inorganic Contaminants

No elevated hydrocarbon contamination has been identified and no other sources of contamination were identified during the site investigation, therefore the probability of these contaminants posing a risk to site users in considered unlikely. With a medium consequence, the risk is considered to be low and no remediation is recommended.

Asbestos

Asbestos (chrysotile and amosite) has been identified on site. The asbestos was identified as free fibres and insulation. The source of the asbestos is likely to be from demolished buildings.

AGS interim guidance[36], based on work by Addison et al[37], notes that the addition of 10% water to soil decreases the risk of potential fibre release by a factor of between 2 and 10 percent. The moisture content of the soil sampled from site was 9-25% - making fibre release unlikely.

Data from Addison et al shows that a sandy soil with Amosite fibre concentrations of 0.01%w/w when agitated in a moderately aggressive way, produced between 0.01f/ml

[36] AGS (2013). "Site Investigation Asbestos Risk Assessment." AGS Interim Guidance, Feb 2013, Ver 2.4.
[37] Addison et al (1988). "The Release of Dispersed Asbestos Fibres from Soils." Institute of Occupational Medicine Report No. TM/88/14.

and no recordable fibres at moisture contents of 5% and above. It should be noted that the clearance level is 0.01f/ml.

The Joint Industry Working Group Risk Ranking Support Tool[38] operating under the CLR11 framework and in consultation with the HSE was utilised to assess the risk from exposure to asbestos contaminated made ground at the site. The tool allows a qualitative overall risk scenario to be determined, from 'very low' to 'high', depending on the combined pathway ranking.

LKC completed the risk assessment methodology using the most appropriate option based on our understanding of the conceptual site model (Appendix G) following suitable remediation (clean capping layer associated with elevated metals & PAHs, above – this is discussed further in Section 9). In instances were options did not sufficiently reflect site conditions then the 'worst case' scenario was presumed to be representative to allow a conservative assessment.

The assessment undertaken above classifies the overall risk ranking as '**low**' based on use of a capping system in soft landscaping and garden areas.

Additional consideration should also be given to the risk to workers and offsite receptors during groundworks and construction. This is discussed further in Section 9.

Asbestos may affect site users in soft landscaping and garden areas via the inhalation of fibres. The probability is considered to be likely. With a medium consequence the risk as assumed to be moderate and remediation is recommended.

6.2.5 Risk from Inhalation of Vapours – Pollutant Linkage 2

No visual / olfactory evidence of volatile contaminants was identified during the investigation. The PID did not detect any significant TVOCs.

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

6.3 Gas Risk Assessment

Gas monitoring was not carried out as part of this assessment. The PRA identified a moderate/low risk and recommended gas monitoring if a significant depth of organic / putrescible material was identified.

No significant organic / putrescible material was encountered on site. Made ground was encountered between 0.6-1.7mbgl, typically <1mbgl and comprising sandy gravelly clay with various amounts of ash, clinker, concrete and bricks.

In line with CL:AIRE Research Bulletin 17[39] where made ground is 1m or less and no significant organic /putrescible material is present, the site can be classified as Characteristic Situation 1 and no gas protection measures are required.

Given the ground conditions encountered, LKC considers the probability of gas posing a risk to site users as unlikely. The consequence is severe, which gives a moderate /

[38] CL:AIRE (2017). "Decision Support Tool for the Qualitative Risk Ranking of Work Activities and Receptors Involved in or Exposed to Asbestos in Soil and Construction & Demolition Materials".
[39] CL:AIRE Research Bulletin (RB17) "A Pragmatic Approach to Ground Gas Risk Assessment" November 2012.

low risk. Given the known ground conditions, LKC considers there to be a low risk and no further action is required with respect to pollutant linkage 3.

6.4 Controlled Water Assessment

LKC considers the Principal Aquifer as the primary receptor. The adjacent Rochdale canal is not considered a receptor as it is hydraulically separated from groundwater by the canal liner and is likely to represent a head of water to regional groundwater.

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

- River Basin District Standards[40] and updated Water Framework Directive[41] for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)[42].
- 2009 UK Drinking Water Standard (UKDWS)[43].
- Resource Protection Values (RPVs)[44].
- Minimal Reporting Values (MRVs).

With regards to hydrocarbon mixtures (TPHCWG) for UKDWS, LKC will use the CL:AIRE guidance on petroleum hydrocarbons in groundwater[45] based on WHO guidelines.

No criteria values have been presented for surface waters (EQS) except the odour, visual evidence and taste test for fish[46]. However, criteria for each banding has been presented by WHO within the CL:AIRE report for drinking water and will be used in the assessment.

The risk from List 2 compound (EC Dangerous Substance Directive 76/464/EEC) in a freshwater ecosystem is governed by the hardness of the water. Where applicable the hardness was taken into account for these contaminants. Additionally, to run the M-BAT[47] model to take into account bioaccessibility of copper, zinc and nickel the Dissolved Oxygen Concentration (DOC), pH and calcium concentrations will be used.

Elevated contaminants are presented in Table 6-4 below and all analysis sheets are presented in Appendix E.

[40] Defra (2010). "The River Basin Districts Typology, Standards and Groundwater Threshold Values". Water Framework Directive (England and Wales) Directions 2010.
[41] Defra (2015). " Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015".
[42] EA (2002). "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the Environment Protection Act 1990."
[43] Statutory Instruments (2009). "The Private Water Supplies Regulation 2009." No. 3101
[44] SEPA (2010). "Assigning Groundwater Assessment Criteria for Pollutant Inputs." WAT-PS-10-01.
[45] CL:AIRE (2017). "Petroleum Hydrocarbons in Groundwater: Guidance on Assessing Petroleum Hydrocarbons Using Existing Hydrological Risk Assessment Methodologies."
[46] EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."
[47] WFD (2014). "UKTAG River & Lake Assessment Method Specific Pollutants (Metal): Metal Bioavailability Assessment Tool (M-BAT)." Water Framework Directive.

Contaminant	Units	No. of samples	Elevated Result	Location	Assessment Criteria	Source of Criteria
Metals						
Copper[1]	µg/l	6	26	WS105	4.08	M-BAT Site-specific PNEC
			32	WS104	1.00	
Selenium	µg/l	6	17	WS104	10	EQS
General						
pH	pH	6	Range 8.3 to 12.0			
Hardness	mg/l $CaCO_3$	6	Range 190 to 740			
DOC	mg/l	6	Range 2.9 to 17.0			

Table 6-4: Summary of elevated groundwater test results.

Notes:

[1] = WFD (2014). "UKTAG River & Lake Assessment Method Specific Pollutants (Metal): Metal Bioavailability Assessment Tool (M-BAT)." Water Framework Directive.

PNEC = Predicted No Effect Concentration.

EQS (2001) and AA / MAC-EQS (2010) = surface water criteria.

Marginally elevated results have been identified for Copper (WS104 and WS105) and Selenium (WS104).

The above assessment is extremely conservative for the site settings. Samples were collected from shallow groundwater on the site. The clay present on the site should significantly reduce any sub-surface migration to the underlying aquifer and processes include dilution, attenuation and biodegradation will reduce the concentration of contamination.

Based on the above, LKC considers the probability of contaminants on site affecting the Principal Aquifer as unlikely. Given the medium consequence, a low risk is anticipated (Pollutant Linkage 4) and no remediation is required.

6.5 Additional Risk Assessments

6.5.1 Concrete (Pollutant Linkage 5)

The concentrations of soluble sulphate in the soil when contrasted to BRE Digest 2005[48] categorise the concrete requirement as DS-1 AC-1s.

Based on the above, the probability of sulphate concentrations affecting buildings is low. Given the consequence is considered to be mild, the risk (pollutant linkage 5) is anticipated to be low and no remediation is required. This should be confirmed with the structural engineer.

6.5.2 Potable Water Supply (Pollutant Linkage 6)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination[49]. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be a risk and therefore not included in the analysis suites: chlorinated compounds, cresols, ethers, nitrobenzene, ketones, aldehydes and amines.

The following elevated contaminants were identified:

[48] BRE (2005)."Concrete in Aggressive Ground." Special Digest 1.

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

- Elevated TVOCs (inc. naphthalene) in made ground across the site.

It should be noted typical pipework depths are 0.75mbgl to 1.35mbgl. The pipework may be laid into the underlying natural strata after levels have been reduced. Once details of the pipeline location and depths are known a UU Risk Assessment should be undertaken.

Barrier pipe may be required across the site subject to the depth and location of the water pipes and in consultation with UU.

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

6.5.3 Phytotoxicity (Pollutant Linkage 7)

Soil results were compared to phytotoxic guideline values as outlined in BS3882[50].

Elevated zinc (maximum concentration 550mg/kg), was identified. The probability of phytotoxic contaminants affecting vegetation is considered to be likely. With a minor consequence, the risk (pollutant linkage 7) is anticipated to be low. Although the risk is low, some remediation is recommended - remediation associated with PL1 (cover system) will be more than sufficient for PL7.

6.6 Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-1) has been revised following the risk assessments undertaken in Sections 6.1-6.5. The revised contamination conceptual model follows the same methodology and guidance used in the preliminary contamination conceptual model. The risk matrix is provided in Appendix A.

The revised contamination conceptual model is presented in Table 6-5.

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

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

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

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

Further details of the remedial proposals and a remedial option appraisal are given in Section 9.

[50] BS (2015). "Specifications for Topsoil and Requirements for Use." BS3882:2015.

Pollutant Linkage	Pathway	Receptor	Contaminant	Probability	Consequence	Risk	Assessment & Recommendations
PL1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, vegetables, soil attached to vegetables. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM - Heavy metals. - PAHs	Likely	Medium	**Moderate**	- Elevated PAHs, metals and ACM identified in made ground across site which could come into contact with site users in gardens and soft landscaping areas. - **Recommendation**: Remediation required. Likely to include an environmental cover system in gardens / soft landscaping areas.*
			- Hydrocarbons. - Other organic & inorganics	Unlikely	Medium	**Low**	- No elevated hydrocarbons present. - No evidence of other contaminants identified. - **Recommendation**: No remediation required.
PL2	- Inhalation of vapours. - Migration through permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants such as hydrocarbons, solvents.	Unlikely	Medium	**Low**	- No elevated TVOCs and no olfactory indications of contamination identified. - **Recommendation**: No remediation required.
PL3	- Inhalation of gas. - Migration through permeable strata and preferential pathways. - Explosion in confined spaces.	- Future site users. - Buildings. - Offsite land users.	- Hazardous Gas: - Methane, carbon dioxide.	Unlikely	Medium	Moderate **/ Low**	- Unlikely probability as no significant source identified. - No significant thickness of made ground and no putrescible material identified. - **Recommendation**: No remediation required.
PL4	- Surface run-off. - Migration through permeable strata and preferential pathways. - Perched waters migration.	- Groundwater.	- Mobile contaminants such as metals, PAHs, hydrocarbons.	Unlikely	Medium	**Low**	- Marginally elevated concentrations of Cu & Se identified in shallow groundwater. - Intervening clay and natural attenuation processes will impede migration to underlying aquifer. - **Recommendation**: No remediation required.
PL5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Low Likelihood	Mild	Low	- No elevated sulphate or pH identified. - **Recommendation**: DS1 AC-1s considered suitable
PL6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as hydrocarbons.	Likely	Medium	**Moderate**	- Likely probability as significant contamination may be present at pipeline depth (0.75-1.35m). - **Recommendation**: Water pipeline risk assessment should be completed once depth and location are known. Barrier pipe may be required.
PL7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants.	Likely	Minor	**Low**	- Elevated Zn identified on site. - **Recommendation**: Remediation associated with PL1 sufficient.

Table 6-5: Revised Contamination Conceptual Model.

Notes:* The conceptual model only takes into consideration the future use of the site and long-term exposure. Consideration should also be given to the short-term exposure of construction workers and nearby land users to ACM containing soils during groundworks.

7 Waste Disposal Assessment

The soil contamination results as presented in Appendix C have been used to help determine the disposal route should any material be earmarked for off-site disposal.

As an initial screen the soil results were inputted into Hazwaste Online™. This is a web-based facility that allows an assessment of contaminant soils and classifies the soils as either hazardous or non-hazardous waste.

It is understood that Hazwaste Online™ has been designed to cover the European Waste Catalogue code number 17 05 03 "soil and stones containing dangerous substances" and follows current guidance[51,52,53,54,55].

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

The output sheet is presented in Appendix H and summarised in Table 7-1.

Sampling Location	Waste Classification	Hazard (Risk Phrase)	Contaminants
TP101	Non Hazardous	-	N/A
TP102	Non Hazardous	-	N/A
TP103	Non Hazardous	-	N/A
TP104	Non Hazardous	-	N/A
TP105	Non Hazardous	-	N/A
TP106	Non Hazardous	-	N/A
TP107	Non Hazardous	-	N/A
TP108	Non Hazardous	-	N/A
WS102 D1	Non Hazardous	-	N/A
WS104 D1	Non Hazardous	-	N/A
WS105 D1	Non Hazardous	-	N/A
WS106 D1	Hazardous	HP14 (Ecotoxic)	Lead
WS107 D1	Non Hazardous	-	N/A
WS108 D1	Non Hazardous	-	N/A
WS109 D1	Non Hazardous	-	N/A

Table 7-1: Summary Hazwaste Online™ findings.

7.1 Statistical Analysis

As described in WM3[56], statistical analysis can be undertaken on the dataset to ascertain the classification of the soil population as a whole. The statistical output sheet is presented in Appendix H.

WM3 sates that the mean (μ) and upper confidence level at 95% (UCL0.95) should be undertaken on the dataset for similar soil types. Where non-normal distribution is present alternate techniques should be employed.

[51] EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.
[52] The Hazardous Waste Directive, (HWD, Council Directive 91/689/EC).
[53] European Waste Catalogue, 2002 (EWC 2002, Commission Decision 2000/532/EC) as amended by Commission Decision 2001/118/EC, 2001/119/EC and Council Decision 2001/573/E.
[54] List of Wastes (England) Regulations 2005.
[55] Approved Supply List (Eighth Edition), 2002. ISBN: 0 7176 2368 8.
[56] EA (2018). "Guidance on the Classification and Assessment of Waste (1st Edition v1.1)". Technical Guidance WM3.

The ESI contaminated land statistics calculator[57] has been used to calculate μ and US_{95}. This approach is used in human health. The Shapiro-Wilk test has been used to test for normality of the dataset. Data that complies with a normal distribution is assessed using the one-sided t-test. Data that complies with a non-normal distribution is assessed using the Chebychev approach.

Outliers were identified for lead. LKC followed CIEH / CL:AIRE guidance[58], which indicated that outliers should only be removed from the dataset where there is an obvious demonstrable error in the laboratory data or clear evidence of more than one soil population. For this dataset there were no demonstrable laboratory errors in the data and made ground was of similar composition (ash component). Therefore, as stipulated in the CIEH guidance note 'outlying data should be assumed to be genuine and reflective of the full range of soil concentrations to which receptors may be exposed'. This approach appears to be consistent with interpreting data for the waste classification of soils.

The upper confidence level for the contaminant of concern (lead) was inputted into Hazwaste Online™ (see Appendix H) and are summarised in Table 7-2.

Contaminant	Sample Size	Range (mg/kg)	Mean (μ) (mg/kg)	95th% Confidence ($UCL_{0.95}$) (mg/kg)	Distribution N / NN	Waste Classification
Lead	16	55-3,100	425	1,230	NN	Non Hazardous

Table 7-2: Summary of Statistical and Hazwaste Online findings.
Note: N=Normal distribution; NN=Non-normal distribution, ET=Ecotoxic

Based on the above assessment, soils on the site should be classified as NON-HAZARDOUS.

Waste Acceptance Criteria (WAC) testing was undertaken on 5no. samples from made ground on site which may be removed as part of the development. Currently there are only acceptance criteria for inert, stable-non-reactive hazardous (SNRH) and hazardous landfills.

There are no numerical WAC limits for landfills for non-hazardous waste. This means there is no limit on the organic content of an individual waste stream accepted at a landfill for non-hazardous waste. However, there are high-level biodegradable waste diversion targets laid out in Article 5 of the Landfill Directive[59].

Based on the above, WAC testing is only required for wastes destined for inert, SNRH and hazardous landfills. LKC recommended sending the waste classification to your designated waste carrier. A licensed landfill operator will confirm the waste classification of the soils.

[57] ESI (2011). "ESI Contaminated Land Statistics Calculator User Manual." Version 2.
[58] CL:AIRE (2008). "Guidance on Comparing Soil Contamination Data with a Critical Concentration."
[59] Environment Agency (2010). "Waste Acceptance at Landfills".

8 Conclusions

8.1 Geotechnical

The natural Clay identified has an allowable bearing pressure of 60kN/m^2 from 1mbgl and 100kN/m^2 from 2mbgl. Consideration should be given to the potential for variable strata to be encountered (localised sand identified between 1.7-3.2mbgl at location of WS105 and organic Clay identified between 0.4-2.2mbgl within the location of BH1). Groundwater (identified during post site monitoring at approximately 0.5-2.0mbgl) may require sump pumping from trenches.

The foundations may need to be deepened to take into account variability of ground conditions (depth of Made Ground, presence of loose Sand and organic Clay). Foundations may also require deepening due to the plasticity of the clay and effects from existing/proposed trees. A low to medium volume change potential was identified.

For the two storey residential houses it is considered that shallow strip foundations, seated upon the natural firm to stiff Clay, will provide a suitable foundation option. Consideration may need to be given to extending the excavation through poor ground where encountered and utilising deep strip foundations.

The four storey apartment blocks will exert higher loadings and it is therefore considered that either a ground improvement or piled foundation option should be used.

No sulphate resistant concrete is required (DS-1 AC-1s).

A design CBR value of 2.5% should be used for the natural CLAY subgrade and a CBR of <2% may be required to be used for the Made Ground when designing footpaths and roads.

Further advice on foundation design should be sought from a structural engineer.

8.2 Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 8-1 below (more detailed model provided in Section 6).

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	**Moderate** (PAHs, metals, ACM)	- Elevated PAHs, metals and ACM identified in made ground across site. - **Recommendation:** Remediation required.
		Low (hydrocarbons, other organic & inorganics)	- No elevated hydrocarbons present. No evidence of other contaminants identified. - **Recommendation**: No remediation required.
2	Volatile contaminants posing a risk to site users via the inhalation of vapours.	**Low**	- No elevated TVOCs and no olfactory indications of contamination identified. - **Recommendation:** No remediation required.
3	Gas posing a risk to buildings and site users via the migration of gas into building causing explosion and asphyxiation.	Moderate / **Low**	- No source and no significant thickness of made ground identified. - **Recommendation:** No remediation required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	**Low**	- Marginally elevated concentrations metals identified. Intervening clay and natural attenuation process will impede migration. - **Recommendation:** No remediation required.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	**Low**	- No elevated sulphate or pH identified. - **Recommendation**: DS1 AC-1s considered suitable.
6	Organic contaminants posing a risk to water pipes.	**Moderate**	- Contamination may be present at pipeline depth (0.75-1.35m). - **Recommendation:** Water pipeline risk assessment should be completed. Barrier pipe may be required.
7	Phytotoxic metals posing a risk to flora via root uptake.	**Low**	- Elevated Zn identified on site. - **Recommendation:** Remediation associated with PL1 sufficient.

Table 8-1: Summary Risk Table.

Remedial recommendations are presented in Section 9.

9 Recommendations and Remedial Strategy

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

9.1 Remediation and Validation Recommendations

Table 9-1 details the further works and remedial recommendations / requirements. The table shows work required pre-construction (i.e. during earthworks) and during / post construction.

Phase	PL	Remediation Requirements	Validation Requirements
Pre-Construction	**ALL**	Earthworks Inspections / Unexpected Contamination The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.

Phase	PL	Remediation Requirements	Validation Requirements
Build-Phase Construction	**1 and 7**	As the made ground is relatively shallow the following options are given: Option 1 Removal of all reworked topsoil / made ground from garden and soft landscaping and raise levels (as required) with suitably chemically validated subsoil and topsoil. If site levels allow, asbestos containing made ground may be placed in a suitably constructed borrow pit within an area of POS with suitably constructed cover system as per Option 2, below. Movements of materials on site should be done under suitable licensing/permitting in accordance with the CL:AIRE Code of Practice Option 2 If all or some of the made ground remains in place in gardens and soft landscaping areas, an environmental cover system will be required incorporating a suitable break layer or barrier to prevent mixing. The environmental cover system should be as follows: **Private Back Gardens: 600mm thick environmental cover system comprising:** **Either** 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 500mm comprising clean inert fill and sufficient topsoil for a growing medium. **Or** geotextile membrane and at least 600mm comprising clean inert fill and sufficient topsoil for a growing medium. **Private Front Gardens / Shared Landscaping: 300mm thick environmental cover system comprising:** **Either** 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 200mm comprising clean inert fill and sufficient topsoil for a growing medium. **Or** geotextile membrane and at least 300mm comprising clean inert fill and sufficient topsoil for a growing medium. The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix I.	Option 1 Consignment notes confirming the removal of made ground. Photographic evidence of natural strata. Chemical validation of imported soils: See Table 9-2. Option 2 Measuring depth of environmental cover system using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer will also be collected. Chemical validation of imported soils: See Table 9-2.
	5	Sulphate Resistant Concrete Sulphate Resistant Concrete in line with DS-1 AC-1s recommended.	N/A
	6	Potable Water Pipes 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 if located in made ground.	Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
	2, 3, 4, 7	No remediation anticipated with respect to PL2 (inhalation of vapours), PL3 (gas), PL4 (water) and PL7 (phytotoxicity); however, this needs to be confirmed once additional work has been completed.	

Table 9-1: Remediation and validation requirements
Notes: See Table 6-1 for pollutant linkage (PL) details.

9.2 Other Considerations

9.2.1 Grubbing Out of In-ground Structures

It is recommended that in-ground structures are grubbed out as part of the groundworks.

9.2.2 Re-use of Site-won Material

To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered.

This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used [60]):

- 5,000 tonnes (*c.* 2,500m^3) treatment of crushed concrete / stone.
- 1,000 tonnes (*c.* 500m^3) use of non-hazardous soil
- 5,000 tonnes (*c.* 2,500m^3) use of clays, sand, gravel, brick, concrete, stone etc.
- 50,000 tonnes (*c.* 25,000m^3) use of bituminous material to be used in roadways.

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

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

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

9.2.3 Asbestos Management Plan

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

This risk can be managed by careful procedures and site monitoring to reduce the risk of airborne fibres, and it is recommended that an appropriate 'Asbestos Management Strategy' is developed and adopted for all intrusive ground works which disturb the made ground in the area of concern. This should be carried out in line with CIRIA C733 .

This may include asbestos awareness training for all site staff, provision of suitable personal and respiratory protective equipment and air monitoring.

With regards to cement bound asbestos, this can be handpicked, doubled bagged and disposed of appropriately to a licenced landfill. Guidance on removing asbestos cement is described in HSE (2012) .

[60] https://www.gov.uk/guidance/waste-exemptions-using-waste

If ACM is identified in soil arisings then soil should be placed directly into covered skips and disposed of at a suitable licenced landfill, after further testing to quantify the extent of asbestos contamination of the soils. It should be considered that blue asbestos is notifiable and must be removed by a licenced contractor.

9.2.4 Health & Safety Considerations

In working with, removing or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance[61]) should be adopted by all workers involved with site enabling and construction works.

9.2.5 Piling in Contaminated Land

If the proposed development incorporates a piled foundation solution, once the method of piling has been determined, good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency[62].

9.3 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 9-2. Ideally, the material should be sampled at source to prevent double handling if soil fails. 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 to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate*
Topsoil	Greenfield	Suite A	1 sample per 50m^3
	Brownfield / Unknown	Suite B	
Subsoil	Brownfield / Unknown	Suite B	1 sample per 150m^3
	Site won natural material	Suite A	
Physical Stone Break Layer	First Generation i.e. quarried sand (subsoil) or stone (break layer)	No testing is required. Certification of material provenance is required.	
	Recycled Stone (6F2 / screened)	Suite B	1 sample per 500m^3

Table 9-2: 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.

*Minimum sampling rate of 3 samples per source.

Any soil with visual or olfactory evidence of hydrocarbons should be rejected.

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

[62] Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

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 BS3882[63]). 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 with plant uptake criteria (as used in the contamination risk assessment).

9.4 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:

- Provision of waste transfer documents.
- If option 1 (source removal)): Validation of any made ground removal (photographic evidence that natural strata was reached).
- If option 2 (environmental capping layer): Validation of environmental cover system.
- Verification testing of all imported soil for garden and soft landscaping areas.
- Information on the installation of protective pipes and / or sterile trenches.
- 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.

[63] BS (2015). "Specifications for Topsoil and Requirements for use." BS3882:2015.

Figures

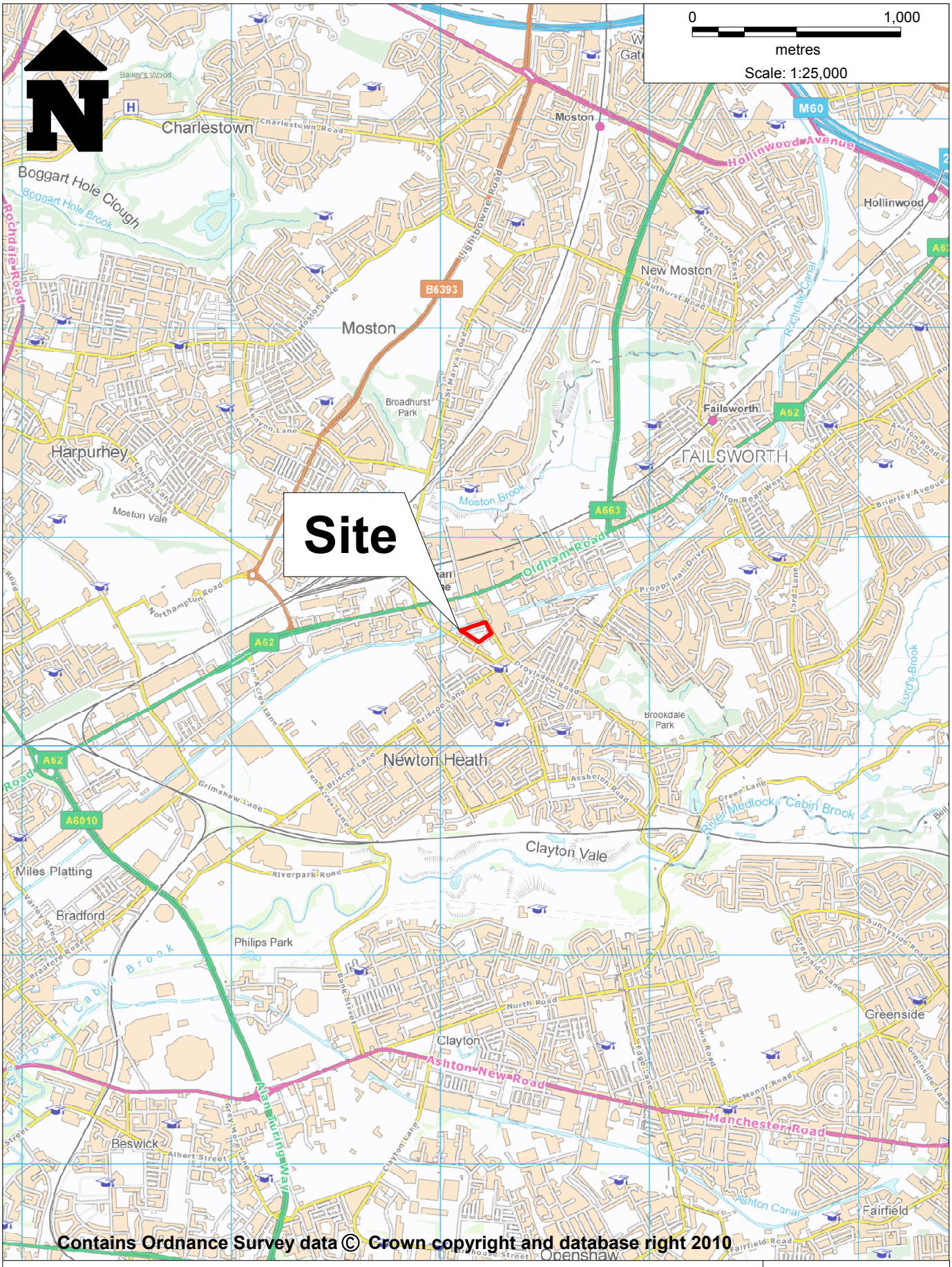
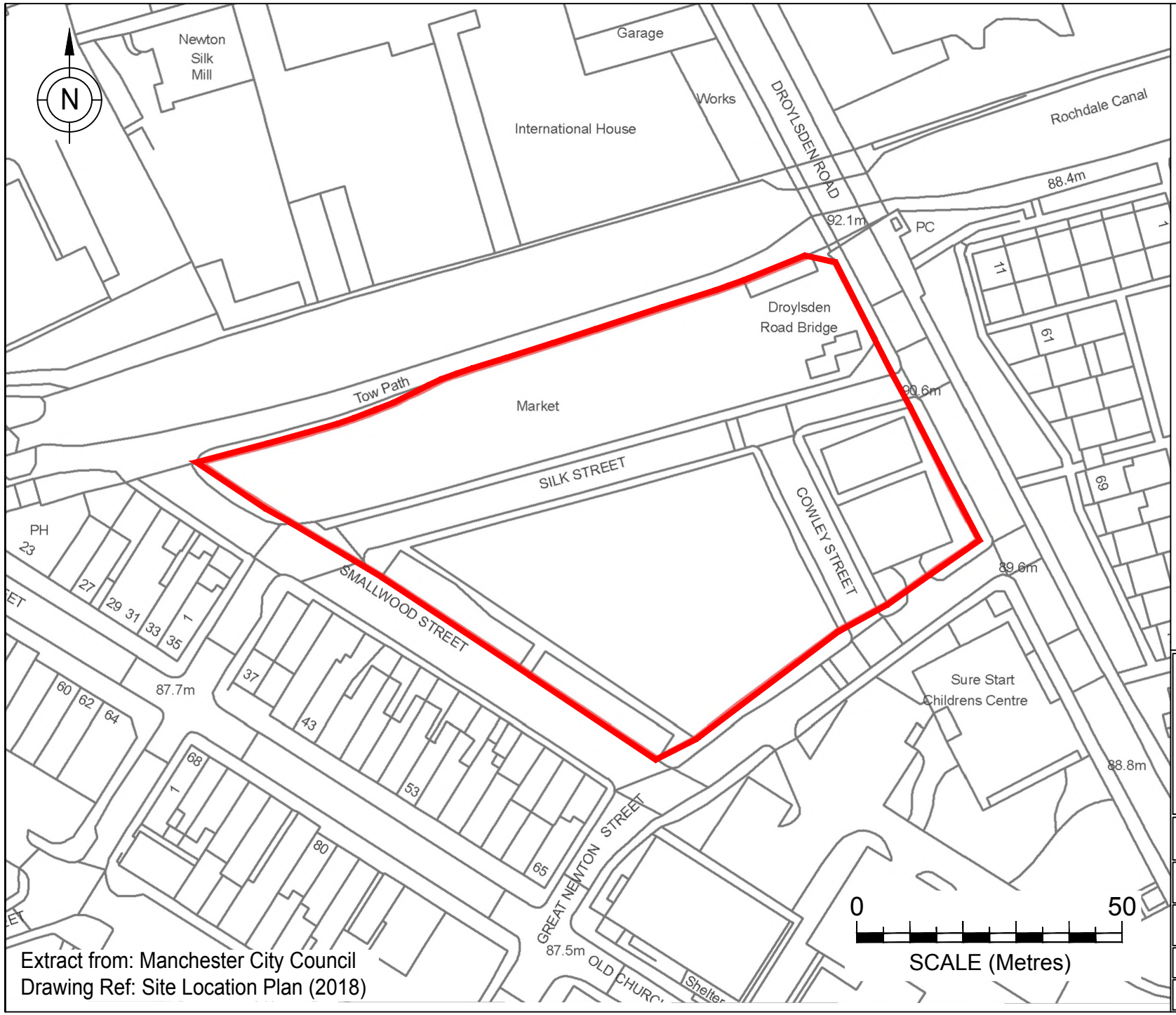


Figure 1: Site Location Plan, Land at Silk Street, Manchester

Drawn: January 2019 Scale: 1:25,000 @ A4 (see scale bar)

LK CONSULT LIMITED



Extract from: Manchester City Council
Drawing Ref: Site Location Plan (2018)

KEY

Site Boundary

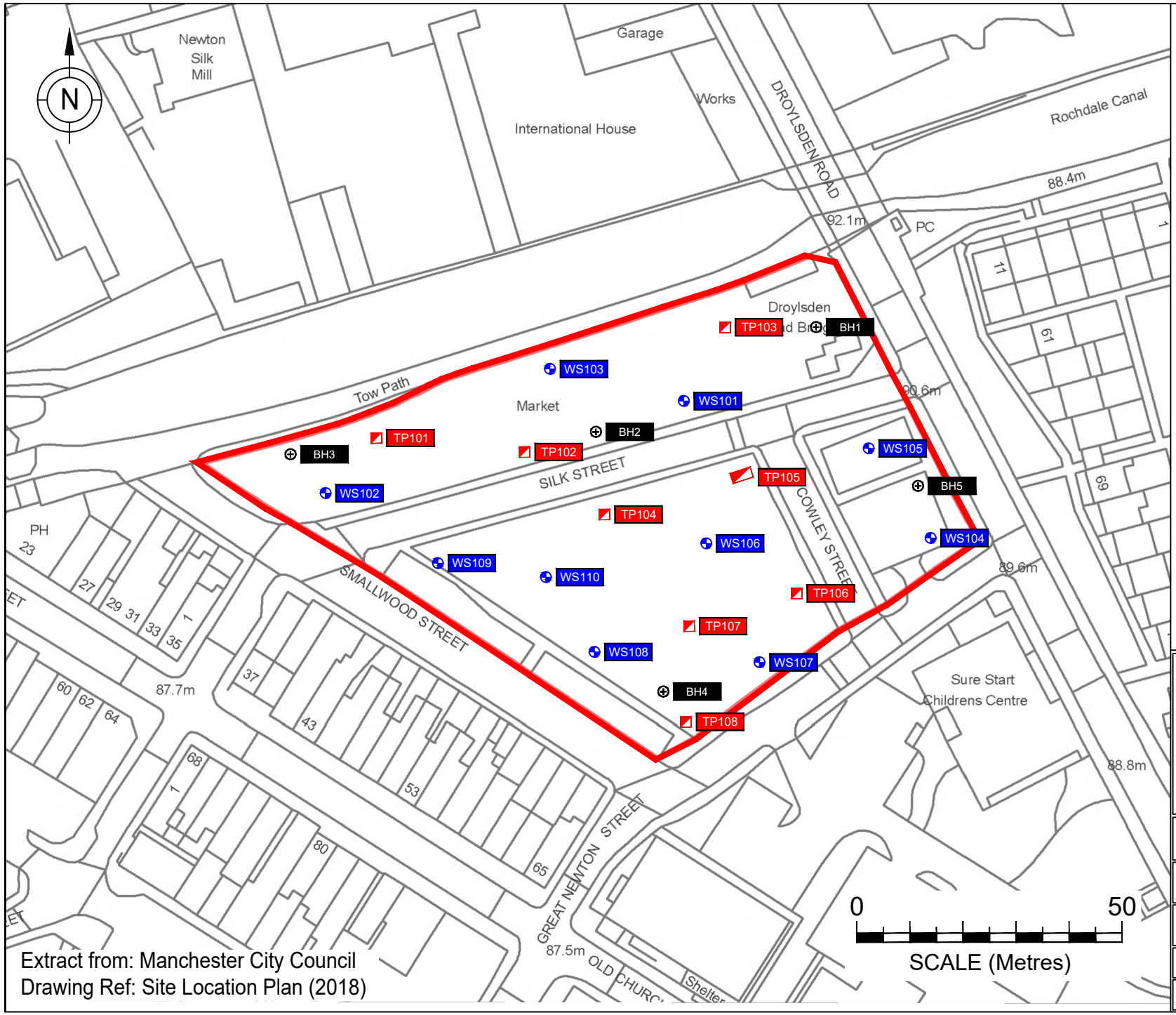
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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.

LK CONSULT LIMITED

Client:	Faithful + Gould
Site:	Land at Silk Street, Manchester
Title:	Site Boundary Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 18 1474	1:1000 @ A4	2	

Drawn By:	Checked By:	Drawn:
AC	PD	Jan 2019



KEY

- Site Boundary
- Window Sample Borehole (WS)
- Trial Pit (TP)
- Cable Percussive Borehole (BH)

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.

LK CONSULT LIMITED

Client:	Faithful + Gould
Site:	Land at Silk Street, Manchester
Title:	Site Investigation Location Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 18 1474	1:1000 @ A4	3	

Drawn By:	Checked By:	Drawn:
AC	PD	Apr 2019

Appendix A

Risk Matrix

Risk Evaluation

The method for risk evaluation is a qualitative method of interpreting the output from the risk estimation stage of the assessment, based on CIRIA 552[64]. It involves the classification of the:

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

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

Table A. Classification of Consequence

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

Table B. Classification of Probability.

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

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

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

Table C. Comparison of Consequence against Probability

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

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

Table D. Description of the Classification and Likely Action Required.

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

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

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

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

Appendix B

Profile Logs

LK CONSULT LTD

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

Site: Land at Silk Street

Borehole Number: BH1

Boring Method: Cable Percussion to 12.32mbgl.

Casing Diameter:

Ground Level (mOD):

Client: Faithful and Gould

Job Number: LKC 18 1474

Location (Handheld GPS)

Dates: 25/03/2019-29/03/2019

Project Contractor: LK Consult

Sheet: 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						0.05				
0.20	D1					(0.30) 0.30	MADE GROUND: Tarmacadam.			
0.80	D2					0.40	MADE GROUND: Grey sandy GRAVEL with frequent ash and brick. Sand is fine to medium. Gravel is fine to medium and subangular to angular comprising mudstone and sandstone.			
						(1.80)	MADE GROUND: Greyish brown sandy GRAVEL with frequent ash, clinker and brick. Sand is fine to coarse. Gravel is fine to medium and angular to subangular comprising mudstone, sandstone and limestone.			
2.30	D3					2.20				
2.50-2.95	U4						Firm to stiff consistency greyish brown organic sandy CLAY with frequent gravel. Sand is fine to coarse. Gravel is fine to medium and angular to subangular comprising mudstone.			
3.00	D5					(1.60)				
3.20-3.50	B6						Very stiff consistency brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium and angular to subangular comprising sandstone.			
3.60-4.05	SPT N=31			3,4/5,6,10,10						
3.60-4.05	X7					3.80				
4.00-4.30	B8					(0.80)	Very stiff consistency brown sandy CLAY. Sand is fine to medium.			
4.60-5.05	SPT N=18			3,3/4,4,5,5		4.60				
4.60-5.05	X9						Very stiff consistency brown sandy CLAY. Sand is fine to medium.			
6.00-6.45	U10									
6.50	D11									
						(5.70)				
7.70-8.15	SPT N=29			4,5/6,7,7,9						
7.70-8.15	X12									
8.20-8.50	B13									
9.20-9.65	U14									
9.70	D15									
10.30-10.65	SPT 50/200			10,10/13,17,20		10.30	Very dense brownish orange very gravelly SAND. Sand is fine to coarse. Gravel is fine to medium and angular to subangular comprising sandstone.			
10.30-10.60	B17									
10.30-10.65	X16									
						(1.60)				
11.90-12.32	SPT 50/270			7,10/12,13,15,10		11.90	Very dense brownish orange silty SAND. Sand is fine to medium.			
11.90-12.00	X18					(0.42) 12.32				
							Complete at 12.32m			

Remarks

Scale (approx): 1:75

Logged By: BR

Figure No.: LKC 18 1474.BH1

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LK CONSULT LTD

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

Site	Borehole Number
Land at Silk Street	**BH2**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion to 12.42mbgl.			Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 25/03/2019-29/03/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20	D1					(1.30)	MADE GROUND: Brown very sandy clayey GRAVEL with frequent brick and ash. Sand is fine to medium. Gravel is fine to coarse and angular to subangular comprising mudstone and sandstone.			
1.00	D2					1.30				
1.50	D3					(1.70)	Stiff consistency brown mottled grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to coarse and angular to subangular comprising mudstone and sandstone. Rootlet identified at 2.10mbgl. Less mottling below 2.00mbgl.			
1.60-2.05	U4									
2.10	D5									
2.20-2.50	B6									
2.70-3.15	SPT N=28			2,3/5,6,7,10						
2.70-3.15	X7									
3.20-3.50	B8					3.00	Very stiff consistency brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded to subrounded comprising mudstone.			
3.90-4.35	U9					(2.10)				
4.40	D10									
5.10-5.55	SPT N=22			3,4/5,5,6,6		5.10	Very stiff consistency brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and angular to subrounded comprising sandstone.			
5.10-5.55	X11									
5.70-6.00	B12					(2.10)			1	
6.50-7.95	U13									
7.00	D14								1	
7.30-7.75	X15			Fast(1) at 7.20m, rose to 6.50m in 20 mins.		7.20	Medium dense brownish orange silty SAND. Sand is fine to medium.			
7.30-7.75	SPT N=20			3,4/5,5,5,5						
8.00-8.30	B16					(2.00)				
9.20-9.65	SPT N=50			7,11/15,15,14,6		9.20	Very dense brown silty SAND. Sand is fine to medium.			
9.20-9.60	X17									
						(3.22)				
11.50-11.95	SPT N=50			8,10/13,13,14,10						
11.50-11.90	X18									
12.00-12.42	SPT 50/270			7,12/12,13,13,12						
12.00-12.40	X19					12.42	Complete at 12.42m			

Remarks
Chiselling from 9.20m to 12.00m for 2 hours.

Scale (approx)	Logged By
1:75	BR

Figure No. LKC 18 1474.BH2

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LK CONSULT LTD

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

Site	Borehole Number
Land at Silk Street	**BH3**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion to 12.15mbgl.			Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 25/03/2019-29/03/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						0.05				
0.20	D1					0.20 (0.40)	MADE GROUND: Tarmacadam.			
0.80	D2					0.60 (1.20)	MADE GROUND: Blackish brown sandy clayey GRAVEL with frequent brick and ash. Sand is fine to medium. Gravel is fine to medium and angular to rounded comprising mudstone, sandstone and limestone.			
2.10-2.55 2.10-2.55	SPT N=21 X3			2,3/4,5,6,6		1.80 (0.40) 2.20	MADE GROUND: Blackish brown very gravelly sandy CLAY with frequent brick and ash. Sand is fine to medium. Gravel is fine to medium and angular to rounded comprising limestone and mudstone.			
3.00-3.30	B7					(1.10) 3.30	Firm consistency brown gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and subrounded to rounded comprising mudstone.			
3.30-3.75	U5						Firm to stiff consistency brown mottled grey slightly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded comprising mudstone.			
3.80 4.00-4.30	D6 B4						Very stiff consistency brown slightly gravelly slightly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded comprising mudstone.			
4.40-4.85 4.40-4.85	SPT N=42 X8			5,6/10,10,10,12			Very stiff consistency brown slightly sandy CLAY. Sand is fine to medium.			
5.50-5.95	U9									
6.00	D10					(5.90)			▼1	
				Fast(1) at 6.50m, rose to 6.10m in 20 mins.					▽1	
7.10-7.55 7.10-7.55	SPT N=32 X11			5,6/7,7,8,10						
8.50-8.95	U12									
9.00 9.30-9.65 9.30-9.65	D13 SPT 50/200 X14			7,12/15,21,14		9.20	Very dense brownish orange slightly gravelly silty SAND. Sand is fine to medium. Gravel is fine to medium and rounded comprising mudstone.			
9.70-10.00	B15									
10.50-10.85 10.50-10.85	SPT 50/200 X16			8,10/15,15,20		(2.95)				
11.80-12.15 11.80-12.15	SPT 50/200 X17			7,12/14,17,19		12.15	Complete at 12.15m			

Remarks
Chiselling from 9.20m to 11.80m for 2.25 hours.

Scale (approx)	Logged By
1:75	BR

Figure No. LKC 18 1474.BH3

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Site	Borehole Number
Land at Silk Street	**BH4**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion to 12.02mbgl.			Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 25/03/2019-29/03/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						0.10	MG: Tarmacadam.			
0.20	D1					(0.80)	MADE GROUND: Brown very sandy GRAVEL with frequent ash and brick. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising sandstone.			
1.00	D2					0.90				
1.20-1.65	U3						Firm to stiff consistency brownish grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising mudstone and sandstone.			
1.70	D4					(1.80)				
1.80-2.70	B5									
2.50-2.95	SPT N=34			3,4/5,8,10,11						
2.50-2.95	X6					2.70	Very stiff consistency brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded comprising mudstone.		▼1 ▽1	
3.00-3.30	B7			Fast(1) at 3.00m, rose to 2.80m in 20 mins, sealed at 4.50m.						
3.60-4.05	U8									
4.10	D9									
4.60-5.05	SPT N=42			4,5/7,10,10,15						
4.60-5.05	X10									
5.50-5.95	SPT N=35			5,6/7,8,8,12						
5.50-5.95	X11					(6.00)				
6.00-6.30	B12									
7.00-7.45	U13									
7.50	D14									
8.60-9.00	SPT 50/250			10,14/15,18,17		8.70	Very dense brownish orange silty SAND. Sand is fine to medium.			
8.60-9.00	X15									
8.70-9.90	B16					(1.10)				
9.80-10.20	SPT 50/250			6,8/12,11,13,14		9.80	Very dense orange silty SAND. Sand is fine to medium.			
9.80-10.20	X17									
10.20-10.50	B18					(2.22)				
11.60-12.02	SPT 50/270			10,10/13,12,13,12						
11.60-12.00	X19					12.02	Complete at 12.02m			

Remarks
Chiselling from 9.80m to 11.60m for 2.25 hours.

Scale (approx)	Logged By
1:75	BR

Figure No. LKC 18 1474.BH4

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Site
Land at Silk Street

Borehole Number
BH5

Boring Method
Cable Percussion to 11.72 mbgl.

Casing Diameter

Ground Level (mOD)

Client
Faithful and Gould

Job Number
LKC 18 1474

Location (Handheld GPS)

Dates
25/03/2019-29/03/2019

Project Contractor
LK Consult

Sheet
1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						0.05	MADE GROUND: Tarmacadam.			
0.20	D1					(1.25)	MADE GROUND: Blackish brown sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium and subangular to angular comprising mudstone and sandstone. Probable ACM tile at 0.2mbgl.			
1.00	D2					1.30				
1.50-1.95 1.50-1.95	SPT N=12 X3			1,2/3,3,3,3		(1.10)	Stiff consistency brownish grey gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and angular to rounded comprising mudstone and sandstone.			
2.00-2.30	B4					2.40				
2.50-2.95	U5					(1.00)	Very stiff consistency brown very sandy CLAY. Sand is fine to medium.			
3.00 3.00-3.30 3.40-3.85 3.40-3.85	D6 B7 SPT N=35 X8			4,5/7,8,10,10		3.40	Very stiff consistency slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and subangular to rounded comprising mudstone.			
4.00-4.30	B9									
4.50-4.95	U10					(2.30)				
5.00	D11									
5.70-6.15 5.70-6.15	SPT N=21 X12			3,4/5,6,5,5		5.70	Stiff to very stiff consistency slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and subrounded to rounded comprising mudstone.			
6.20-6.50	B13					(1.50)			▼1	
				Fast(1) at 7.00m, rose to 6.50m in 20 mins.					▽1	
7.20-7.65	X14					7.20	Very stiff consistency brown sandy CLAY with frequent sand lenses. Sand is fine to medium.			
7.20-7.65 7.70-8.00	SPT N=30 B15			4,5/7,8,8,7						
						(1.80)				
8.40-8.83	U16									
8.90 9.10-9.53 9.10-9.50 9.20-9.50	D17 SPT 50/280 X18 B19			7,11/12,14,14,10		9.00	Very dense brownish orange silty SAND. Sand is fine to medium.			
10.20-10.65 10.20-10.60	SPT N=50 X20			7,12/15,16,19		(2.72)				
11.30-11.72	SPT 50/270			7,13/13,13,15,9		11.72	Complete at 11.72m			

Remarks
ACM tile identified at 0.2mbgl.
ACM = Asbestos Containing Material.
Chiselling from 9.00m to 11.30m for 2.5 hours.

Scale (approx)
1:75

Logged By
BR

Figure No.
LKC 18 1474.BH5

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Site	Number
Land at Silk Street	WS101

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388195 E 400556 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
				90.95	0.05	MADE GROUND: Tarmacadam.			
0.10-0.70	D1 PID = 0.2ppm				(1.15)	MADE GROUND: Brown very sandy silty GRAVEL with abundant ash and clinker, frequent brick and concrete fragments and rare tarmac fragments. Sand is fine to coarse. Gravel is fine to coarse and angular to subangular comprising mudstone and sandstone.			
0.90-1.20	D2 PID < 0.1ppm								
1.20-12.45	SPT N=8		1,1/2,2,2,2	89.80	1.20	Firm to stiff consistency brown mottled grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium and rounded to subrounded comprising mudstone.			
					(0.80)				
2.00-2.45	SPT N=20		3,3/3,5,5,7	89.00	2.00	Stiff consistency brown mottled grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium and rounded to subrounded comprising mudstone.			
2.50-3.00	B3 PID < 0.1ppm				(1.20)				
3.00-3.45	SPT N=34		6,6/7,7,8,12	87.80	3.20	Very stiff consistency brown sandy CLAY. Sand is fine to medium.			
3.50-4.00	B4 PID < 0.1ppm				(1.25)				
4.00-4.45	SPT N=50		7,8/10,12,13,15						
				86.55	4.45	SPT refusal at 4.45mbgl on very stiff CLAY.			
						Complete at 4.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS101

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Site	Number
Land at Silk Street	**WS102**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS) 3881127 E 400556 N	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
				90.95	0.05	MADE GROUND: Tarmacadam.			
0.05-0.30	D1 PID = 0.1ppm					MADE GROUND: Brown/blackish sandy GRAVEL with abundant ash and clinker and frequent brick fragments. Sand is fine to coarse. Gravel is fine to course and angular to subrounded comprising mudstone. Wet strata at 1.0mbgl.			
					(1.45)				
1.20-1.65	SPT N=7		1,0/1,2,2,2						
				89.50	1.50	Very stiff consistency brown mottled grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded to subrounded comprising mudstone. Less mottling below 2.20 mbgl.			
1.70-1.90	D2 PID < 0.1ppm								
2.00-1.45	SPT N=22		4,4/5,5,6,6						
2.50-3.00	B3 PID < 0.1ppm								
					(2.94)				
3.00-2.45	SPT N=35		6,6/7,8,10,10						
3.50-4.00	B4 PID < 0.1ppm								
4.00-4.44	SPT 50/285		7,8/10,12,12,16						
				86.56	4.44	SPT refusal at 4.44mbgl on very stiff CLAY.			
						Complete at 4.44m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No. LKC 18 1474.WS102

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Site	Number
Land at Silk Street	**WS103**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388127 E 400556 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
				90.95	0.05	MADE GROUND: Tarmacadam.			
0.10-0.30	D1 PID = 0.2ppm				(1.25)	MADE GROUND: Black very sandy GRAVEL with abundant ash and clinker and frequent brick. Sand is fine to medium. Gravel is fine to medium and angular to subrounded comprising sandstone, limestone and mudstone.			
1.20-1.65 1.30-1.50	SPT N=7 D2 PID < 0.1ppm		1,1/1,2,2,2	89.70	1.30	Firm consistency brown sandy gravelly CLAY with occasional sand lenses. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising sandstone.			
				89.30	(0.40) 1.70	Very stiff consistency brown mottled grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded to subrounded comprising mudstone. Less mottling below 2.0mbgl.			
2.00-2.45	SPT N=16		2,2/3,3,4,6						
2.50-3.00	B3 PID < 0.1ppm								
3.00-3.45	SPT N=27		5,5/5,6,6,10		(2.72)				
3.50-4.00	B4 PID < 0.1ppm								
4.00-4.42	SPT 50/270		8,8/10,12,13,15						
				86.58	4.42	SPT refusal at 4.42mbgl on very stiff clay.			
						Complete at 4.42m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS103

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Site	Number
Land at Silk Street	WS104

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388239 E 400536 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	D1 PID = 0.1ppm			90.95	0.05	MADE GROUND: Tarmacadam.			
					(1.65)	MADE GROUND: Light brown/grey very sandy GRAVEL with abundant ash and clinker and frequent brick and occasional coal. Sand is fine to medium. Gravel is fine to medium and angular to subrounded comprising limestone and mudstone. Slate fragments at 1.50mbgl.			
1.20-1.65	SPT N=17		3,4/5,4,4,4						
1.70-2.00	D2 PID < 0.1ppm			89.30	1.70	Stiff consistency brown mottled grey sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium and rounded to subrounded comprising mudstone. Rootlets at 1.70mbgl. Less mottling below 2.00mbgl. Wet strata at 2.10mbgl.			
2.00-2.45	SPT N=17		2,3/3,4,5,5						
2.50-3.00	B3 PID < 0.1ppm								
3.00-3.45	SPT N=35		4,5/7,7,10,11		(2.73)				
4.00-4.43	SPT 50/280		8,8/11,12,13,14						
				86.57	4.43	STP refusal at 4.43mbgl on very stiff clay.			
						Complete at 4.43m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS104

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Site	Number
Land at Silk Street	WS105

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388225 E 400562 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.70)	MADE GROUND: Concrete.			
0.70-1.20	D1 PID < 0.1ppm			90.30	0.70	MADE GROUND: Light brown very sandy clayey GRAVEL with frequent brick. Sand is fine to coarse. Gravel is fine to coarse and subangular comprising sandstone and limestone.			
1.20-1.65	SPT N=8		1,2/1,3,2,2		(1.00)				
1.70-1.90	D2 PID < 0.1ppm			89.30	1.70	Loose light brown silty SAND. Sand is fine to medium.			
2.00-2.45	SPT N=6		1,1/1,1,2,2		(1.50)				
3.00-3.45	SPT N=12		2,2/3,3,3,3	87.80	3.20	Stiff consistency brown/grey very sandy gravelly CLAY with frequent slate. Sand is fine to medium. Gravel is fine to medium and subangular comprising sandstone.			
3.50-4.00	B3 PID < 0.1ppm				(0.80)				
4.00-4.45	SPT N=23		4,4/5,5,6,7	87.00	4.00	Very stiff consistency brown/grey very sandy gravelly CLAY with frequent slate. Sand is fine to medium. Gravel is fine to medium and subangular comprising sandstone.			
4.20-4.50	B4 PID < 0.1ppm								
					(1.45)				
5.00-5.45	SPT N=12		2,3/3,3,3,3						
				85.55	5.45	Complete at 5.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS105

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Site	Number
Land at Silk Street	WS106

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388200 E 400543 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	D1 PID = 0.3ppm					MADE GROUND: Black very sandy GRAVEL with abundant ash and clinker and frequent brick fragments. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising sandstone.			
0.70-1.00	D2 PID = 0.1ppm				(1.30)				
1.20-1.65	SPT N=9		2,2/3,2,2,2	89.70	1.30	Stiff light brown/grey slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and subrounded comprising mudstone and sandstone. Very stiff clay below 2.00mbgl. Cobble at 2.90mbgl.			
1.50-2.00	B3 PID < 0.1ppm								
2.00-2.45	SPT N=21		2,3/4,5,5,7						
2.50-3.00	B4 PID < 0.1ppm								
					(3.15)				
3.00-3.45	SPT N=28		5,5/8,6,6,8						
4.00-4.45	SPT N=50		7,9/12,12,13,13						
				86.55	4.45	SPT refusal at 4.45mbgl on very stiff CLAY.			
						Complete at 4.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS106

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Site	Number
Land at Silk Street	**WS107**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388203 E 400517 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.40	D1 PID < 0.1ppm				(1.10)	MADE GROUND: Dark brown/black sandy GRAVEL with abundant brick and frequent ash. Sand is fine to coarse. Gravel is fine to coarse and angular to subangular comprising limestone, mudstone and sandstone. Cobble at 0.2mbgl.			
				89.90	1.10				
1.20-1.65	SPT N=11		1,2/2,3,3,3			Firm consistency orangey brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and rounded to subrounded comprising mudstone. Very stiff clay below 3.00mbgl.			
1.50-1.70	D2 PID < 0.1ppm				(1.10)				
2.00-2.45	SPT N=12		1,2/2,3,3,4						
				88.80	2.20	Stiff consistency brown mottled grey slightly gravelly sandy CLAY with occasional sands pockets. Sand is fine to medium. Gravel is fine to medium and subrounded comprising quartz and mudstone.			
2.50-3.00	B3 PID < 0.1ppm								
3.00-3.45	SPT N=28		4,4/6,6,7,9						
					(3.25)				
4.00-4.45	SPT N=25		5,5/5,6,6,8						
5.00-5.45	SPT N=23		4,4/5,5,6,7						
				85.55	5.45	Complete at 5.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS107

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Site	Number
Land at Silk Street	WS108

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388164 E 400528 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	D1 PID = 0.2ppm				(0.60)	MADE GROUND: Brown very sandy clayey GRAVEL with abundant brick and frequent concrete fragments. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising sandstone.			
				90.40	0.60	Stiff consistency light brown mottled grey gravelly sandy CLAY. Sand is fine to medium. Gravel is fine to medium and angular to subrounded comprising sandstone. Less mottling below 2.40mbgl.Very stiff clay below 2.00mbgl.			
1.20-1.65	SPT N=11		1,1/2,2,3,4						
1.20-1.50	D2 PID < 0.1ppm								
1.50-1.80	B2 PID < 0.1ppm								
2.00-2.45	SPT N=22		2,3/4,6,6,6						
2.50-3.00	B3 PID < 0.1ppm				(3.85)				
3.00-3.45	SPT N=28		5,5/6,6,8,8						
3.50-4.00	B4 PID < 0.1ppm								
4.00-4.45	SPT 50/295		5,6/12,12,13,13						
				86.55	4.45	SPT refusal at 4.45mbgl on very stiff CLAY.			
						Complete at 4.45m			

Remarks
Elevation estimated from www.freemaptools.com/elevation-finder.
GPS coordinates accurate to 6m.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS108

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Site	Number
Land at Silk Street	WS109

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388152 E 400535 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	D1 PID = 0.1ppm				(0.30)	MADE GROUND: Brown very sandy GRAVEL with abundant brick and ash. Sand is fine to medium. Gravel is fine to medium and subangular comprising sandstone.			
0.30-0.70	D2 PID < 0.1ppm			90.70	0.30				
					(0.40)	MADE GROUND: Black very sandy GRAVEL with abundant ash, brick and limestone. Sand is fine to medium. Gravel is fine to medium and angular to subrounded comprising sandstone and limestone. Very stiff clay below 2.00mbgl.			
				90.30	0.70	Stiff brown mottled grey sandy CLAY. Sand is fine to medium. Less mottling below 2.00mbgl.			
1.20-1.65	SPT N=10		1,1/1,3,3,3						
1.30-1.50	D3 PID < 0.1ppm								
1.50-2.00	B3 PID < 0.1ppm								
2.00-2.45	SPT N=21		2,3/4,4,6,7						
2.50-3.00	B4 PID < 0.1ppm				(3.75)				
3.00-3.45	SPT N=32		4,5/6,7,9,10						
3.50-4.00	B5 PID < 0.1ppm								
4.00-4.45	SPT N=50		6,7/9,11,15,15						
				86.55	4.45	SPT refusal at 4.45 mbgl on very stiff CLAY.			
						Complete at 4.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS109

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LK CONSULT LTD

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

Site	Number
Land at Silk Street	**WS110**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler		91.00	Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates**	**Project Contractor**	**Sheet**
	388169 E 400527 N	20/02/2019-21/02/2019	LK Consult	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	D1 PID = 0.2ppm				(0.90)	MADE GROUND: Black sandy GRAVEL with abundant ash and brick. Sand is fine to medium. Gravel is fine to medium and angular to subangular comprising limestone.			
				90.10	0.90	Stiff consistency brown mottled grey sandy CLAY. Sand is fine to medium. Less mottling below 2.00mbgl.			
1.20-1.65	SPT N=10		1,1/2,2,3,3						
1.40-1.70	D2 PID < 0.1ppm				(1.00)				
				89.10	1.90	Very stiff consistency brown sandy CLAY. Sand is fine to medium.			
2.00-2.45	SPT N=21		3,3/4,5,5,7						
2.50-3.00	B3 PID < 0.1ppm								
3.00-3.45	SPT N=21		4,4/5,5,5,6						
3.50-4.00	B4 PID < 0.1ppm				(3.55)				
4.00-4.45	SPT N=23		4,4/5,5,6,7						
5.00-5.45	SPT N=24		5,5/5,5,6,8						
				85.55	5.45	Complete at 5.45m			

Remarks
GPS coordinates accurate to 6m.
Elevation estimated from www.freemaptools.com/elevation-finder.

Scale (approx)	Logged By
1:40	BR

Figure No.
LKC 18 1474.WS110

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LK CONSULT LTD

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Tel: 0161 763 7200 web: www.thelkgroup.com

Site
Land at Silk Street

Trial Pit Number
TP101

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam.		
0.10-0.60 0.10-0.60	B2 D1 0.0ppm				(0.75)	MADE GROUND: Dark brown to black sandy gravel of ash and clinker.		
					0.80			
1.00	SV 42kPa		42,44,40/Av. 42.00		(0.40)	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					1.20			
1.50 1.50-2.00	SV 41.67kPa B3		40,44,41/Av. 41.67		(0.80)	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
2.00	SV 54kPa		50,56,56/Av. 54.00		2.00	Complete at 2.00m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	Logged By	Figure No.
1:40	BS	LKC 18 1474.TP101

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LK CONSULT LTD

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

Site	Trial Pit Number
Land at Silk Street	TP102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam.		
0.10-0.80	D1 0.0ppm				(0.75)	MADE GROUND: Dark brown to black sandy gravel of ash and clinker.		
					0.80			
1.00	SV 36.67kPa		38,40,32/Av. 36.67		(0.80)	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
1.50	SV 34.67kPa		36,34,34/Av. 34.67		1.60			
1.50-2.00	B2				(0.60)	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
2.00	SV 59.67kPa		61,58,60/Av. 59.67		2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	Logged By	Figure No.
1:40	BS	LKC 18 1474.TP102

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LK CONSULT LTD

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

Site	Trial Pit Number
Land at Silk Street	TP103

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.40	D1 0.0ppm				0.05	MADE GROUND: Tarmacadam.		
					(0.45)	MADE GROUND: Dark brown to black sandy gravel of ash and clinker.		
					0.50	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					(0.50)			
1.00 1.00-2.00	SV 31.33kPa B2		30,32,32/Av. 31.33		1.00	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					(1.20)			
2.00	SV 65.33kPa		68,64,64/Av. 65.33		2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	Logged By	Figure No.
1:40	BS	LKC 18 1474.TP103

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Land at Silk Street	**Trial Pit Number** **TP104**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.70	D1 0.0ppm				0.05 (0.65) 0.70	MADE GROUND: Tarmacadam. MADE GROUND: Dark brown to black sandy gravel with abundant ash, clinker, brick (fragments to whole), sandstone (fragment and block), slate, rare glass, plastic and metals. .		
1.00 1.00-2.00	SV 32.67kPa B2		34,32,32/Av. 32.67		(1.50)	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
2.00	SV 66kPa		68,64,66/Av. 66.00		2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	**Logged By**	**Figure No.**
1:40	BS	LKC 18 1474.TP104

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Tel: 0161 763 7200 web: www.thelkgroup.com

Site	Trial Pit Number
Land at Silk Street	TP105

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.60	D1 0.0ppm				0.05 (0.65)	MADE GROUND: Tarmacadam. MADE GROUND: Dark brown to black sandy gravel with abundant ash, clinker, brick (fragments to whole), sandstone (fragment and block), slate, rare glass, plastic and metals. .		
1.00 1.00-2.00	SV 42.33kPa B2		43,44,40/Av. 42.33		0.70 (1.50)	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale. Extensive made ground of brick and stone formed the eastern end of the trial pit. This could not be bottomed out or explored futher as the made ground gradually collapased into the pit. It was determined that any futher excavation may risk undermining the pavement and the trial pit was halted at 2.4mbgl.		
2.00	SV 65kPa		66,62,67/Av. 65.00		2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	Logged By	Figure No.
1:40	BS	LKC 18 1474.TP103

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LK CONSULT LTD

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

Site	Trial Pit Number
Land at Silk Street	TP106

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam.		
0.10-0.60	D1 0.0ppm				(0.55)	MADE GROUND: Dark brown to black sandy gravel with abundant ash, clinker, brick (fragments to whole), sandstone (fragment and block), slate, rare glass, plastic and metals. .		
					0.60	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					(0.40)			
1.00 1.00-2.00	SV 35.67kPa B2		38,32,37/Av. 35.67		1.00	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					(1.50)			
2.00	SV 51.33kPa		50,52,52/Av. 51.33					
2.50	SV 62.67kPa		66,60,62/Av. 62.67		2.50	Complete at 2.50m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	Logged By	Figure No.
1:40	BS	LKC 18 1474.TP103

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Land at Silk Street	**Trial Pit Number** **TP107**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam.		
0.10-1.00	D1 0.0ppm				(0.55)	MADE GROUND: Dark brown to black sandy gravel with abundant ash, clinker, brick (fragments to whole), sandstone (fragment and block), slate, rare glass, plastic and metals.		
					0.60	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
					(0.40)			
1.00	SV 33kPa		32,35,32/Av. 33.00		1.00	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
1.00-1.50	B2							
					(1.20)			
1.80-2.20	B3							
1.90	SV 61.33kPa		62,62,60/Av. 61.33					
					2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	**Logged By**	**Figure No.**
1:40	BS	LKC 18 1474.TP107

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LK GROUP	**LK CONSULT LTD** Eton Business Park, Eton Hill Road, Radcliffe, M26 2ZS Tel: 0161 763 7200 web: www.thelkgroup.com	**Site** Land at Silk Street	**Trial Pit Number** **TP108**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Slow scrape to 1.2mbgl	2.5m x 0.5m		Faithful and Gould	LKC 18 1474
	Location (Handheld GPS)	**Dates** 20/02/2019-21/02/2019	**Project Contractor** LK Consult	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Tarmacadam.		
0.10-0.40	D1 0.0ppm				(0.35)	MADE GROUND: Dark brown to black sandy gravel with abundant ash, clinker, brick (fragments to whole), sandstone (fragment and block), slate, rare glass, plastic and metals.		
					0.40			
0.50-1.00	B2				(0.90)	Soft to firm consistency greyish brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
1.00	SV 33.33kPa		34,36,30/Av. 33.33					
					1.30	Firm to stiff consistency brown slightly gravelly sandy silty CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone and shale.		
1.50-2.00	B3				(0.90)			
2.00	SV 58kPa		58,56,60/Av. 58.00					
					2.20	Complete at 2.20m		

Remarks

Trial Pit Dry.
Trial Pit Stable.

Scale (approx)	**Logged By**	**Figure No.**
1:40	BS	

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Appendix C

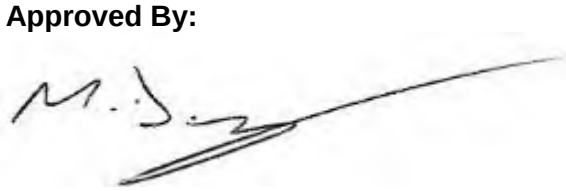
Certificates of Analysis – Soil

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	19-06686-1		
Initial Date of Issue:	13-Mar-2019		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 18 1474 Silk Street, Manchester		
Quotation No.:		**Date Received:**	22-Feb-2019
Order No.:	736751	**Date Instructed:**	22-Feb-2019
No. of Samples:	13		
Turnaround (Wkdays):	11	**Results Due:**	08-Mar-2019
Date Approved:	13-Mar-2019		

Approved By:



Details: Martin Dyer, Laboratory Manager

Results - Soil

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult					**Chemtest Job No.:**	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686
Quotation No.:					**Chemtest Sample ID.:**	780895	780896	780898	780899	780900	780902	780904	780905	780906
					Client Sample ID.:	WS101 D3	WS102 D1	WS104 D1	WS104 D2	WS105 D1	WS106 D1	WS107 D1	WS107 D2	WS108 D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.20	0.05	0.00	1.70	0.70	0.00	0.00	1.50	0.00
					Bottom Depth (m):	2.00	0.30	0.30	2.00	1.20	0.30	0.40	1.70	0.30
					Date Sampled:	20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019
					Asbestos Lab:		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
ACM Type	U	2192		N/A		-	-		-	Fibres/Clumps	-		-
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	Chrysotile	No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-		-	Stereo Microscopy	-		-
Asbestos by Gravimetry	U	2192	%	0.001						0.006			
Total Asbestos	N	2192	%	0.001						0.006			
Moisture	N	2030	%	0.020	20	12	4.6	18	15	16	15	26	19
Soil Colour	N	2040		N/A		Brown	Brown		Brown	Brown	Brown,		Grey
Other Material	N	2040		N/A		Stones	Stones		Stones	Stones	Stones		Stones
Soil Texture	N	2040		N/A		Sand	Sand		Clay	Sand	Loam		Clay
pH	M	2010		N/A	6.5	7.8	8.4	7.7	7.8	8.0	9.3	6.5	7.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010			0.013				< 0.010	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.22	0.020	0.14	< 0.010	0.17
Chloride (Water Soluble)	M	2220	g/l	0.010	< 0.010			0.021				< 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010			< 0.010				< 0.010	
Arsenic	M	2450	mg/kg	1.0		29	17		16	35	24		16
Cadmium	M	2450	mg/kg	0.10		0.45	0.45		0.11	1.1	0.40		0.13
Chromium	M	2450	mg/kg	1.0		35	9.8		16	62	25		19
Copper	M	2450	mg/kg	0.50		88	20		57	160	66		52
Mercury	M	2450	mg/kg	0.10		0.84	0.16		3.2	1.7	0.71		0.44
Nickel	M	2450	mg/kg	0.50		23	8.0		22	41	30		25
Lead	M	2450	mg/kg	0.50		250	55		70	3100	840		120
Selenium	M	2450	mg/kg	0.20		0.46	< 0.20		0.40	0.36	0.48		0.54
Vanadium	U	2450	mg/kg	5.0		20	7.0		21	54	34		27
Zinc	M	2450	mg/kg	0.50		190	58		45	340	100		140
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50		< 0.50	< 0.50	< 0.50		< 0.50
Organic Matter	M	2625	%	0.40		9.8	3.3		6.2	15	16		9.3
Naphthalene	M	2800	mg/kg	0.10		0.98	< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		0.41	< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
Acenaphthene	M	2800	mg/kg	0.10		0.22	< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
Fluorene	M	2800	mg/kg	0.10		0.41	< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
Phenanthrene	M	2800	mg/kg	0.10		4.8	0.70		0.22	1.3	1.9		0.39
Anthracene	M	2800	mg/kg	0.10		1.2	0.14		< 0.10	0.26	0.46		< 0.10
Fluoranthene	M	2800	mg/kg	0.10		10	1.6		0.11	3.0	4.3		0.64
Pyrene	M	2800	mg/kg	0.10		10	1.8		0.12	2.9	4.1		0.64
Benzo[a]anthracene	M	2800	mg/kg	0.10		7.3	0.99		< 0.10	1.4	1.9		0.12
Chrysene	M	2800	mg/kg	0.10		7.6	1.2		< 0.10	1.7	2.3		0.18

Results - Soil

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-06686	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686	19-06686
Quotation No.:			**Chemtest Sample ID.:**		780895	780896	780898	780899	780900	780902	780904	780905	780906
			Client Sample ID.:		WS101 D3	WS102 D1	WS104 D1	WS104 D2	WS105 D1	WS106 D1	WS107 D1	WS107 D2	WS108 D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.20	0.05	0.00	1.70	0.70	0.00	0.00	1.50	0.00
			Bottom Depth (m):		2.00	0.30	0.30	2.00	1.20	0.30	0.40	1.70	0.30
			Date Sampled:		20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	20-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019
			Asbestos Lab:			COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Benzo[b]fluoranthene	M	2800	mg/kg	0.10		11	1.9		< 0.10	3.0	3.9		< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10		4.2	0.53		< 0.10	0.87	1.1		< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10		9.3	1.4		< 0.10	2.5	2.9		< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10		6.0	0.77		< 0.10	2.0	2.1		< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		1.3	< 0.10		< 0.10	0.14	0.15		< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10		6.0	0.78		< 0.10	2.1	2.1		< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0		81	12		< 2.0	21	27		< 2.0

Results - Soil

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult					**Chemtest Job No.:**	19-06686	19-06686	19-06686
Quotation No.:					**Chemtest Sample ID.:**	780908	780911	780912	780917
					Client Sample ID.:	WS109 D1	WS110 D1	WS110 D2	WS102 D2
					Sample Type:	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.00	1.40	1.50
					Bottom Depth (m):	0.30	0.30	1.70	2.00
					Date Sampled:	21-Feb-2019	21-Feb-2019	21-Feb-2019	20-Feb-2019
					Asbestos Lab:	COVENTRY	COVENTRY		
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-	-		
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected		
ACM Detection Stage	U	2192		N/A	-	-		
Asbestos by Gravimetry	U	2192	%	0.001				
Total Asbestos	N	2192	%	0.001				
Moisture	N	2030	%	0.020	9.9	21	25	24
Soil Colour	N	2040		N/A	Brown	Brown		
Other Material	N	2040		N/A	Stones, Brick	Stones		
Soil Texture	N	2040		N/A	Sand	Loam		
pH	M	2010		N/A	8.7	7.6	7.3	7.4
Magnesium (Water Soluble)	N	2120	g/l	0.010			< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.075	0.050	< 0.010	< 0.010
Chloride (Water Soluble)	M	2220	g/l	0.010			< 0.010	0.013
Nitrate (Water Soluble)	N	2220	g/l	0.010			< 0.010	< 0.010
Arsenic	M	2450	mg/kg	1.0	14	76		
Cadmium	M	2450	mg/kg	0.10	0.50	1.5		
Chromium	M	2450	mg/kg	1.0	19	25		
Copper	M	2450	mg/kg	0.50	130	150		
Mercury	M	2450	mg/kg	0.10	0.37	1.2		
Nickel	M	2450	mg/kg	0.50	21	49		
Lead	M	2450	mg/kg	0.50	190	380		
Selenium	M	2450	mg/kg	0.20	< 0.20	0.99		
Vanadium	U	2450	mg/kg	5.0	21	51		
Zinc	M	2450	mg/kg	0.50	140	550		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		
Organic Matter	M	2625	%	0.40	3.5	17		
Naphthalene	M	2800	mg/kg	0.10	0.45	< 0.10		
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10		
Acenaphthene	M	2800	mg/kg	0.10	0.54	< 0.10		
Fluorene	M	2800	mg/kg	0.10	0.32	< 0.10		
Phenanthrene	M	2800	mg/kg	0.10	4.1	1.5		
Anthracene	M	2800	mg/kg	0.10	0.77	0.27		
Fluoranthene	M	2800	mg/kg	0.10	4.5	2.2		
Pyrene	M	2800	mg/kg	0.10	4.2	2.1		
Benzo[a]anthracene	M	2800	mg/kg	0.10	1.5	0.74		
Chrysene	M	2800	mg/kg	0.10	1.7	0.96		

Results - Soil

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-06686	19-06686	19-06686	19-06686
Quotation No.:			**Chemtest Sample ID.:**		780908	780911	780912	780917
			Client Sample ID.:		WS109 D1	WS110 D1	WS110 D2	WS102 D2
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.00	0.00	1.40	1.50
			Bottom Depth (m):		0.30	0.30	1.70	2.00
			Date Sampled:		21-Feb-2019	21-Feb-2019	21-Feb-2019	20-Feb-2019
			Asbestos Lab:		COVENTRY	COVENTRY		
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	2.1	1.3		
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.54	0.31		
Benzo[a]pyrene	M	2800	mg/kg	0.10	1.4	0.76		
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	0.83	0.51		
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10		
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	0.84	0.52		
Total Of 16 PAH's	N	2800	mg/kg	2.0	24	11		

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	19-06683-1		
Initial Date of Issue:	05-Mar-2019		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 18 1474 Silk Street, Manchester		
Quotation No.:		**Date Received:**	22-Feb-2019
Order No.:	736751	**Date Instructed:**	22-Feb-2019
No. of Samples:	8		
Turnaround (Wkdays):	5	**Results Due:**	28-Feb-2019
Date Approved:	05-Mar-2019		
Approved By:			
Details:	Robert Monk, Technical Manager		

Results - Soil

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult				**Chemtest Job No.:**	19-06683	19-06683	19-06683	19-06683	19-06683	19-06683	19-06683	19-06683
Quotation No.:				**Chemtest Sample ID.:**	780878	780879	780880	780881	780882	780883	780884	780885
				Client Sample ID.:	TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
				Bottom Depth (m):	0.60	0.80	0.40	0.70	0.60	0.60	0.40	0.40
				Date Sampled:	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019
				Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	Fibres/Clumps	Fibres/Clumps	-	-	Insulation	Fibres/Clumps	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Amosite	Amosite	No Asbestos Detected	No Asbestos Detected	Amosite Chrysotile	Amosite Chrysotile	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	Stereo Microscopy	Stereo Microscopy	-	-	Stereo Microscopy	Stereo Microscopy	-
Asbestos by Gravimetry	U	2192	%	0.001		0.003	0.003			0.12	0.006	
Total Asbestos	N	2192	%	0.001		0.003	0.003			0.12	0.006	
Moisture	N	2030	%	0.020	19	17	21	16	9.0	18	17	9.1
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Chromatogram (TPH)	N			N/A	See Attached		See Attached	See Attached			See Attached	See Attached
pH	M	2010		N/A	9.4	9.4	8.7	9.3	9.2	8.4	8.1	8.3
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.81		0.74	0.52			0.70	0.40
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.050	0.16	0.062	0.10	< 0.010	0.066	0.013	0.053
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50		< 0.50	< 0.50			< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50		< 0.50	0.60			< 0.50	< 0.50
Arsenic	M	2450	mg/kg	1.0	36	29	48	28	20	24	29	14
Cadmium	M	2450	mg/kg	0.10	0.28	0.29	0.74	0.54	1.1	0.85	0.32	0.37
Chromium	M	2450	mg/kg	1.0	21	18	33	22	28	44	26	17
Copper	M	2450	mg/kg	0.50	110	86	170	63	88	72	83	29
Mercury	M	2450	mg/kg	0.10	0.52	0.56	3.5	1.3	0.46	1.6	0.79	0.23
Nickel	M	2450	mg/kg	0.50	35	29	48	26	46	36	39	24
Lead	M	2450	mg/kg	0.50	150	140	460	240	270	230	230	79
Selenium	M	2450	mg/kg	0.20	0.69	0.52	1.4	0.45	< 0.20	0.43	0.36	< 0.20
Vanadium	U	2450	mg/kg	5.0	40	36	53	29	41	33	52	28
Zinc	M	2450	mg/kg	0.50	82	110	130	140	220	260	170	87
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	13	26	28	8.6	11	10	14	5.9
Fuel Type	N	2670		N/A	PAH		PAH	PAH/LUBE			PAH/LUBE	LUBE
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0		1.1	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0		5.4	< 1.0			< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	3.1		28	7.5			19	8.1

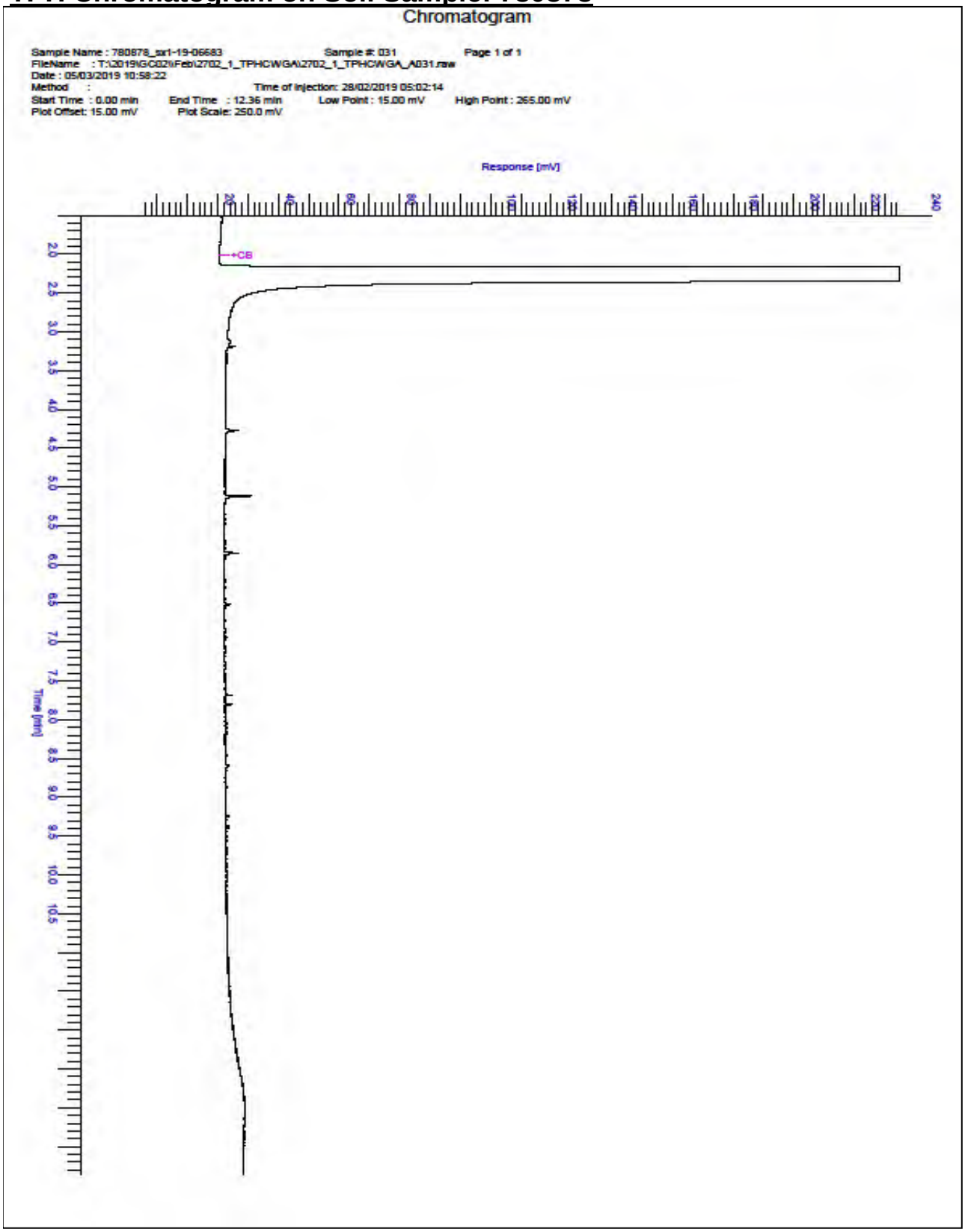
Results - Soil

Chemtest
The right chemistry to deliver results

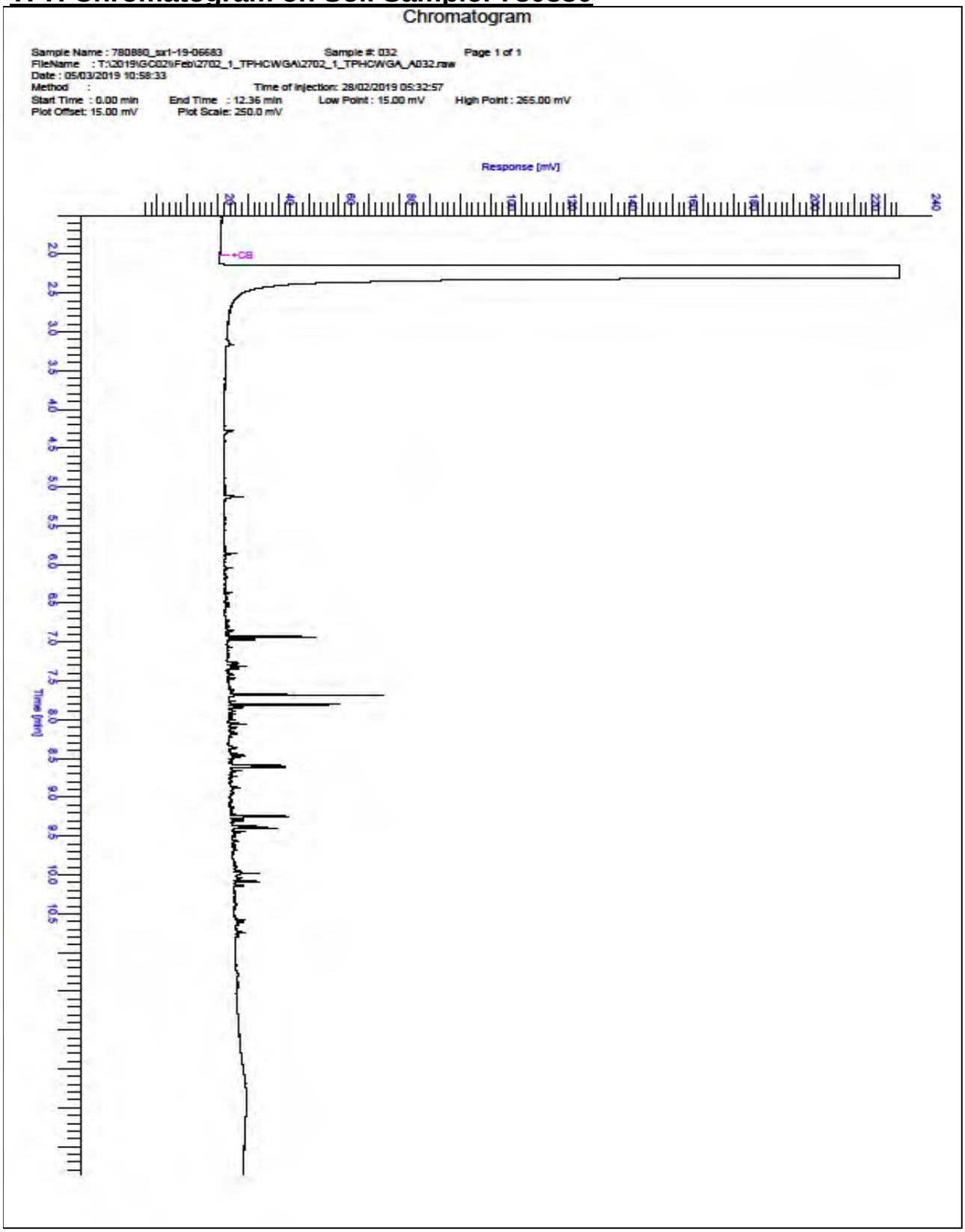
Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-06683	19-06683	19-06683	19-06683	19-06683	19-06683	19-06683	19-06683
Quotation No.:			**Chemtest Sample ID.:**		780878	780879	780880	780881	780882	780883	780884	780885
			Client Sample ID.:		TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
			Bottom Depth (m):		0.60	0.80	0.40	0.70	0.60	0.60	0.40	0.40
			Date Sampled:		21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019	21-Feb-2019
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0		35	7.5			19	8.1
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0		6.0	< 1.0			< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0		130	< 1.0			3.7	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	13		490	150			180	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	13		630	150			180	120
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	16		660	150			200	130
Benzene	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0		< 1.0	< 1.0			< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	1.0	1.3	2.3	1.0	2.9	1.1	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	0.18	0.39	0.25	< 0.10	0.25	0.18	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	0.75	4.5	1.3	0.50	5.5	2.0	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	0.67	5.0	1.1	0.23	4.6	1.4	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	5.0	35	10	2.9	35	12	1.3	< 0.10
Anthracene	M	2800	mg/kg	0.10	1.6	10	3.0	0.86	5.9	2.5	0.18	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	6.6	31	13	5.4	41	15	1.8	1.5
Pyrene	M	2800	mg/kg	0.10	5.6	27	11	5.4	36	13	1.8	2.6
Benzo[a]anthracene	M	2800	mg/kg	0.10	1.5	9.8	4.6	3.1	13	5.2	0.55	0.69
Chrysene	M	2800	mg/kg	0.10	2.7	11	5.4	3.9	15	6.0	0.74	1.1
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	2.3	10	5.3	3.9	17	6.8	0.92	1.3
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.74	4.4	2.3	1.6	7.5	2.5	0.22	0.30
Benzo[a]pyrene	M	2800	mg/kg	0.10	1.5	9.0	3.6	3.0	17	5.2	0.61	0.90
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	0.56	5.5	1.8	1.8	11	3.4	0.40	0.89
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	0.70	0.11	< 0.10	2.9	0.60	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	0.56	5.5	1.8	1.9	11	3.4	0.40	0.89
Total Of 16 PAH's	N	2800	mg/kg	2.0	31	170	67	36	230	80	8.9	10
Total Phenols	M	2920	mg/kg	0.30	0.57		< 0.30	< 0.30			< 0.30	< 0.30

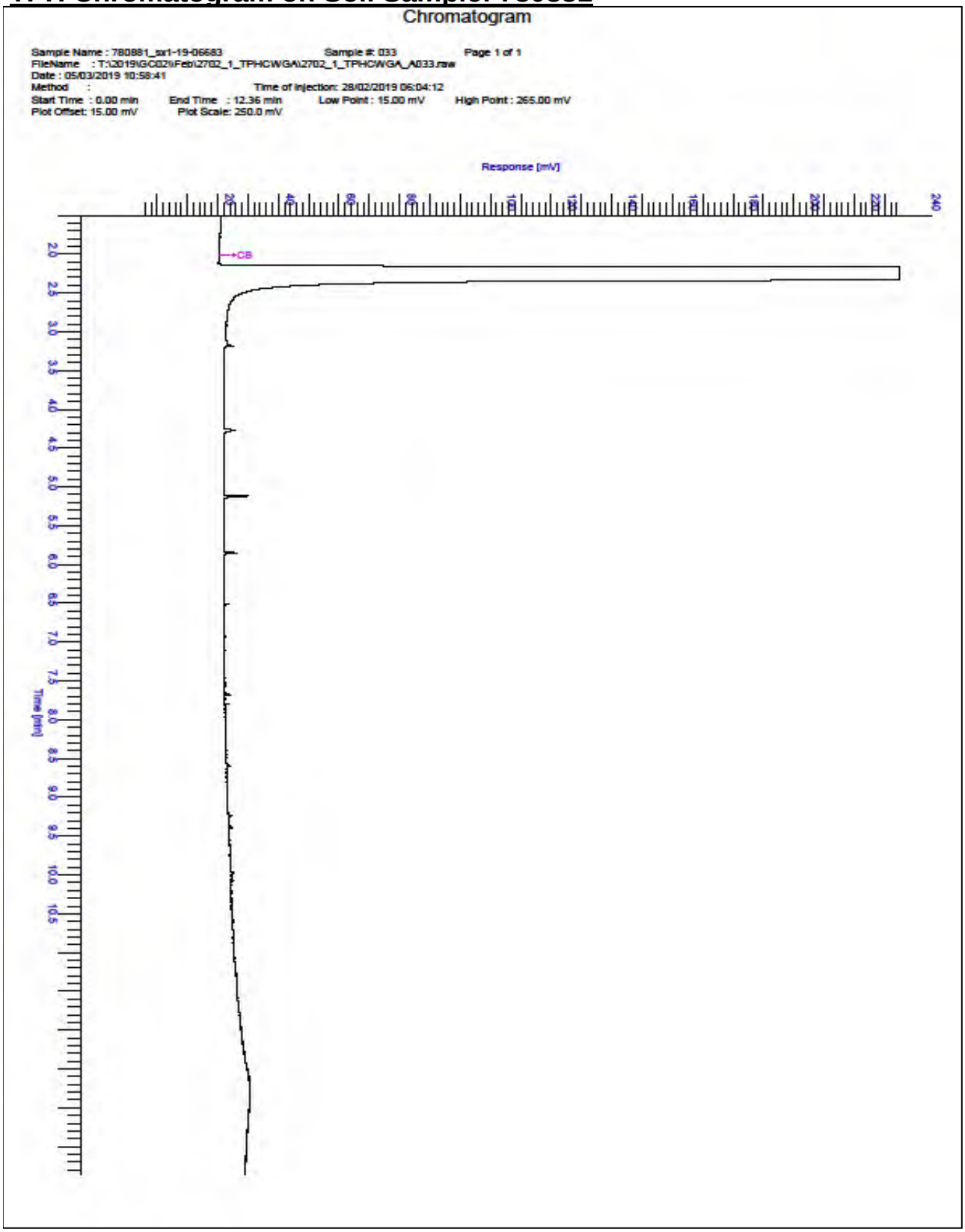
TPH Chromatogram on Soil Sample: 780878



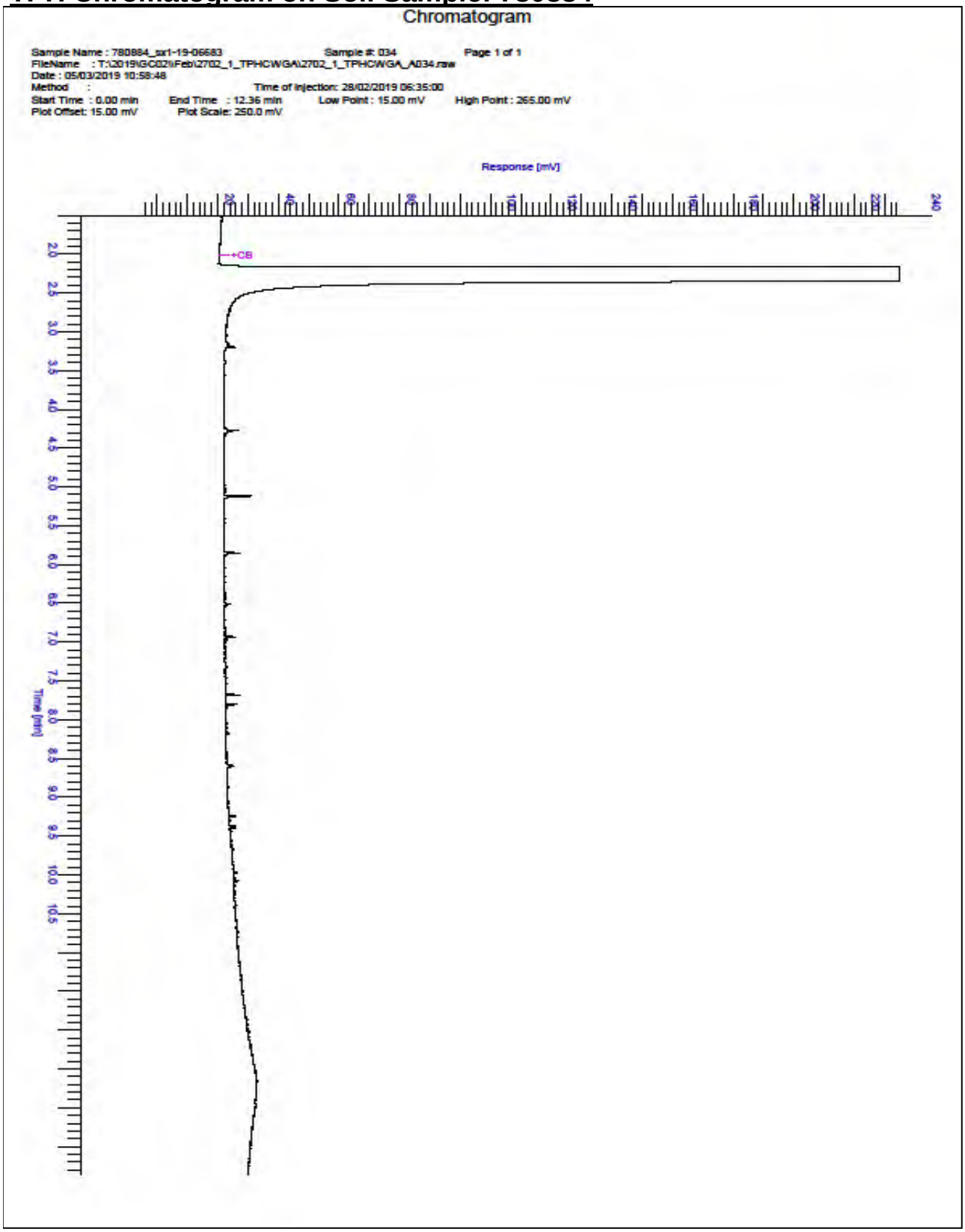
TPH Chromatogram on Soil Sample: 780880



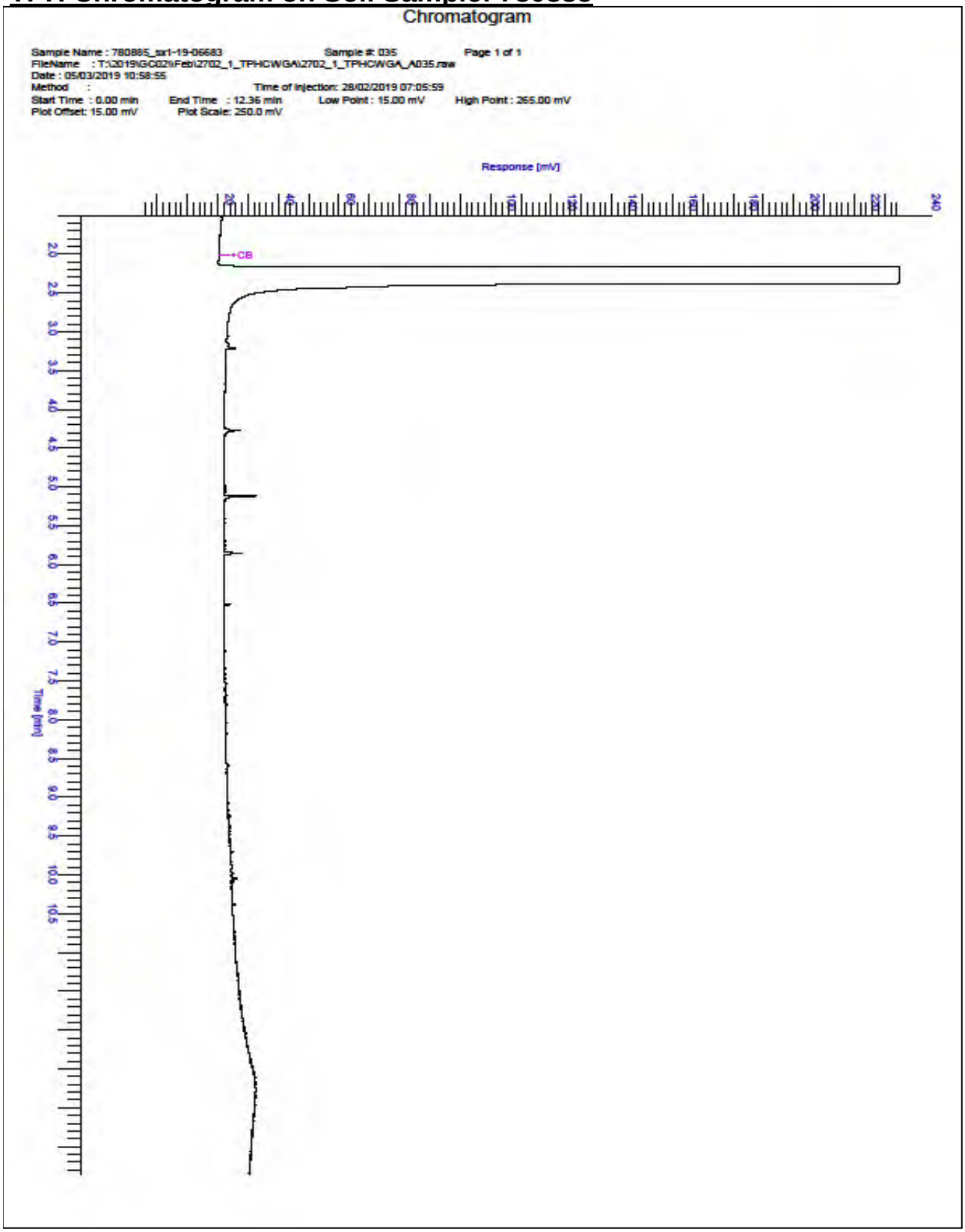
TPH Chromatogram on Soil Sample: 780881



TPH Chromatogram on Soil Sample: 780884



TPH Chromatogram on Soil Sample: 780885



Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Final Report

Report No.:	19-06684-1		
Initial Date of Issue:	08-Mar-2019		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 18 1474 Silk Street, Manchester		
Quotation No.:		**Date Received:**	22-Feb-2019
Order No.:	736751	**Date Instructed:**	22-Feb-2019
No. of Samples:	5		
Turnaround (Wkdays):	7	**Results Due:**	04-Mar-2019
Date Approved:	08-Mar-2019		

Approved By:

Details: Robert Monk, Technical Manager

Results - 2 Stage WAC

Project: LKC 18 1474 Silk Street, Manchester

Chemtest Job No:	19-06684
Chemtest Sample ID:	780886
Sample Ref:	
Sample ID:	TP101
Sample Location:	
Top Depth(m):	0.10
Bottom Depth(m):	0.60
Sampling Date:	21-Feb-2019

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			23	3	5	6
Loss On Ignition	2610	U	%			14	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			110	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			84	100	--	--
pH	2010	U				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.013	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0017	0.0032	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.018	0.036	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	0.0020	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.00092	0.0011	0.0018	0.011	0.01	0.2	2
Molybdenum	1450	U	0.0071	0.012	< 0.050	0.11	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0021	< 0.010	0.016	0.5	10	50
Antimony	1450	U	0.0015	0.0019	< 0.010	0.018	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0015	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2.1	< 1.0	< 10	< 10	800	15000	25000
Fluoride	1220	U	0.43	0.54	< 1.0	5.1	10	150	500
Sulphate	1220	U	44	21	86	260	1000	20000	50000
Total Dissolved Solids	1020	N	100	98	200	980	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	12	9.3	< 50	98	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	20

Leachate Test Information	
Leachant volume 1st extract/l	0.306
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.367

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
The right chemistry to deliver results

Results - 2 Stage WAC

Project: LKC 18 1474 Silk Street, Manchester

Chemtest Job No:	19-06684
Chemtest Sample ID:	780887
Sample Ref:	
Sample ID:	TP103
Sample Location:	
Top Depth(m):	0.10
Bottom Depth(m):	0.40
Sampling Date:	21-Feb-2019

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			24	3	5	6
Loss On Ignition	2610	U	%			15	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			310	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			69	100	--	--
pH	2010	U				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.011	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0024	0.0045	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.028	0.040	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0010	0.0024	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0016	0.0013	0.0031	0.014	0.01	0.2	2
Molybdenum	1450	U	0.0064	0.019	< 0.050	0.16	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0019	< 0.010	0.015	0.5	10	50
Antimony	1450	U	0.0013	0.0030	< 0.010	0.026	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0025	0.0013	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2.2	2.0	< 10	20	800	15000	25000
Fluoride	1220	U	0.57	0.80	1.1	7.5	10	150	500
Sulphate	1220	U	91	42	180	520	1000	20000	50000
Total Dissolved Solids	1020	N	190	120	370	1400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	23	9.3	< 50	120	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	22

Leachate Test Information	
Leachant volume 1st extract/l	0.299
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.370

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
The right chemistry to deliver results

Results - 2 Stage WAC

Project: LKC 18 1474 Silk Street, Manchester

Chemtest Job No:	19-06684
Chemtest Sample ID:	780888
Sample Ref:	
Sample ID:	TP104
Sample Location:	
Top Depth(m):	0.10
Bottom Depth(m):	0.70
Sampling Date:	21-Feb-2019

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			9.7	3	5	6
Loss On Ignition	2610	U	%			10	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			510	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			79	100	--	--
pH	2010	U				7.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.024	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0017	0.0030	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.018	0.027	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	0.0021	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0017	0.0025	0.0034	0.023	0.01	0.2	2
Molybdenum	1450	U	0.0082	0.0067	< 0.050	0.070	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0083	< 0.010	0.067	0.5	10	50
Antimony	1450	U	0.0015	0.0011	< 0.010	0.012	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	1.7	< 1.0	< 10	< 10	800	15000	25000
Fluoride	1220	U	0.60	0.49	1.2	5.1	10	150	500
Sulphate	1220	U	26	10	52	130	1000	20000	50000
Total Dissolved Solids	1020	N	72	51	140	550	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	31	13	62	170	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	11

Leachate Test Information	
Leachant volume 1st extract/l	0.328
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.340

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: LKC 18 1474 Silk Street, Manchester

Chemtest Job No:	19-06684
Chemtest Sample ID:	780889
Sample Ref:	
Sample ID:	TP107
Sample Location:	
Top Depth(m):	0.10
Bottom Depth(m):	0.40
Sampling Date:	21-Feb-2019

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			6.4	3	5	6
Loss On Ignition	2610	U	%			11	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			42	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			2.3	100	--	--
pH	2010	U				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.016	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0024	0.0036	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.011	0.011	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0010	0.0022	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0025	0.0024	0.0049	0.024	0.01	0.2	2
Molybdenum	1450	U	0.0057	0.0039	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0036	< 0.010	0.030	0.5	10	50
Antimony	1450	U	0.0018	0.0011	< 0.010	0.012	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0011	0.0019	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2.1	1.0	< 10	12	800	15000	25000
Fluoride	1220	U	0.72	0.76	1.4	7.5	10	150	500
Sulphate	1220	U	12	5.9	23	69	1000	20000	50000
Total Dissolved Solids	1020	N	91	72	180	750	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	14	7.1	< 50	83	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.308
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.308

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: LKC 18 1474 Silk Street, Manchester

Chemtest Job No:	19-06684
Chemtest Sample ID:	780890
Sample Ref:	
Sample ID:	TP108
Sample Location:	
Top Depth(m):	0.10
Bottom Depth(m):	0.40
Sampling Date:	21-Feb-2019

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			13	3	5	6
Loss On Ignition	2610	U	%			6.8	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			39	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.048	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0025	0.0054	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.010	0.0095	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0014	0.0024	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0025	0.0021	0.0049	0.022	0.01	0.2	2
Molybdenum	1450	U	0.0044	0.0035	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	0.0013	0.0087	< 0.010	0.076	0.5	10	50
Antimony	1450	U	0.0027	0.0018	< 0.010	0.019	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	0.0022	< 0.50	< 0.50	4	50	200
Chloride	1220	U	4.9	1.2	< 10	18	800	15000	25000
Fluoride	1220	U	0.39	0.37	< 1.0	3.7	10	150	500
Sulphate	1220	U	27	11	53	130	1000	20000	50000
Total Dissolved Solids	1020	N	120	72	240	790	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	56	15	110	210	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.318
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.264

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

Appendix D

Certificates of Analysis - Geotechnical

TEST REPORT

Client LK Consult Ltd

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

Contract LKC 18 1474 -
Silk Street, Manchester

Job Number MRN 3524/41
Date of Issue 13 March 2019
Page **1 of 22**

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

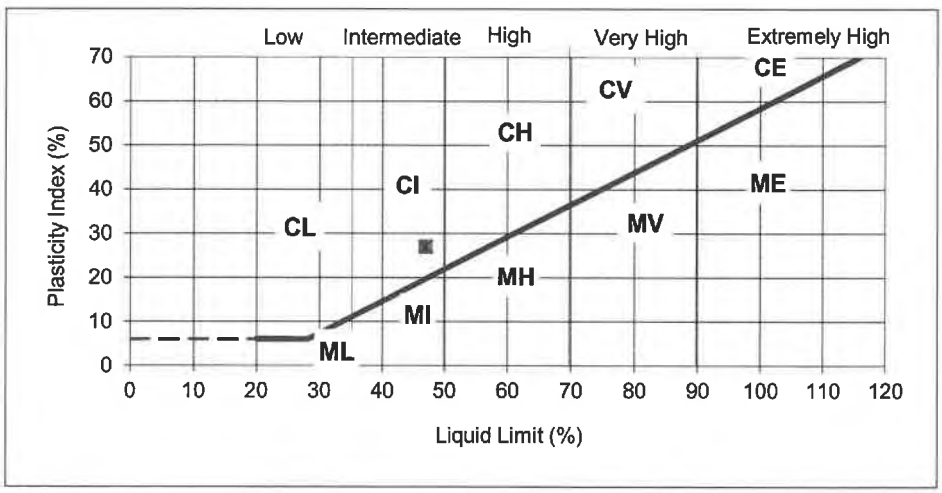
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP101 0.1-0.6m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81897	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
26	47	20	27	96



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

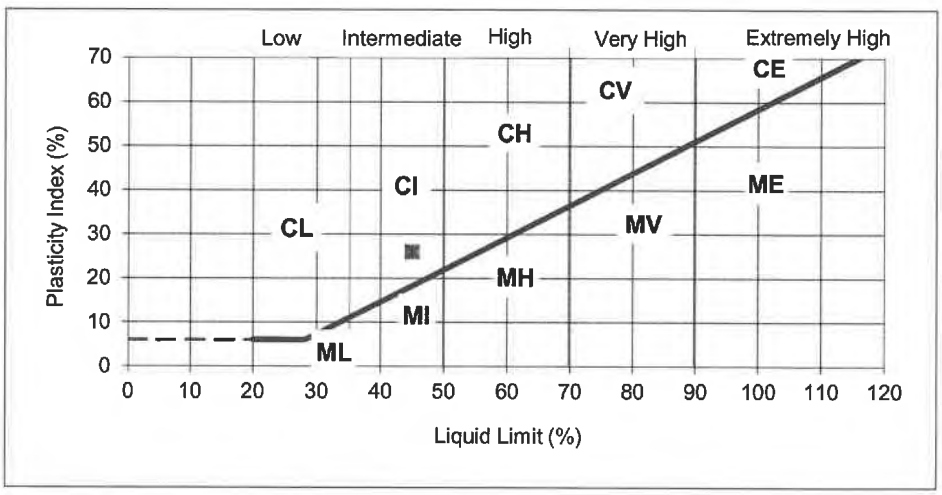
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP102 1.5-2.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81898	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
23	45	19	26	94



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

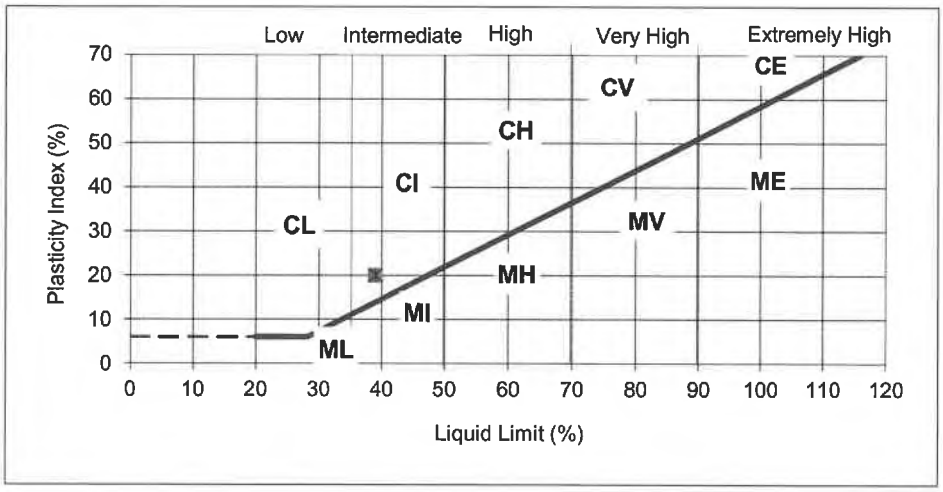
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP103 1.0-2.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81900	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
21	39	19	20	95



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

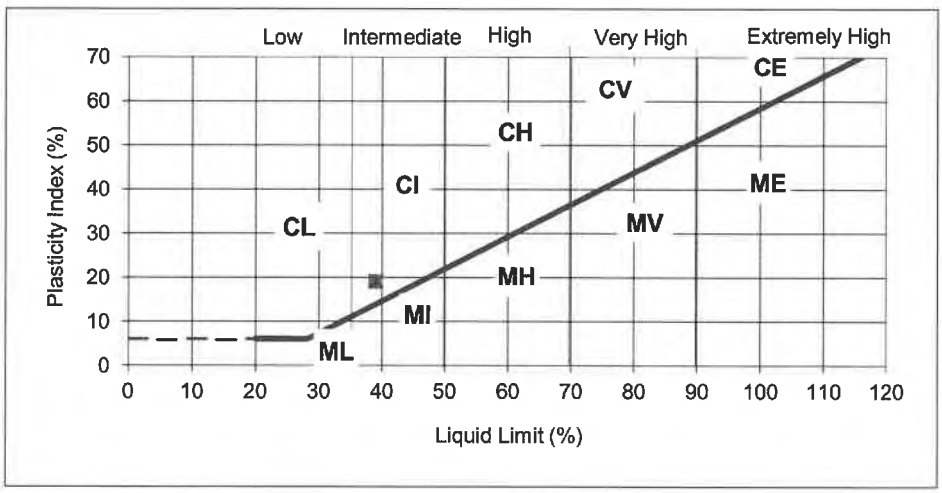
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP104 1.0-2.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81901	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24	39	20	19	98



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

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BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

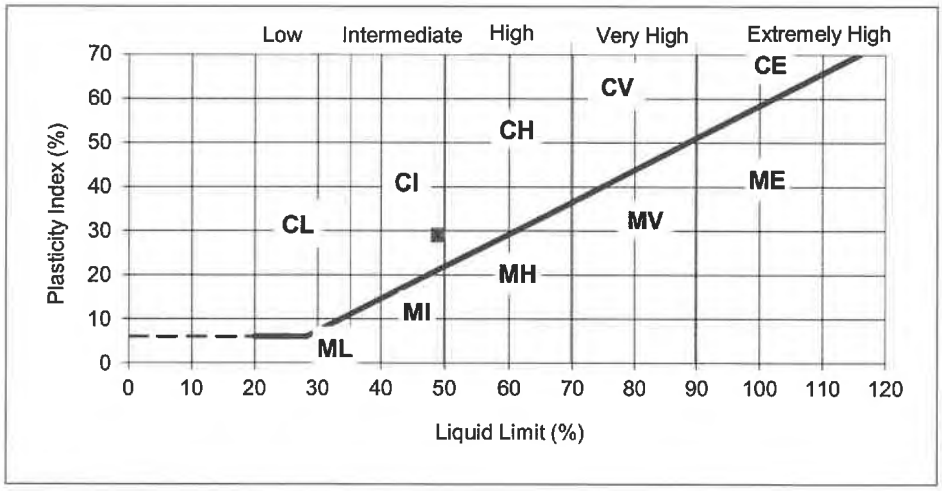
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP106 1.0-2.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81899	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	49	20	29	92



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

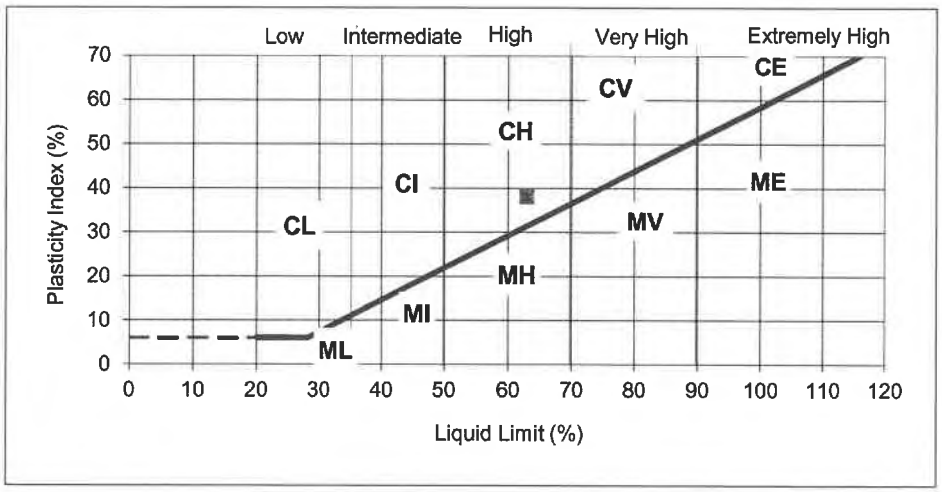
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP108 0.5-1.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81904	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Firm orangey brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
38	63	25	38	100



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

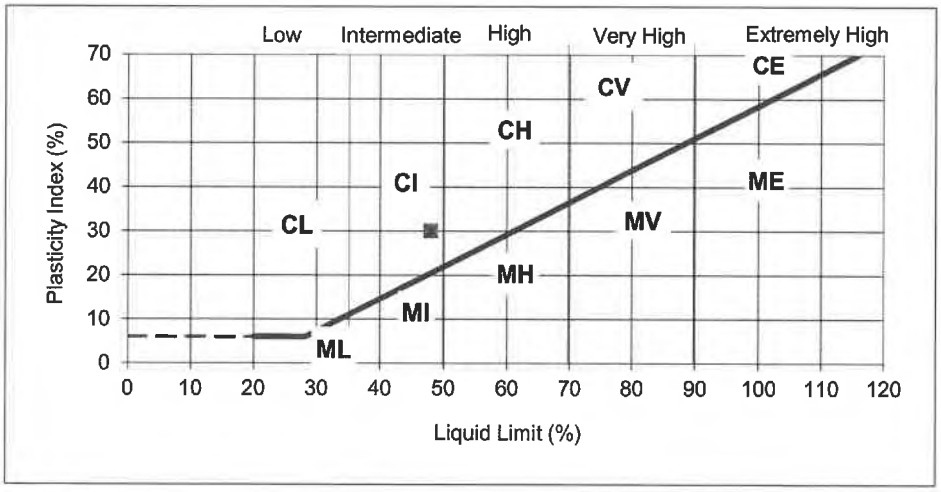
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	TP108 1.5-2.0m	DATE SAMPLED	25-Feb-19
SAMPLE No.	81905	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	48	18	30	97



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

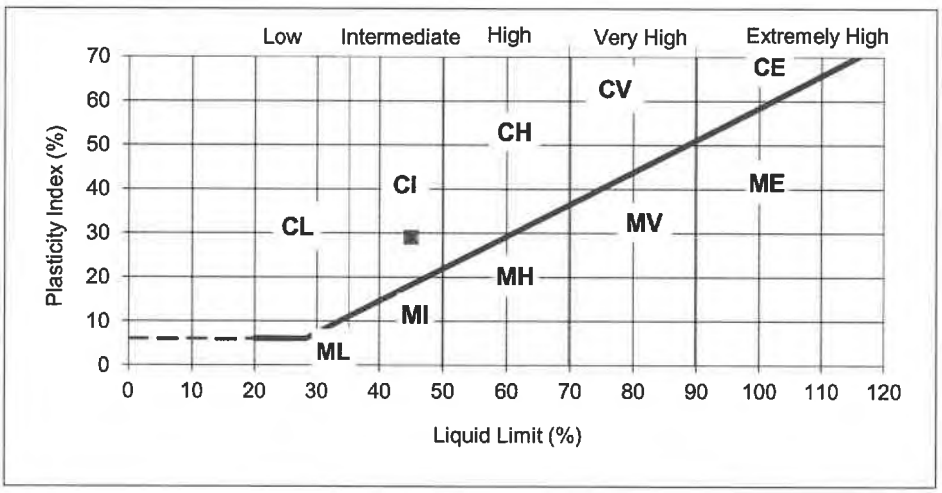
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS101 B4 3.5-4.0	DATE SAMPLED	21-Feb-19
SAMPLE No.	81906	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19	45	16	29	94



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS102 B4 (3.5-4.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81907	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	145	mm
SPECIMEN DIAMETER	74	mm
MOISTURE CONTENT OF SAMPLE	18	%
BULK DENSITY	2.16	Mg/m^3
DRY DENSITY	1.83	Mg/m^3
DEPTH OF TOP OF SPECIMEN	3.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE

Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
80	20	2.0	203.9	102

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
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UKAS TESTING 1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

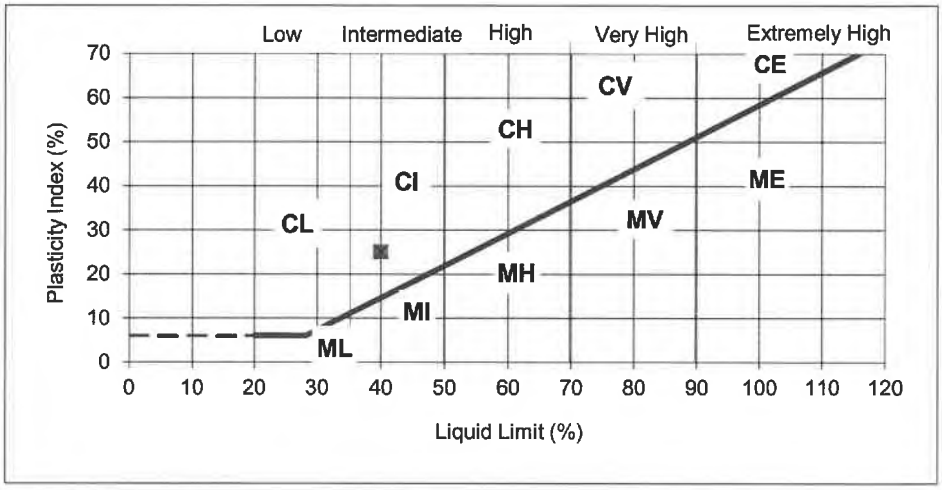
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS103 B3 2.5-3.0	DATE SAMPLED	21-Feb-19
SAMPLE No.	81921	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17	40	15	25	90



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

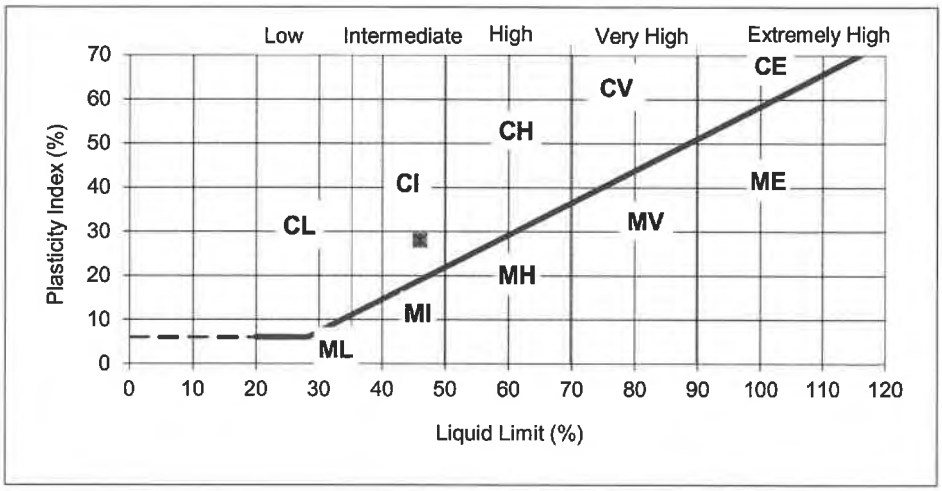
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS104 B3 3.5-4.0	DATE SAMPLED	21-Feb-19
SAMPLE No.	81922	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19	46	18	28	93



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX
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TEL 0161 475 0870 FAX 161 475N 0871

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS104 B3 (3.5-4.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81922	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	120	mm
SPECIMEN DIAMETER	62	mm
MOISTURE CONTENT OF SAMPLE	19	%
BULK DENSITY	2.08	Mg/m^3
DRY DENSITY	1.75	Mg/m^3
DEPTH OF TOP OF SPECIMEN	3.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE

Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
80	18	2.0	239.6	120

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX
33C VAUXHALL INDUSTRIAL ESTATE, GREG STREET
REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 161 475N 0871

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS105 B4 (4.2-4.5)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81909	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	150	mm
SPECIMEN DIAMETER	74	mm
MOISTURE CONTENT OF SAMPLE	17	%
BULK DENSITY	2.12	Mg/m^3
DRY DENSITY	1.81	Mg/m^3
DEPTH OF TOP OF SPECIMEN	4.25	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE

Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
90	20	2.0	188.3	97

REMARKS

SIGNED

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

DATE 13 March 2019

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REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 161 475N 0871

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS106 B4 (2.5-3.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81910	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	150	mm
SPECIMEN DIAMETER	75	mm
MOISTURE CONTENT OF SAMPLE	14	%
BULK DENSITY	2.12	Mg/m^3
DRY DENSITY	1.87	Mg/m^3
DEPTH OF TOP OF SPECIMEN	2.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE

Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
60	20	2.0	224.0	112

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

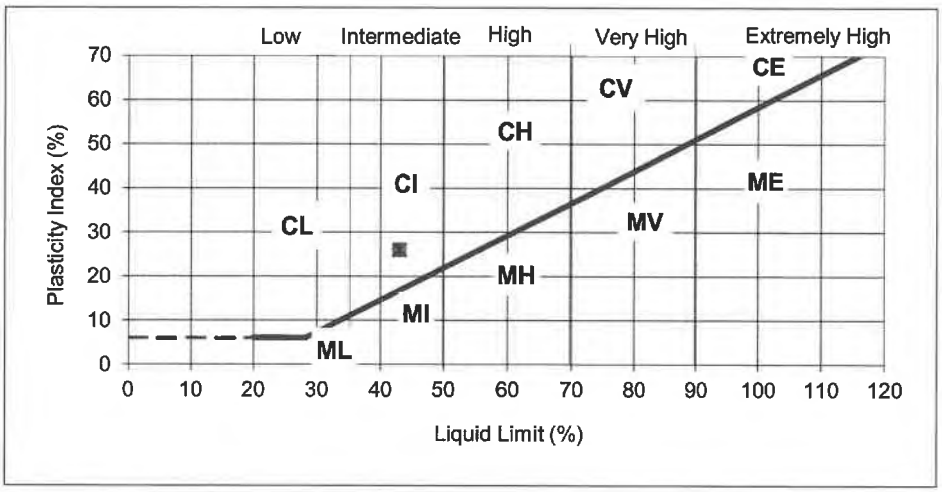
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS107 B3 2.5-3.0	DATE SAMPLED	21-Feb-19
SAMPLE No.	81912	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19	43	17	26	94



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX
33C VAUXHALL INDUSTRIAL ESTATE, GREG STREET
REDDISH, STOCKPORT SK5 7BR
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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

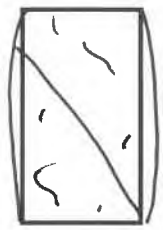
CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS107 B3 (2.5-3.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81912	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	146	mm
SPECIMEN DIAMETER	73	mm
MOISTURE CONTENT OF SAMPLE	19	%
BULK DENSITY	2.09	Mg/m^3
DRY DENSITY	1.76	Mg/m^3
DEPTH OF TOP OF SPECIMEN	2.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE



Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
60	18	2.0	249.5	125

REMARKS

SIGNED

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

DATE 13 March 2019

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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS108 B3 (2.5-3.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81914	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	146	mm
SPECIMEN DIAMETER	73	mm
MOISTURE CONTENT OF SAMPLE	18	%
BULK DENSITY	2.12	Mg/m^3
DRY DENSITY	1.79	Mg/m^3
DEPTH OF TOP OF SPECIMEN	2.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE

Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
60	20	2.0	166.1	83

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX

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UKAS TESTING 1580

TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

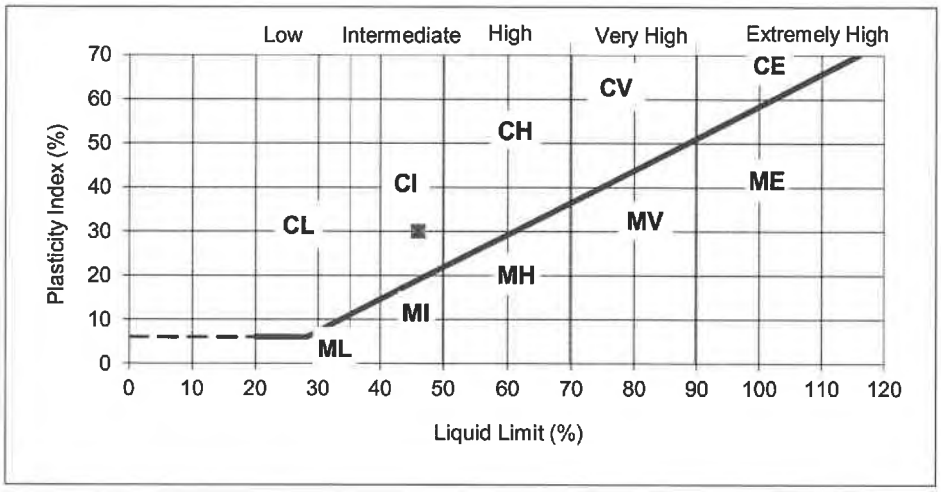
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 - Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS109 B3 1.5-2.0	DATE SAMPLED	21-Feb-19
SAMPLE No.	81916	DATE RECEIVED	06-Mar-19
DATE TESTED	07-Mar-19	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	46	16	30	96



REMARKS
Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons) DATE 13-Mar-19
(Laboratory Manager)

MURRAY RIX
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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

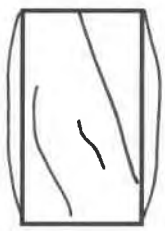
CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS109 B5 (3.5-4.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81917	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	124	mm
SPECIMEN DIAMETER	62	mm
MOISTURE CONTENT OF SAMPLE	19	%
BULK DENSITY	2.12	Mg/m^3
DRY DENSITY	1.78	Mg/m^3
DEPTH OF TOP OF SPECIMEN	3.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE



Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
80	17	2.0	233.7	117

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX
33C VAUXHALL INDUSTRIAL ESTATE, GREG STREET
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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377: PART 7: 1990:CLAUSE 8 SINGLE STAGE

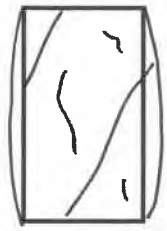
CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

SAMPLE LABEL	WS110 B5 (2.5-3.0)	DATE SAMPLED	21 February 2019
LAB SAMPLE No	81918	DATE RECEIVED	06 March 2019
DATE TESTED	06 March 2019	SAMPLED BY	Client

MATERIAL	Stiff brown silty CLAY with rare gravel
ADVISED SOURCE	Site Investigation sample

SPECIMEN LENGTH	144	mm
SPECIMEN DIAMETER	72	mm
MOISTURE CONTENT OF SAMPLE	19	%
BULK DENSITY	2.06	Mg/m^3
DRY DENSITY	1.75	Mg/m^3
DEPTH OF TOP OF SPECIMEN	2.60	m
RATE OF STRAIN	2	%/min
RUBBER MEMBRANE THICKNESS	0.6	mm

SPECIMEN AT FAILURE



Measured Cell Pressure (kPa)	Strain at Failure (%)	Membrane Correction (kPa)	Corrected Max Deviator Stress (kPa)	Shear Stress Cu (kPa)
60	18	2.0	246.0	123

REMARKS

SIGNED

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

DATE 13 March 2019

MURRAY RIX
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GREG STREET, REDDISH, STOCKPORT SK5 7BR
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UKAS TESTING 1580

TEST CERTIFICATE

MOISTURE CONTENT DETERMINATION
BS 1377 : PART 2 : CLAUSE 3.2 : 1990 (OVEN DRY)

CLIENT	LK Consult Ltd
SITE	LKC 18 1474 – Silk Street, Manchester
JOB NUMBER	MRN 3524/41

DATE SAMPLED	21 February 2019	SAMPLED BY	Client
DATE TESTED	07 March 2019	DATE RECEIVED	06 March 2019

Sample No	Site Reference	Material	Date Sampled	Moisture Content %
81908	WS105 B3 3.2-3.5	Stiff brown silty sandy CLAY with rare gravel	As above	20
81911	WS106 B5 3.5-4.0	Stiff brown silty sandy CLAY with rare gravel	As above	19
81913	WS107 B4 3.5-4.0	Stiff brown silty sandy CLAY with rare gravel	As above	19
81915	WS108 B3 3.5-4.0	Stiff brown silty sandy CLAY with rare gravel	As above	19

REMARKS

SIGNED

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 13 March 2019

LABORATORY REPORT

4043

Contract Number: PSL19/2423

Report Date: 18 April 2019

Client's Reference: LKC 18 1474

Client Name: LK Consult Limited

For the attention of: Peter Dunn

Contract Title: Silk Street, Manchester

Date Received: 15/4/2019
Date Commenced: 15/4/2019
Date Completed: 18/4/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	R Cowles (Senior Technician)

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awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

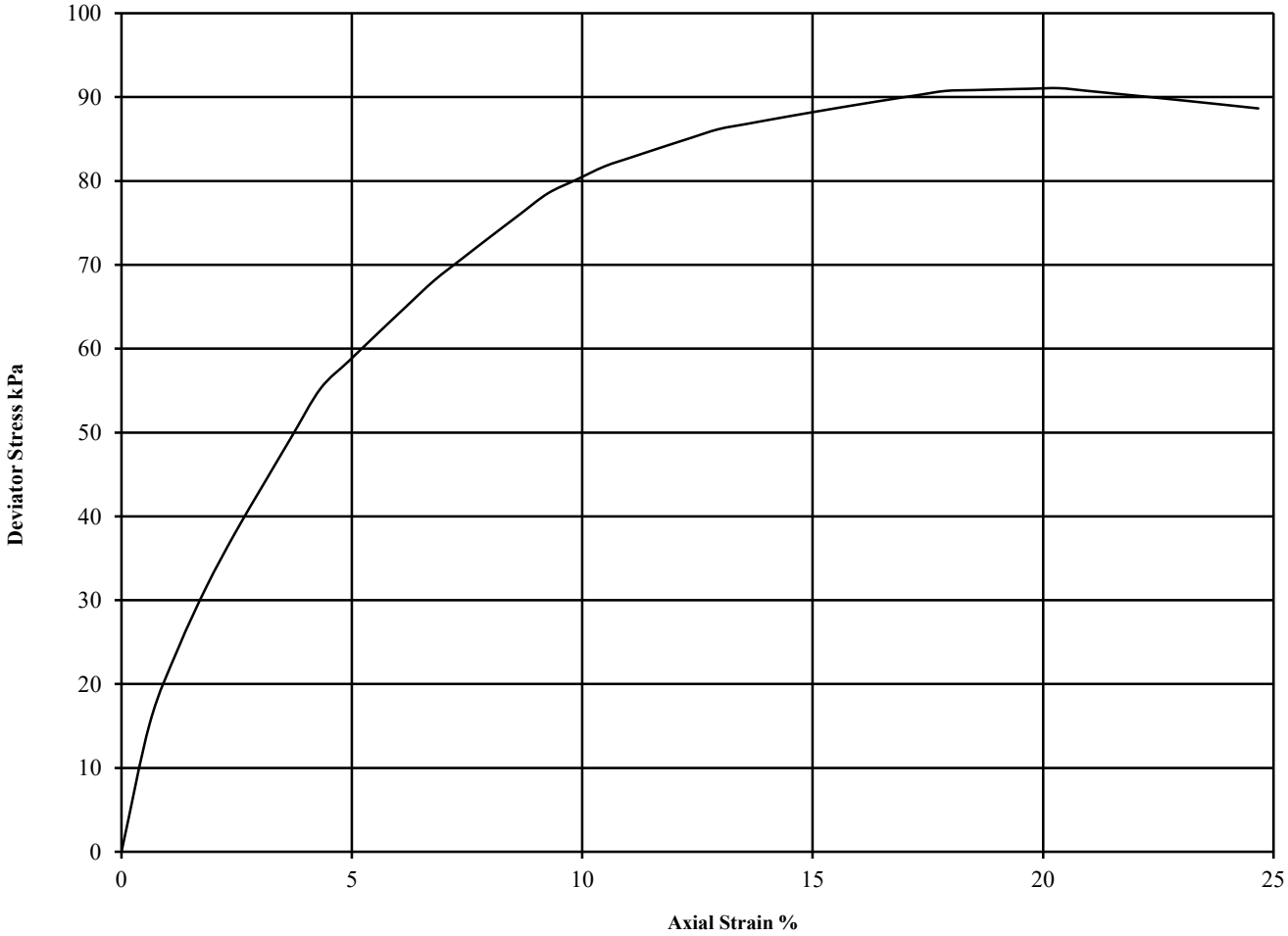
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH1	4	U	2.50	2.95	Firm brown slightly gravelly very sandy CLAY.
BH1	10	U	6.00	6.45	Stiff brown sandy CLAY.
BH2	4	U	1.60	2.05	Stiff brown sandy CLAY.
BH2	9	U	3.90	4.35	Very stiff brown slightly gravelly sandy CLAY.
BH3	5	U	3.30	3.75	Very stiff brown slightly gravelly sandy CLAY.
BH4	8	U	3.60	4.05	Very stiff brown slightly gravelly sandy CLAY.
BH4	13	U	7.00	7.45	Stiff brown slightly gravelly sandy CLAY.
BH5	5	U	2.50	2.95	Very soft brown very sandy CLAY.
BH5	10	U	4.50	4.95	Very stiff brown slightly gravelly sandy CLAY.

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH1**	**Top Depth (m):**	**2.50**
Sample Number:	**4**	**Base Depth (m):**	**2.95**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		167	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33
1	18	2.15	1.82	50	91	46	20.4	Plastic	See summary of soil descriptions

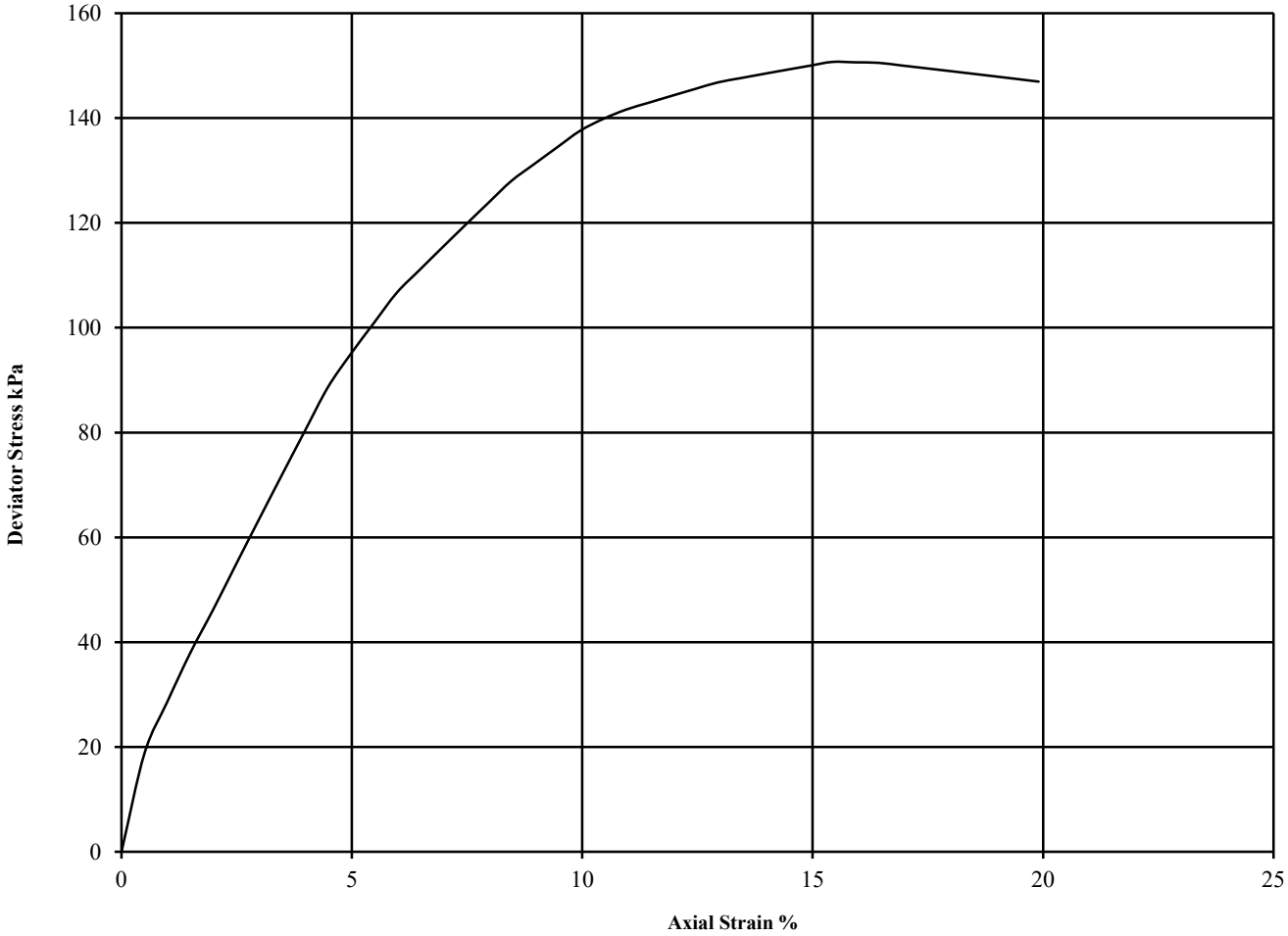
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH1**	**Top Depth (m):**	**6.00**
Sample Number:	**10**	**Base Depth (m):**	**6.45**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	19	2.09	1.75	120	151	75	15.4	Plastic	See summary of soil descriptions

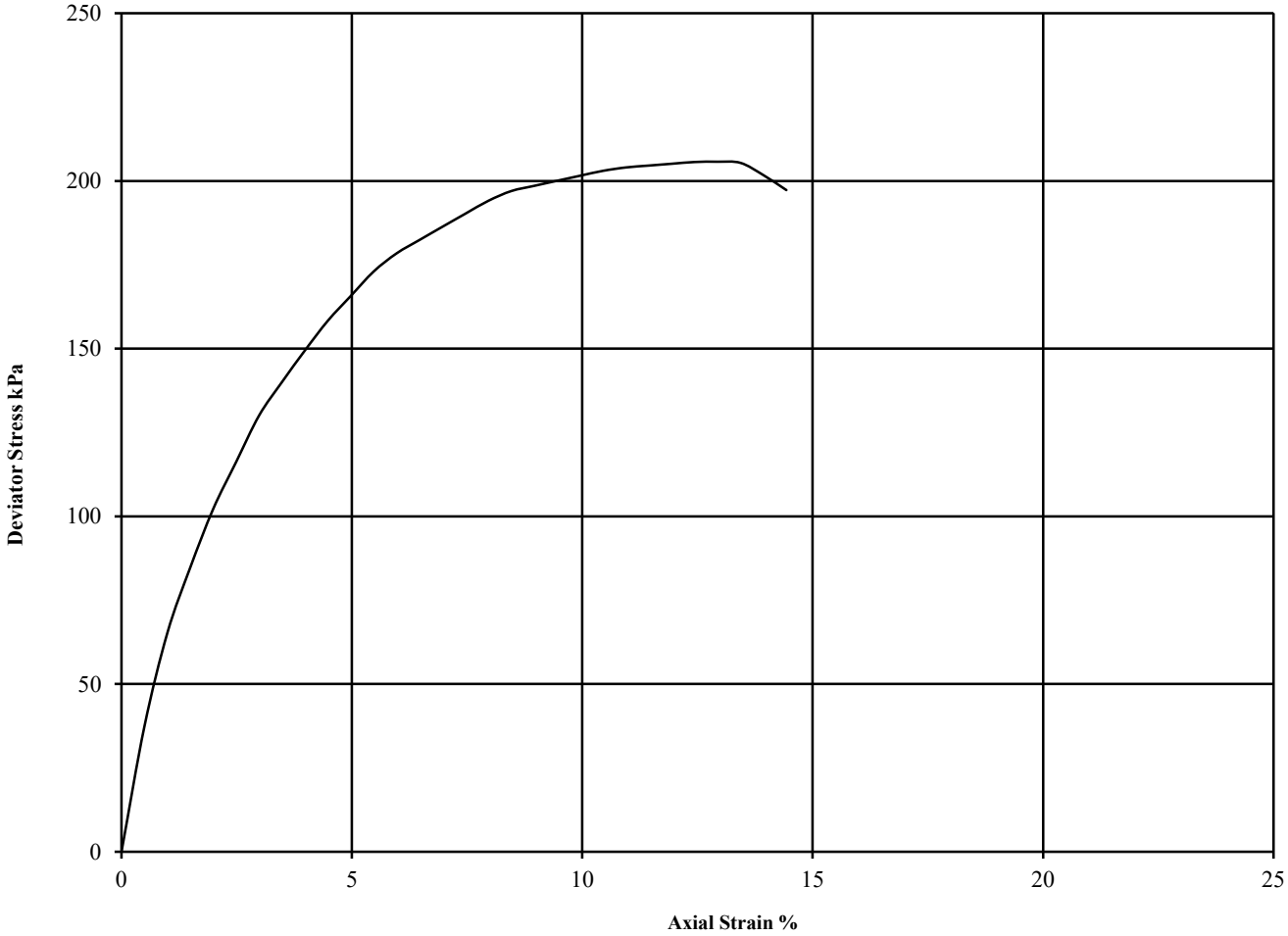
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH2**	**Top Depth (m):**	**1.60**
Sample Number:	**4**	**Base Depth (m):**	**2.05**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	22	2.04	1.67	35	206	103	12.9	Brittle	See summary of soil descriptions

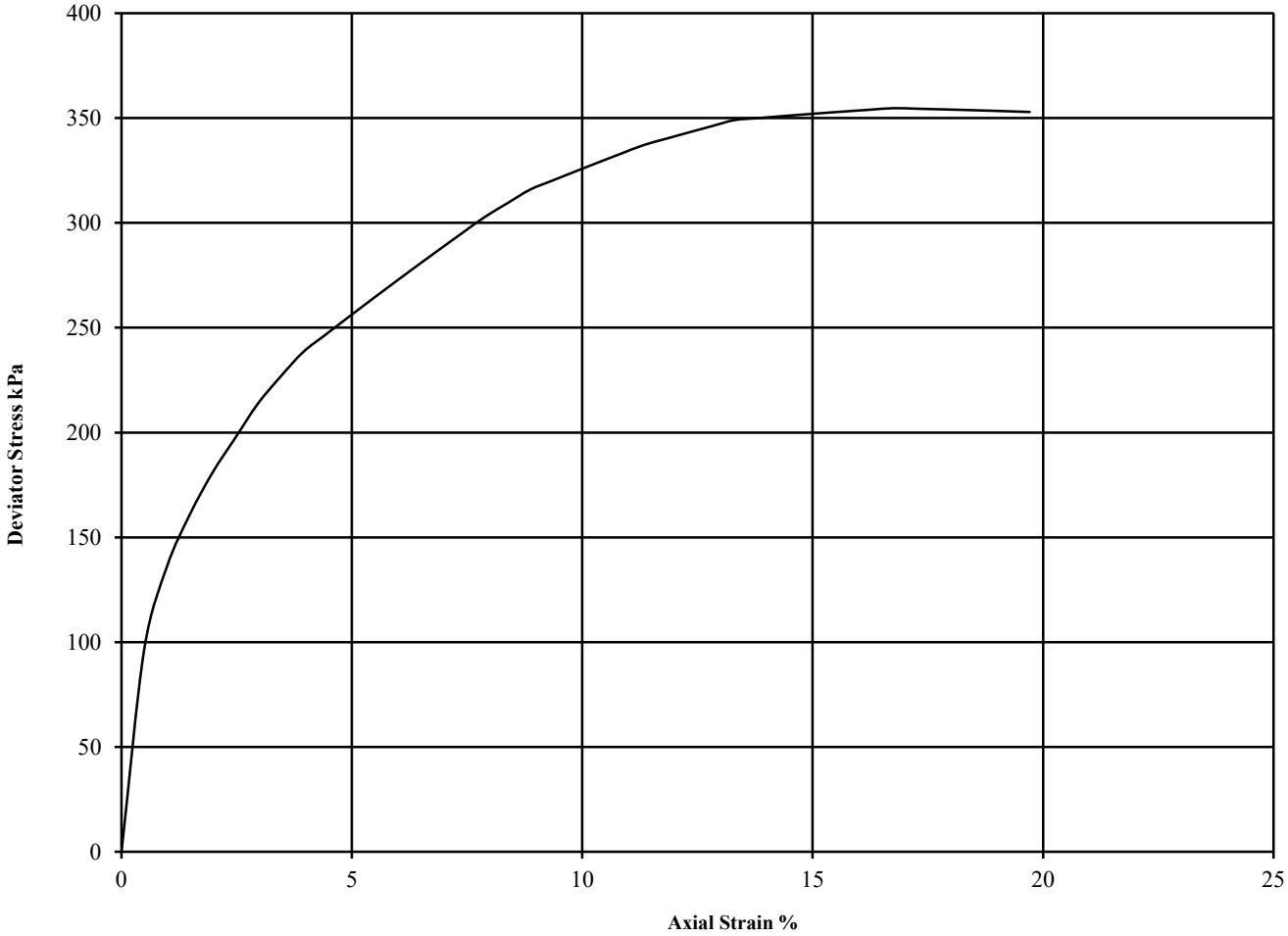
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH2**	**Top Depth (m):**	**3.90**
Sample Number:	**9**	**Base Depth (m):**	**4.35**
Sample Type	**U**		



Diameter (mm):		102	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	19	2.15	1.81	80	355	177	16.8	Plastic	See summary of soil descriptions

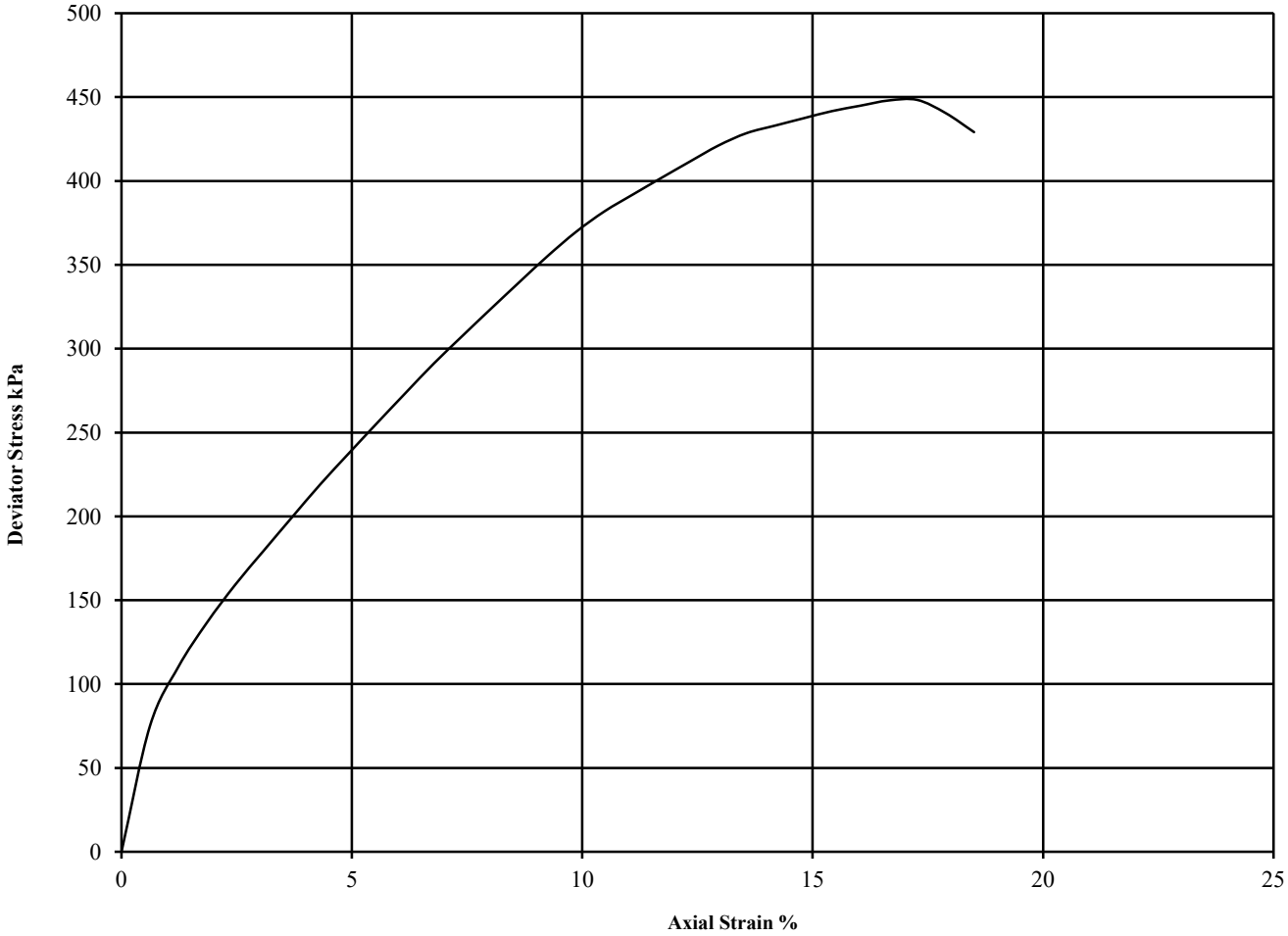
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH3**	**Top Depth (m):**	**3.30**
Sample Number:	**5**	**Base Depth (m):**	**3.75**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		167	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	19	2.09	1.76	66	448	224	17.3	Brittle	See summary of soil descriptions

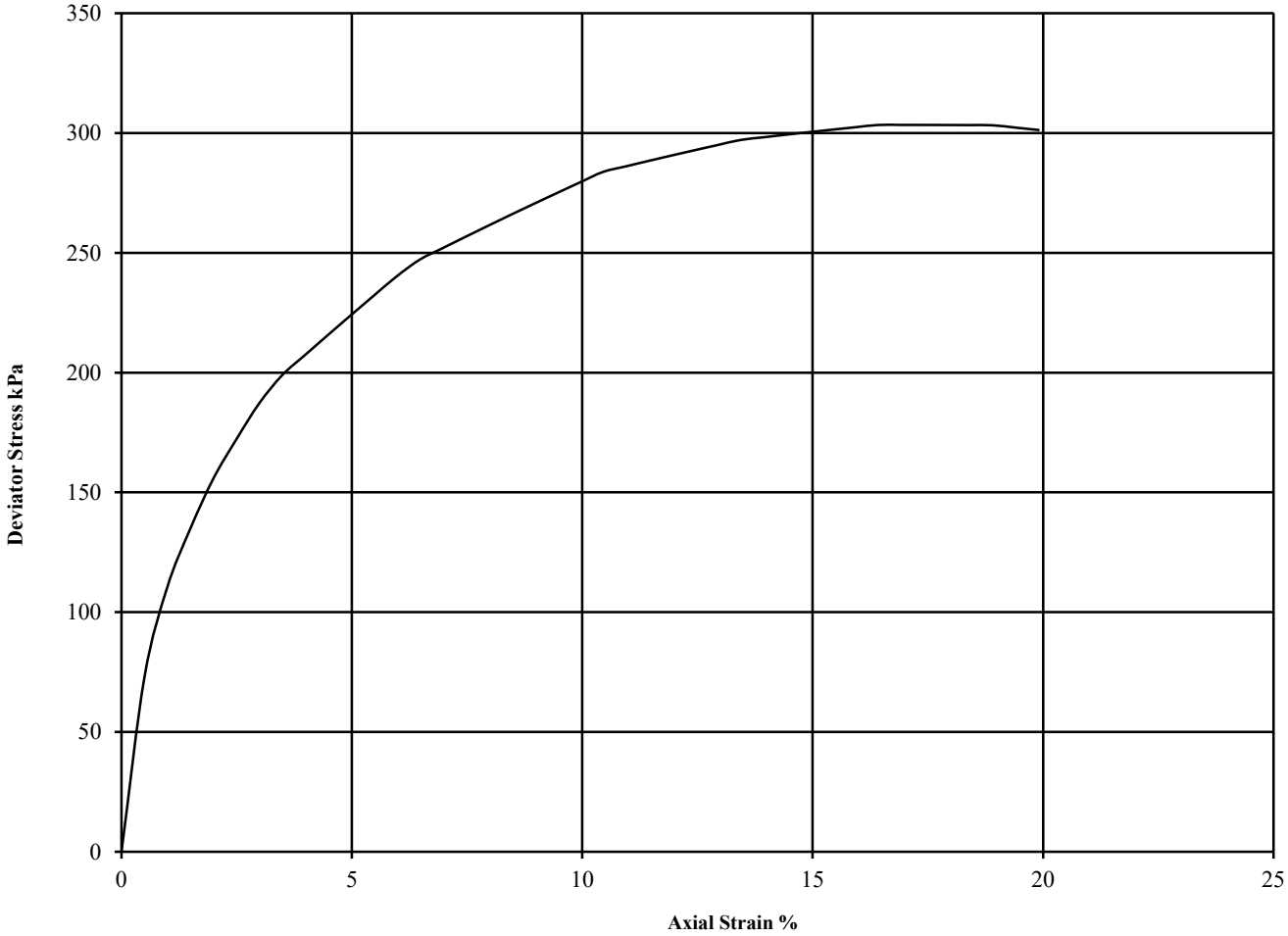
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH4**	**Top Depth (m):**	**3.60**
Sample Number:	**8**	**Base Depth (m):**	**4.05**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	18	2.11	1.78	75	303	152	16.9	Plastic	See summary of soil descriptions

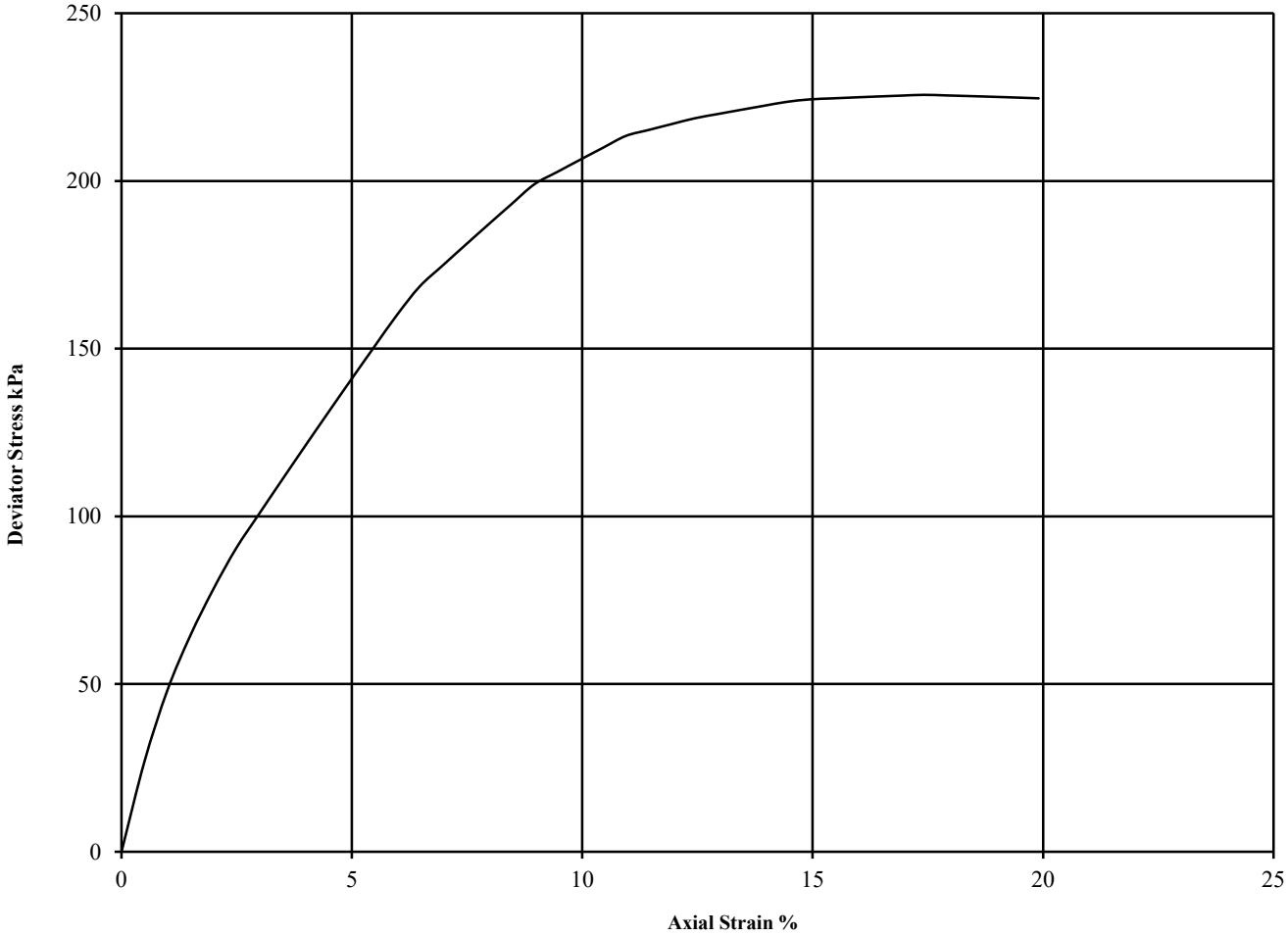
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH4**	**Top Depth (m):**	**7.00**
Sample Number:	**13**	**Base Depth (m):**	**7.45**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	18	2.11	1.79	140	226	113	17.4	Plastic	See summary of soil descriptions

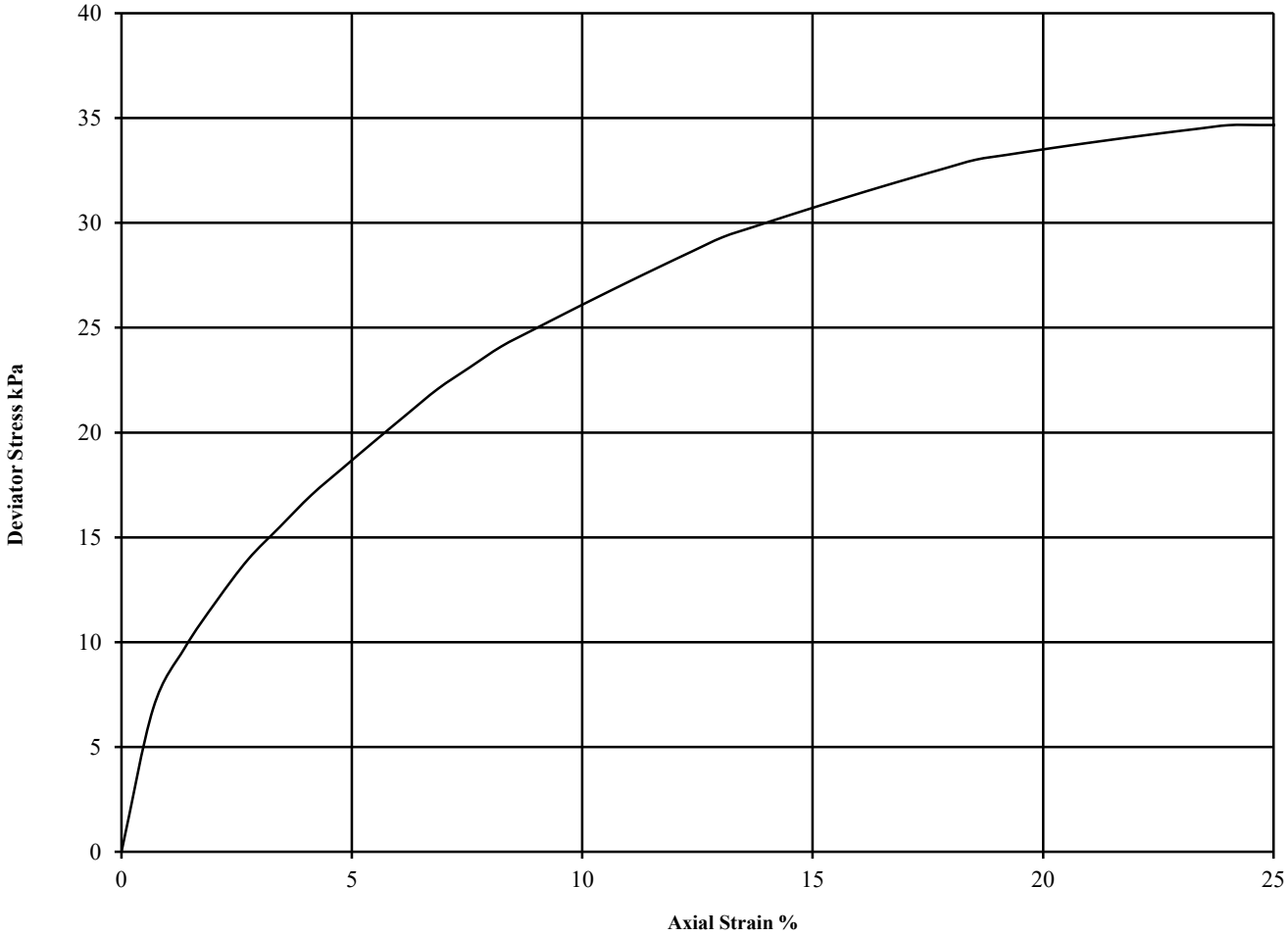
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH5**	**Top Depth (m):**	**2.50**
Sample Number:	**5**	**Base Depth (m):**	**2.95**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		150	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.32
1	20	2.08	1.73	50	35	17	25.4	Plastic	See summary of soil descriptions

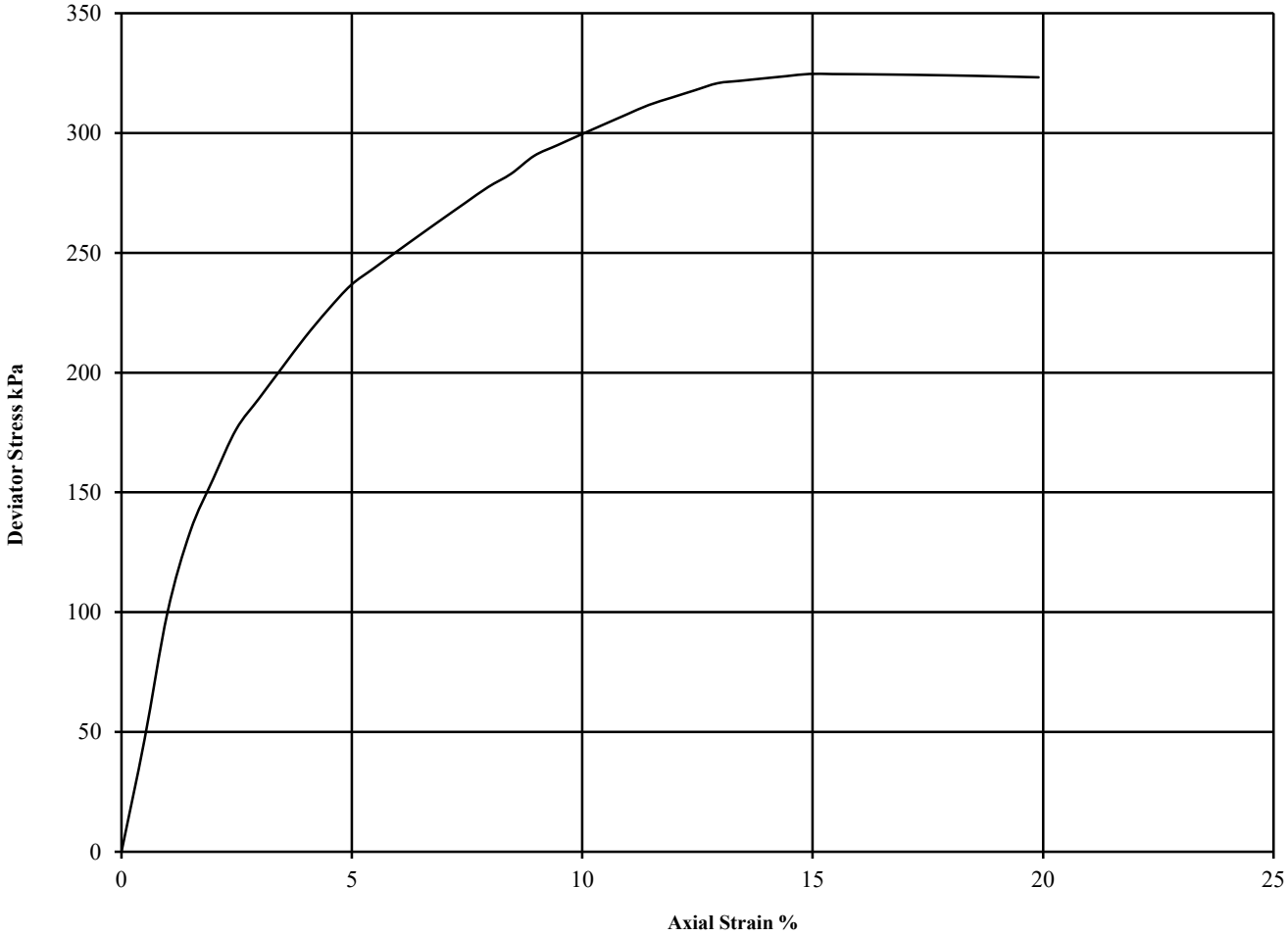
UKAS TESTING 4043	PSL Professional Soils Laboratory	Silk Street, Manchester	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH5**	**Top Depth (m):**	**4.50**
Sample Number:	**10**	**Base Depth (m):**	**4.95**
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 90 mm thick, Correction applied 0.34
1	19	2.07	1.73	90	325	162	14.9	Plastic	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Silk Street, Manchester**	**Contract No:** PSL19/2423
			Client Ref: LKC 18 1474

ONE DIMENSIONAL CONSOLIDATION TEST

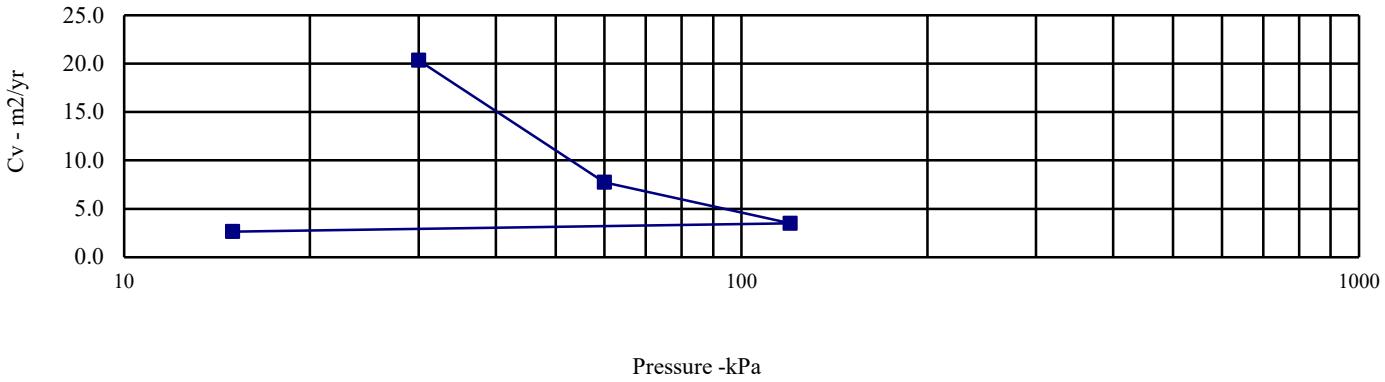
BS 1377: Part 5: 1990: Clause 3

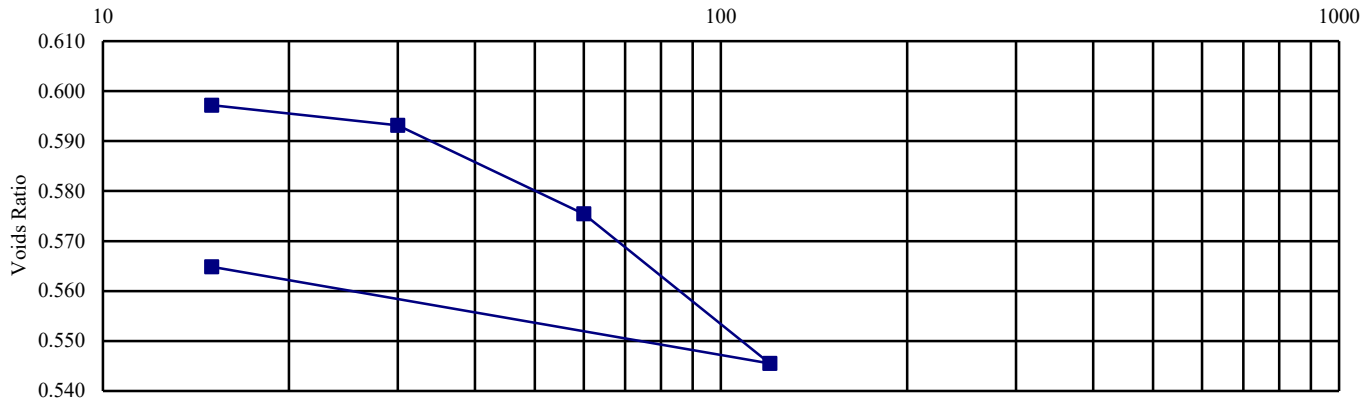
Hole Number: BH2 **Top Depth (m):** 1.60

Sample Number: 4 **Base Depth (m) :** 2.05

Sample Type: U

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	22						
Bulk Density (Mg/m3):	2.02	0	15	Swelling	Swelling	Method used to determine CV:	T90
Dry Density (Mg/m3):	1.66	15	30	0.167	20.339		
Voids Ratio:	0.597	30	60	0.371	7.724	Nominal temperature during test ' C:	20
Degree of saturation:	97.6	60	120	0.317	3.496		
Height (mm):	19.528	120	15	0.119	2.648	Remarks: See summary of soil descriptions	
Diameter (mm)	75.008						
Particle Density (Mg/m3): Assumed	2.65						





UKAS TESTING 4043	PSL Professional Soils Laboratory	Silk Street, Manchester	Contract No: PSL19/2423
			Client Ref: LKC 18 1474

ONE DIMENSIONAL CONSOLIDATION TEST

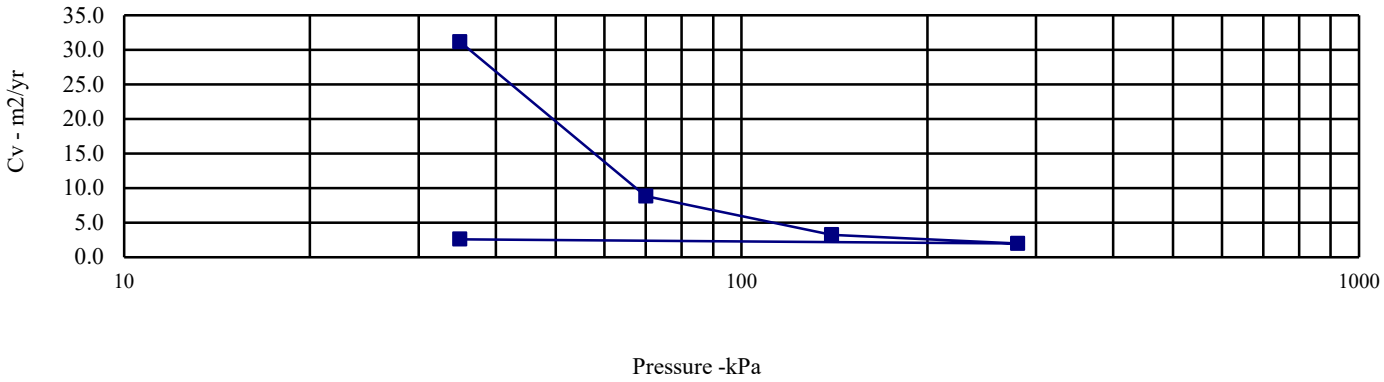
BS 1377: Part 5: 1990: Clause 3

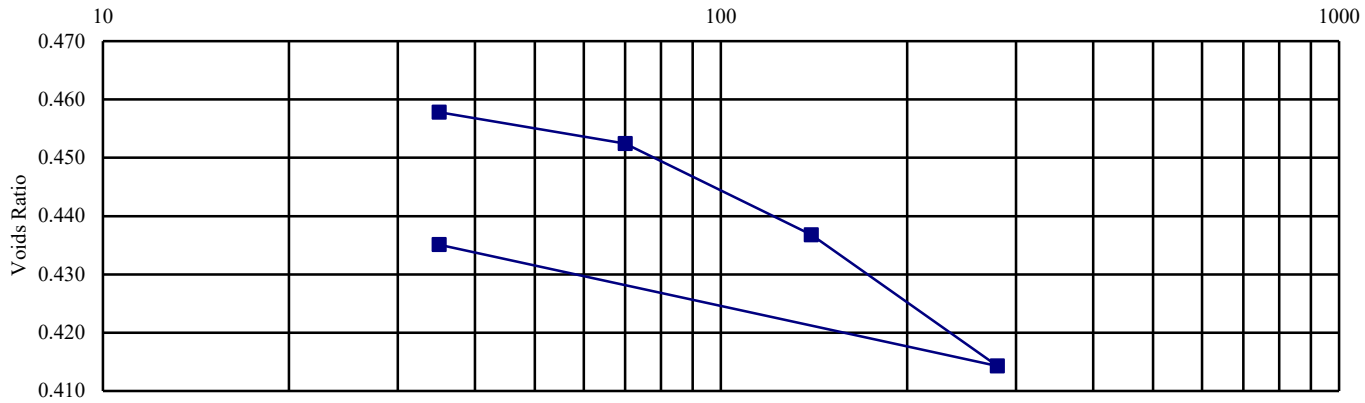
Hole Number: BH4 **Top Depth (m):** 3.60

Sample Number: 8 **Base Depth (m) :** 4.05

Sample Type: U

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	18						
Bulk Density (Mg/m3):	2.13	0	35	0.239	31.142	Method used to determine CV:	T90
Dry Density (Mg/m3):	1.80	35	70	0.106	8.811		
Voids Ratio:	0.470	70	140	0.154	3.235	Nominal temperature during test ' C:	20
Degree of saturation:	101.5	140	280	0.112	1.989		
Height (mm):	19.852	280	35	0.060	2.588	Remarks: See summary of soil descriptions	
Diameter (mm)	75.083						
Particle Density (Mg/m3): Assumed	2.65						





UKAS TESTING 4043	PSL Professional Soils Laboratory	Silk Street, Manchester	Contract No: PSL19/2423
			Client Ref: LKC 18 1474

ONE DIMENSIONAL CONSOLIDATION TEST

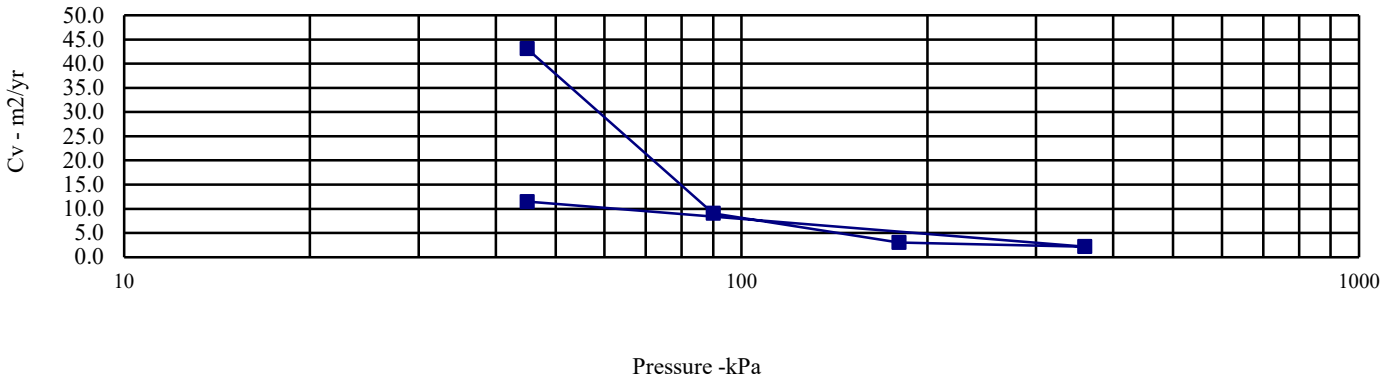
BS 1377: Part 5: 1990: Clause 3

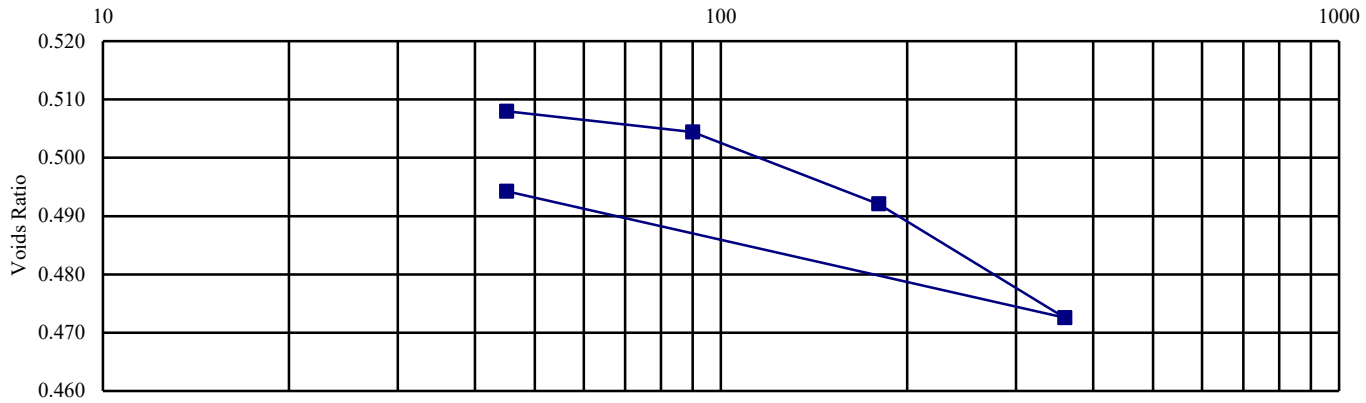
Hole Number: BH5 **Top Depth (m):** 4.50

Sample Number: 10 **Base Depth (m) :** 4.95

Sample Type: U

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	19						
Bulk Density (Mg/m3):	2.08	0	45	0.153	43.075	Method used to determine CV:	T90
Dry Density (Mg/m3):	1.75	45	90	0.052	9.032		
Voids Ratio:	0.518	90	180	0.091	3.032	Nominal temperature during test ' C:	20
Degree of saturation:	99.0	180	360	0.073	2.168		
Height (mm):	20.052	360	45	0.047	11.466	Remarks: See summary of soil descriptions	
Diameter (mm)	75.128						
Particle Density (Mg/m3): Assumed	2.65						





UKAS TESTING 4043	PSL Professional Soils Laboratory	Silk Street, Manchester	Contract No: PSL19/2423
			Client Ref: LKC 18 1474

Appendix E

Certificate of Analysis - Groundwater

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Final Report

Report No.:	19-12328-1		
Initial Date of Issue:	17-Apr-2019		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 18 1474 Silk Street, Manchester		
Quotation No.:		**Date Received:**	09-Apr-2019
Order No.:	736819	**Date Instructed:**	09-Apr-2019
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	17-Apr-2019
Date Approved:	17-Apr-2019		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Results - Water

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-12328
Quotation No.:			**Chemtest Sample ID.:**		808116
			Client Sample ID.:		WS104
			Sample Type:		WATER
			Date Sampled:		08-Apr-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	8.6
Sulphate	U	1220	mg/l	1.0	280
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050
Calcium	U	1415	mg/l	5.0	78
Total Hardness as CaCO3	U	1270	mg/l	15	200
Arsenic (Dissolved)	U	1450	µg/l	1.0	1.8
Boron (Dissolved)	U	1450	µg/l	20	< 20
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	3.3
Copper (Dissolved)	U	1450	µg/l	1.0	32
Nickel (Dissolved)	U	1450	µg/l	1.0	1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	17
Vanadium (Dissolved)	U	1450	µg/l	1.0	8.1
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0
Mercury Low Level	U	1460	µg/l	0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	< 20
Dissolved Organic Carbon	U	1610	mg/l	2.0	17
Fuel Type	N	1670		N/A	n/a
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10
Benzene	U	1760	µg/l	1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Water

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-12328
Quotation No.:			**Chemtest Sample ID.:**		808116
			Client Sample ID.:		WS104
			Sample Type:		WATER
			Date Sampled:		08-Apr-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Ethylbenzene	U	1760	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0
Naphthalene	N	1800	µg/l	0.010	0.030
Acenaphthylene	N	1800	µg/l	0.010	0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	0.010
Phenanthrene	N	1800	µg/l	0.010	0.010
Anthracene	N	1800	µg/l	0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	0.020
Benzo[a]anthracene	N	1800	µg/l	0.010	0.020
Chrysene	N	1800	µg/l	0.010	0.020
Benzo[b]fluoranthene	N	1800	µg/l	0.010	0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	0.020
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	0.030
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	0.020
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	0.020
Total Of 6 PAH's	N	1800	µg/l	0.10	0.10
Total Phenols	U	1920	mg/l	0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1460	Mercury low-level in Waters by AFS	Mercury	Atomic Fluorescence Spectrometry, with collimated UV source, wavelength 253.7 nm.
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Final Report

Report No.:	19-10006-1		
Initial Date of Issue:	01-Apr-2019		
Client	LK Consult		
Client Address:	Unit 29 Eton Business Park Eton Hill Road Radcliffe Manchester Lancashire M26 2ZS		
Contact(s):	Contaminated Land Peter Dunn		
Project	LKC 18 1474 Silk Street, Manchester		
Quotation No.:		**Date Received:**	22-Mar-2019
Order No.:	736819	**Date Instructed:**	22-Mar-2019
No. of Samples:	5		
Turnaround (Wkdays):	7	**Results Due:**	01-Apr-2019
Date Approved:	01-Apr-2019		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Results - Water

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult				**Chemtest Job No.:**	19-10006	19-10006	19-10006	19-10006	19-10006
Quotation No.:				**Chemtest Sample ID.:**	797664	797665	797666	797667	797668
				Client Sample ID.:	WS101	WS102	WS105	WS107	WS110
				Sample Type:	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	U	1010		N/A	8.3	8.3	12.0	8.5	8.3
Sulphate	U	1220	mg/l	1.0	44	16	33	350	110
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1415	mg/l	5.0	51	63	100	220	99
Total Hardness as CaCO3	U	1270	mg/l	15	190	220	280	740	350
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Boron (Dissolved)	U	1450	µg/l	20	660	550	320	600	320
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080	0.090
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	26	< 1.0	< 1.0
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	1.9	1.8	1.7	1.2	7.7
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	6.2	1.4	2.9
Vanadium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	1.5	10	7.8
Mercury Low Level	U	1460	µg/l	0.010	< 0.010	< 0.010	0.060	< 0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20	< 20	< 20
Dissolved Organic Carbon	U	1610	mg/l	2.0	4.1	3.7	3.2	4.1	2.9
Fuel Type	N	1670		N/A	N/A	N/A	N/A	N/A	N/A
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10	< 10	< 10
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Water

Project: LKC 18 1474 Silk Street, Manchester

Client: LK Consult			**Chemtest Job No.:**		19-10006	19-10006	19-10006	19-10006	19-10006
Quotation No.:			**Chemtest Sample ID.:**		797664	797665	797666	797667	797668
			Client Sample ID.:		WS101	WS102	WS105	WS107	WS110
			Sample Type:		WATER	WATER	WATER	WATER	WATER
			Date Sampled:		20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 6 PAH's	N	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1460	Mercury low-level in Waters by AFS	Mercury	Atomic Fluorescence Spectrometry, with collimated UV source, wavelength 253.7 nm.
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

Appendix F

Hazard Quotient

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

where: HI = Hazard Index
HQ = Hazard Quotient
Fi = Fraction I
SGV/GAC = Soil Guideline Value or Generic Assessment Criteria

Job Silk Street
Job No. LKC 17 1191
SOM 6%

	S4UL	TP101	TP103	TP104	TP107	TP108
Aliphatic						
EC5-EC6	**160**	***1***	***1***	***1***	***1***	***1***
EC6-EC8	**530**	***1***	***1***	***1***	***1***	***1***
EC8-EC10	**150**	***1***	***1***	***1***	***1***	***1***
EC10-EC12	**760**	***1***	***1***	***1***	***1***	***1***
EC12-EC16	**4300**	***1***	1.1	***1***	***1***	***1***
EC16-EC21	**110000**	***1***	5.4	***1***	***1***	***1***
EC21-EC35	**110000**	3.1	28.0	7.5	19.0	8.1
EC35-EC44	**110000**	***1***	***1***	***1***	***1***	***1***
Aromatic						
EC5-EC7 (benzene)	**300**	***1***	***1***	***1***	***1***	***1***
EC7-EC8 (tolulene)	**660**	***1***	***1***	***1***	***1***	***1***
EC8-EC10	**190**	***1***	***1***	***1***	***1***	***1***
EC10-EC12	**380**	***1***	***1***	***1***	***1***	***1***
EC12-EC16	**660**	***1***	6.0	***1***	***1***	***1***
EC16-EC21	**930**	***1***	130.0	***1***	3.7	***1***
EC21-EC35	**1700**	13.0	490.0	150.0	180.0	120.0
EC35-EC44	**1700**	***1***	***1***	***1***	***1***	***1***
HI		**0.04**	**0.47**	**0.12**	**0.14**	**0.10**

NB: Bold italics = <LOD

Appendix G

Joint Industry Working Group – Risk Ranking Tool

JIWG

Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Decision Support Tool for Receptor Risk Ranking

Stage 1 Hazard Identification		Score
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Mainly amosite (and possible trace tremolite/anthophyllite) with/without chrysotile (no crocidolite)	3
Sub-total		13
Hazard ranking		Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

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Stage 2

Emission Factors		Score
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Large quantities - ≥0.1 %wt/wt	4
Respirable fibre index for ACM - RIVM report 711701034 (2003)	High	4
Activity type and effect on deterioration of ACMs	Moderate disturbance, slight deterioration expected	3
Best description of primary host material matrix	Made Ground - Recycled Aggregate, Track Ballast	4
Sub-total		15
Exposure ranking		High

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Stage 3

Pathway and Receptor Sensitivity		Score	
Receptor category	Residential	No score required	
Age of Receptor	Infant (under 5)	4	
Duration of exposure/site occupancy	>> 10 hours per day (e.g. 24 hour residential exposure)	4	
Receptor ranking		8	High
Combined hazard, exposure and receptor ranking			High
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	Material buried at depth, unlikely to be disturbed except for deeper construction related excavation	B	
Pathway ranking		4B	Very Low
Overall ranking			Low

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Project Reference	LKC 18 1474

Site Name	Silk Street
Client	Faithful + Gould

Run by	PD
Date	18-Apr-19
Reviewed by	PQ

Characterisation of scenario being evaluated	Conceptual model based on use of a 600mm clean capping layer in soft landscaping and garden areas.

Interpretation of scenario ranking by DST	

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Appendix H

Waste Classification

HazWasteOnline™

Waste Classification Report

NV3A8-CFCHT-G2UXS

Job name

Silk Street

Description/Comments

Project

LKC 18 1474

Site

Silk Street

Related Documents

#	Name	Description
None		

Waste Stream Template

LK SUITE 1 - 5

Classified by

Name:
Peter Dunn
Date:
24 Apr 2019 13:01 GMT
Telephone:
0161 763 7200

Company:
LK Group
Unit 29, Eton Business Park
Eton Hill Rd, Radcliffe
Manchester
M26 2ZS

Report

Created by: Peter Dunn
Created date: 24 Apr 2019 13:01 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.60	Non Hazardous		3
2	TP102	0.80	Non Hazardous		6
3	TP103	0.40	Non Hazardous		8
4	TP104	0.70	Non Hazardous		11
5	TP105	0.60	Non Hazardous		14
6	TP106	0.60	Non Hazardous		16
7	TP107	0.40	Non Hazardous		18
8	TP108	0.40	Non Hazardous		21
9	WS102 D1	0.30	Non Hazardous		24
10	WS104 D1	0.30	Non Hazardous		26
11	WS105 D1	1.20	Non Hazardous		28

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
12	WS106 D1	0.30	Hazardous	HP 14	30
13	WS107 D1	0.40	Non Hazardous		32
14	WS108 D1	0.30	Non Hazardous		34
15	WS109 D1	0.30	Non Hazardous		36
16	WS110 D1	0.30	Non Hazardous		38
17	U95		Non Hazardous		40

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	41
Appendix B: Rationale for selection of metal species	42
Appendix C: Version	43

Classification of sample: TP101

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

Sample details

Sample Name:
TP101
Sample Depth:
0.60 m
Moisture content:
19%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		36	mg/kg	1.32	38.501	mg/kg	0.00385 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.28	mg/kg	1.142	0.259	mg/kg	0.0000259 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		21	mg/kg	1.462	24.861	mg/kg	0.00249 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		110	mg/kg	1.126	100.317	mg/kg	0.01 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.52	mg/kg	1.353	0.57	mg/kg	0.000057 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		35	mg/kg	2.976	84.377	mg/kg	0.00844 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	150	mg/kg		121.5	mg/kg	0.0121 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.69	mg/kg	2.554	1.427	mg/kg	0.000143 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		40	mg/kg	1.785	57.84	mg/kg	0.00578 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		82	mg/kg	1.245	82.674	mg/kg	0.00827 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		TPH (C6 to C40) petroleum group			TPH		16	mg/kg		12.96	mg/kg	0.0013 %		
13		confirm TPH has NOT arisen from diesel or petrol												**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<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		naphthalene				1	mg/kg		0.81	mg/kg	0.000081 %		
		601-052-00-2	202-049-5	91-20-3									
20		acenaphthylene				0.18	mg/kg		0.146	mg/kg	0.0000146 %		
			205-917-1	208-96-8									
21		acenaphthene				0.75	mg/kg		0.608	mg/kg	0.0000608 %		
			201-469-6	83-32-9									
22		fluorene				0.67	mg/kg		0.543	mg/kg	0.0000543 %		
			201-695-5	86-73-7									
23		phenanthrene				5	mg/kg		4.05	mg/kg	0.000405 %		
			201-581-5	85-01-8									
24		anthracene				1.6	mg/kg		1.296	mg/kg	0.00013 %		
			204-371-1	120-12-7									
25		fluoranthene				6.6	mg/kg		5.346	mg/kg	0.000535 %		
			205-912-4	206-44-0									
26		pyrene				5.6	mg/kg		4.536	mg/kg	0.000454 %		
			204-927-3	129-00-0									
27		benzo[a]anthracene				1.5	mg/kg		1.215	mg/kg	0.000122 %		
		601-033-00-9	200-280-6	56-55-3									
28		chrysene				2.7	mg/kg		2.187	mg/kg	0.000219 %		
		601-048-00-0	205-923-4	218-01-9									
29		benzo[b]fluoranthene				2.3	mg/kg		1.863	mg/kg	0.000186 %		
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				0.74	mg/kg		0.599	mg/kg	0.0000599 %		
		601-036-00-5	205-916-6	207-08-9									
31		benzo[a]pyrene; benzo[def]chrysene				1.5	mg/kg		1.215	mg/kg	0.000122 %		
		601-032-00-3	200-028-5	50-32-8									
32		indeno[123-cd]pyrene				0.56	mg/kg		0.454	mg/kg	0.0000454 %		
			205-893-2	193-39-5									
33		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
34		benzo[ghi]perylene				0.56	mg/kg		0.454	mg/kg	0.0000454 %		
			205-883-8	191-24-2									
										Total:	0.0557 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because TPH source from ash within sample. Laboratory trace interpretation identifies sample as PAH which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and and no other evidence of hydrocarbon contamination in samples. 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.: 0.0013%)

Classification of sample: TP102

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

Sample details

Sample Name:
TP102
Sample Depth:
0.80 m
Moisture content:
17%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		29	mg/kg	1.32	31.78	mg/kg	0.00318 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.29	mg/kg	1.142	0.275	mg/kg	0.0000275 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18	mg/kg	1.462	21.836	mg/kg	0.00218 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		86	mg/kg	1.126	80.366	mg/kg	0.00804 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.56	mg/kg	1.353	0.629	mg/kg	0.0000629 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		29	mg/kg	2.976	71.639	mg/kg	0.00716 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	140	mg/kg		116.2	mg/kg	0.0116 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.52	mg/kg	2.554	1.102	mg/kg	0.00011 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		36	mg/kg	1.785	53.341	mg/kg	0.00533 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		110	mg/kg	1.245	113.642	mg/kg	0.0114 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		1.3	mg/kg		1.079	mg/kg	0.000108 %		
13		acenaphthylene		205-917-1	208-96-8		0.39	mg/kg		0.324	mg/kg	0.0000324 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				4.5	mg/kg		3.735	mg/kg	0.000373 %		
			201-469-6	83-32-9									
15		fluorene				5	mg/kg		4.15	mg/kg	0.000415 %		
			201-695-5	86-73-7									
16		phenanthrene				35	mg/kg		29.05	mg/kg	0.00291 %		
			201-581-5	85-01-8									
17		anthracene				10	mg/kg		8.3	mg/kg	0.00083 %		
			204-371-1	120-12-7									
18		fluoranthene				31	mg/kg		25.73	mg/kg	0.00257 %		
			205-912-4	206-44-0									
19		pyrene				27	mg/kg		22.41	mg/kg	0.00224 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				9.8	mg/kg		8.134	mg/kg	0.000813 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				11	mg/kg		9.13	mg/kg	0.000913 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				10	mg/kg		8.3	mg/kg	0.00083 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				4.4	mg/kg		3.652	mg/kg	0.000365 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				9	mg/kg		7.47	mg/kg	0.000747 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				5.5	mg/kg		4.565	mg/kg	0.000457 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.7	mg/kg		0.581	mg/kg	0.0000581 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				5.5	mg/kg		4.565	mg/kg	0.000457 %		
			205-883-8	191-24-2									
										Total:	0.0633 %		

Key

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

Classification of sample: TP103

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

Sample details

Sample Name:
TP103
Sample Depth:
0.40 m
Moisture content:
21%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		48	mg/kg	1.32	50.067	mg/kg	0.00501 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.74	mg/kg	1.142	0.668	mg/kg	0.0000668 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		33	mg/kg	1.462	38.103	mg/kg	0.00381 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		170	mg/kg	1.126	151.207	mg/kg	0.0151 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		3.5	mg/kg	1.353	3.742	mg/kg	0.000374 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		48	mg/kg	2.976	112.86	mg/kg	0.0113 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	460	mg/kg		363.4	mg/kg	0.0363 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.4	mg/kg	2.554	2.824	mg/kg	0.000282 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		53	mg/kg	1.785	74.746	mg/kg	0.00747 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		130	mg/kg	1.245	127.832	mg/kg	0.0128 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		TPH (C6 to C40) petroleum group			TPH		660	mg/kg		521.4	mg/kg	0.0521 %		
13		confirm TPH has NOT arisen from diesel or petrol												**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<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		naphthalene				2.3	mg/kg		1.817	mg/kg	0.000182 %		
		601-052-00-2	202-049-5	91-20-3									
20		acenaphthylene				0.25	mg/kg		0.198	mg/kg	0.0000198 %		
			205-917-1	208-96-8									
21		acenaphthene				1.3	mg/kg		1.027	mg/kg	0.000103 %		
			201-469-6	83-32-9									
22		fluorene				1.1	mg/kg		0.869	mg/kg	0.0000869 %		
			201-695-5	86-73-7									
23		phenanthrene				10	mg/kg		7.9	mg/kg	0.00079 %		
			201-581-5	85-01-8									
24		anthracene				3	mg/kg		2.37	mg/kg	0.000237 %		
			204-371-1	120-12-7									
25		fluoranthene				13	mg/kg		10.27	mg/kg	0.00103 %		
			205-912-4	206-44-0									
26		pyrene				11	mg/kg		8.69	mg/kg	0.000869 %		
			204-927-3	129-00-0									
27		benzo[a]anthracene				4.6	mg/kg		3.634	mg/kg	0.000363 %		
		601-033-00-9	200-280-6	56-55-3									
28		chrysene				5.4	mg/kg		4.266	mg/kg	0.000427 %		
		601-048-00-0	205-923-4	218-01-9									
29		benzo[b]fluoranthene				5.3	mg/kg		4.187	mg/kg	0.000419 %		
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				2.3	mg/kg		1.817	mg/kg	0.000182 %		
		601-036-00-5	205-916-6	207-08-9									
31		benzo[a]pyrene; benzo[def]chrysene				3.6	mg/kg		2.844	mg/kg	0.000284 %		
		601-032-00-3	200-028-5	50-32-8									
32		indeno[123-cd]pyrene				1.8	mg/kg		1.422	mg/kg	0.000142 %		
			205-893-2	193-39-5									
33		dibenz[a,h]anthracene				0.11	mg/kg		0.0869	mg/kg	0.00000869 %		
		601-041-00-2	200-181-8	53-70-3									
34		benzo[ghi]perylene				1.8	mg/kg		1.422	mg/kg	0.000142 %		
			205-883-8	191-24-2									
										Total:	0.151 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because TPH source from ash within sample. Laboratory trace interpretation identifies sample as PAH which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and and no other evidence of hydrocarbon contamination in samples. 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.: 0.0521%)

Classification of sample: TP104

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

Sample details

Sample Name:
TP104
Sample Depth:
0.70 m
Moisture content:
16%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		28	mg/kg	1.32	31.054	mg/kg	0.00311 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.54	mg/kg	1.142	0.518	mg/kg	0.0000518 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		22	mg/kg	1.462	27.01	mg/kg	0.0027 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		63	mg/kg	1.126	59.582	mg/kg	0.00596 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.3	mg/kg	1.353	1.478	mg/kg	0.000148 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		26	mg/kg	2.976	65.002	mg/kg	0.0065 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	240	mg/kg		201.6	mg/kg	0.0202 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.45	mg/kg	2.554	0.965	mg/kg	0.0000965 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		29	mg/kg	1.785	43.487	mg/kg	0.00435 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		140	mg/kg	1.245	146.378	mg/kg	0.0146 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		TPH (C6 to C40) petroleum group			TPH		150	mg/kg		126	mg/kg	0.0126 %		
13		confirm TPH has NOT arisen from diesel or petrol												**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<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		naphthalene				1	mg/kg		0.84	mg/kg	0.000084 %		
		601-052-00-2	202-049-5	91-20-3									
20		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
21		acenaphthene				0.5	mg/kg		0.42	mg/kg	0.000042 %		
			201-469-6	83-32-9									
22		fluorene				0.23	mg/kg		0.193	mg/kg	0.0000193 %		
			201-695-5	86-73-7									
23		phenanthrene				2.9	mg/kg		2.436	mg/kg	0.000244 %		
			201-581-5	85-01-8									
24		anthracene				0.86	mg/kg		0.722	mg/kg	0.0000722 %		
			204-371-1	120-12-7									
25		fluoranthene				5.4	mg/kg		4.536	mg/kg	0.000454 %		
			205-912-4	206-44-0									
26		pyrene				5.4	mg/kg		4.536	mg/kg	0.000454 %		
			204-927-3	129-00-0									
27		benzo[a]anthracene				3.1	mg/kg		2.604	mg/kg	0.00026 %		
		601-033-00-9	200-280-6	56-55-3									
28		chrysene				3.9	mg/kg		3.276	mg/kg	0.000328 %		
		601-048-00-0	205-923-4	218-01-9									
29		benzo[b]fluoranthene				3.9	mg/kg		3.276	mg/kg	0.000328 %		
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				1.6	mg/kg		1.344	mg/kg	0.000134 %		
		601-036-00-5	205-916-6	207-08-9									
31		benzo[a]pyrene; benzo[def]chrysene				3	mg/kg		2.52	mg/kg	0.000252 %		
		601-032-00-3	200-028-5	50-32-8									
32		indeno[123-cd]pyrene				1.8	mg/kg		1.512	mg/kg	0.000151 %		
			205-893-2	193-39-5									
33		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
34		benzo[ghi]perylene				1.9	mg/kg		1.596	mg/kg	0.00016 %		
			205-883-8	191-24-2									
										Total:	0.0739 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because TPH source from ash within sample. Laboratory trace interpretation identifies sample as PAH which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and and no other evidence of hydrocarbon contamination in samples. 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.: 0.0126%)

Classification of sample: TP105

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

Sample details

Sample Name:
TP105
Sample Depth:
0.60 m
Moisture content:
9%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 9% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20	mg/kg	1.32	24.03	mg/kg	0.0024 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.1	mg/kg	1.142	1.143	mg/kg	0.000114 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		28	mg/kg	1.462	37.24	mg/kg	0.00372 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		88	mg/kg	1.126	90.161	mg/kg	0.00902 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.46	mg/kg	1.353	0.567	mg/kg	0.0000567 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		46	mg/kg	2.976	124.586	mg/kg	0.0125 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	270	mg/kg		245.7	mg/kg	0.0246 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		**<LOD**
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		41	mg/kg	1.785	66.605	mg/kg	0.00666 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		220	mg/kg	1.245	249.192	mg/kg	0.0249 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		2.9	mg/kg		2.639	mg/kg	0.000264 %		
13		acenaphthylene		205-917-1	208-96-8		0.25	mg/kg		0.228	mg/kg	0.0000228 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				5.5	mg/kg		5.005	mg/kg	0.0005 %		
			201-469-6	83-32-9									
15		fluorene				4.6	mg/kg		4.186	mg/kg	0.000419 %		
			201-695-5	86-73-7									
16		phenanthrene				35	mg/kg		31.85	mg/kg	0.00319 %		
			201-581-5	85-01-8									
17		anthracene				5.9	mg/kg		5.369	mg/kg	0.000537 %		
			204-371-1	120-12-7									
18		fluoranthene				41	mg/kg		37.31	mg/kg	0.00373 %		
			205-912-4	206-44-0									
19		pyrene				36	mg/kg		32.76	mg/kg	0.00328 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				13	mg/kg		11.83	mg/kg	0.00118 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				15	mg/kg		13.65	mg/kg	0.00137 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				17	mg/kg		15.47	mg/kg	0.00155 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				7.5	mg/kg		6.825	mg/kg	0.000683 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				17	mg/kg		15.47	mg/kg	0.00155 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				11	mg/kg		10.01	mg/kg	0.001 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				2.9	mg/kg		2.639	mg/kg	0.000264 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				11	mg/kg		10.01	mg/kg	0.001 %		
			205-883-8	191-24-2									
										Total:	0.105 %		

Key

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

Classification of sample: TP106

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

Sample details

Sample Name:
TP106
Sample Depth:
0.60 m
Moisture content:
18%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		24	mg/kg	1.32	25.984	mg/kg	0.0026 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.85	mg/kg	1.142	0.796	mg/kg	0.0000796 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		44	mg/kg	1.462	52.733	mg/kg	0.00527 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		72	mg/kg	1.126	66.472	mg/kg	0.00665 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.6	mg/kg	1.353	1.776	mg/kg	0.000178 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		36	mg/kg	2.976	87.859	mg/kg	0.00879 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	230	mg/kg		188.6	mg/kg	0.0189 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.43	mg/kg	2.554	0.9	mg/kg	0.00009 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		33	mg/kg	1.785	48.307	mg/kg	0.00483 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		260	mg/kg	1.245	265.373	mg/kg	0.0265 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		1.1	mg/kg		0.902	mg/kg	0.0000902 %		
13		acenaphthylene		205-917-1	208-96-8		0.18	mg/kg		0.148	mg/kg	0.0000148 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				2	mg/kg		1.64	mg/kg	0.000164 %		
			201-469-6	83-32-9									
15		fluorene				1.4	mg/kg		1.148	mg/kg	0.000115 %		
			201-695-5	86-73-7									
16		phenanthrene				12	mg/kg		9.84	mg/kg	0.000984 %		
			201-581-5	85-01-8									
17		anthracene				2.5	mg/kg		2.05	mg/kg	0.000205 %		
			204-371-1	120-12-7									
18		fluoranthene				15	mg/kg		12.3	mg/kg	0.00123 %		
			205-912-4	206-44-0									
19		pyrene				13	mg/kg		10.66	mg/kg	0.00107 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				5.2	mg/kg		4.264	mg/kg	0.000426 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				6	mg/kg		4.92	mg/kg	0.000492 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				6.8	mg/kg		5.576	mg/kg	0.000558 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				2.5	mg/kg		2.05	mg/kg	0.000205 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				5.2	mg/kg		4.264	mg/kg	0.000426 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				3.4	mg/kg		2.788	mg/kg	0.000279 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.6	mg/kg		0.492	mg/kg	0.0000492 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				3.4	mg/kg		2.788	mg/kg	0.000279 %		
			205-883-8	191-24-2									
										Total:	0.0806 %		

Key

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

Classification of sample: TP107

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

Sample details

Sample Name:
TP107
Sample Depth:
0.40 m
Moisture content:
17%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		29	mg/kg	1.32	31.78	mg/kg	0.00318 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.32	mg/kg	1.142	0.303	mg/kg	0.0000303 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		26	mg/kg	1.462	31.54	mg/kg	0.00315 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		83	mg/kg	1.126	77.562	mg/kg	0.00776 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.79	mg/kg	1.353	0.887	mg/kg	0.0000887 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		39	mg/kg	2.976	96.342	mg/kg	0.00963 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	230	mg/kg		190.9	mg/kg	0.0191 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.36	mg/kg	2.554	0.763	mg/kg	0.0000763 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		52	mg/kg	1.785	77.049	mg/kg	0.0077 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		170	mg/kg	1.245	175.629	mg/kg	0.0176 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		TPH (C6 to C40) petroleum group			TPH		200	mg/kg		166	mg/kg	0.0166 %		
13		confirm TPH has NOT arisen from diesel or petrol												**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<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		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
20		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
21		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
22		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
23		phenanthrene				1.3	mg/kg		1.079	mg/kg	0.000108 %		
			201-581-5	85-01-8									
24		anthracene				0.18	mg/kg		0.149	mg/kg	0.0000149 %		
			204-371-1	120-12-7									
25		fluoranthene				1.8	mg/kg		1.494	mg/kg	0.000149 %		
			205-912-4	206-44-0									
26		pyrene				1.8	mg/kg		1.494	mg/kg	0.000149 %		
			204-927-3	129-00-0									
27		benzo[a]anthracene				0.55	mg/kg		0.457	mg/kg	0.0000457 %		
		601-033-00-9	200-280-6	56-55-3									
28		chrysene				0.74	mg/kg		0.614	mg/kg	0.0000614 %		
		601-048-00-0	205-923-4	218-01-9									
29		benzo[b]fluoranthene				0.92	mg/kg		0.764	mg/kg	0.0000764 %		
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				0.22	mg/kg		0.183	mg/kg	0.0000183 %		
		601-036-00-5	205-916-6	207-08-9									
31		benzo[a]pyrene; benzo[def]chrysene				0.61	mg/kg		0.506	mg/kg	0.0000506 %		
		601-032-00-3	200-028-5	50-32-8									
32		indeno[123-cd]pyrene				0.4	mg/kg		0.332	mg/kg	0.0000332 %		
			205-893-2	193-39-5									
33		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
34		benzo[ghi]perylene				0.4	mg/kg		0.332	mg/kg	0.0000332 %		
			205-883-8	191-24-2									
										Total:	0.0863 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because TPH source from ash within sample. Laboratory trace interpretation identifies sample as PAH which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and and no other evidence of hydrocarbon contamination in samples. 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.: 0.0166%)

Classification of sample: TP108

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

Sample details

Sample Name:
TP108
Sample Depth:
0.40 m
Moisture content:
9.1%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 9.1% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14	mg/kg	1.32	16.802	mg/kg	0.00168 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.37	mg/kg	1.142	0.384	mg/kg	0.0000384 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		17	mg/kg	1.462	22.585	mg/kg	0.00226 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29	mg/kg	1.126	29.68	mg/kg	0.00297 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.23	mg/kg	1.353	0.283	mg/kg	0.0000283 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		24	mg/kg	2.976	64.93	mg/kg	0.00649 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	79	mg/kg		71.811	mg/kg	0.00718 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		**<LOD**
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		28	mg/kg	1.785	45.437	mg/kg	0.00454 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		87	mg/kg	1.245	98.436	mg/kg	0.00984 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		TPH (C6 to C40) petroleum group			TPH		130	mg/kg		118.17	mg/kg	0.0118 %		
13		confirm TPH has NOT arisen from diesel or petrol												**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
15		benzene	601-020-00-8	200-753-7	71-43-2		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
16		toluene	601-021-00-3	203-625-9	108-88-3		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
17		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
19		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
21		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
22		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
23		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		fluoranthene		205-912-4	206-44-0		1.5	mg/kg		1.364	mg/kg	0.000136 %		
26		pyrene		204-927-3	129-00-0		2.6	mg/kg		2.363	mg/kg	0.000236 %		
27		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.69	mg/kg		0.627	mg/kg	0.0000627 %		
28		chrysene	601-048-00-0	205-923-4	218-01-9		1.1	mg/kg		1.0	mg/kg	0.0001 %		
29		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.3	mg/kg		1.182	mg/kg	0.000118 %		
30		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.3	mg/kg		0.273	mg/kg	0.0000273 %		
31		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.9	mg/kg		0.818	mg/kg	0.0000818 %		
32		indeno[123-cd]pyrene		205-893-2	193-39-5		0.89	mg/kg		0.809	mg/kg	0.0000809 %		
33		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[ghi]perylene		205-883-8	191-24-2		0.89	mg/kg		0.809	mg/kg	0.0000809 %		
											Total:	0.0485 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because TPH source from ash within sample. Laboratory trace interpretation identifies sample as PAH which are unlikely to be flammable. No free draining liquid, no olfactory evidence, no anticipated sources identified and and no other evidence of hydrocarbon contamination in samples. 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.: 0.0118%)

Classification of sample: WS102 D1

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

Sample details

Sample Name:
WS102 D1
Sample Depth:
0.30 m
Moisture content:
12%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		29	mg/kg	1.32	33.695	mg/kg	0.00337 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.45	mg/kg	1.142	0.452	mg/kg	0.0000452 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		35	mg/kg	1.462	45.016	mg/kg	0.0045 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		88	mg/kg	1.126	87.189	mg/kg	0.00872 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.84	mg/kg	1.353	1	mg/kg	0.0001 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23	mg/kg	2.976	60.24	mg/kg	0.00602 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	250	mg/kg		220	mg/kg	0.022 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.46	mg/kg	2.554	1.034	mg/kg	0.000103 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		20	mg/kg	1.785	31.419	mg/kg	0.00314 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		190	mg/kg	1.245	208.116	mg/kg	0.0208 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.98	mg/kg		0.862	mg/kg	0.0000862 %		
13		acenaphthylene		205-917-1	208-96-8		0.41	mg/kg		0.361	mg/kg	0.0000361 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				0.22	mg/kg		0.194	mg/kg	0.0000194 %		
			201-469-6	83-32-9									
15		fluorene				0.41	mg/kg		0.361	mg/kg	0.0000361 %		
			201-695-5	86-73-7									
16		phenanthrene				4.8	mg/kg		4.224	mg/kg	0.000422 %		
			201-581-5	85-01-8									
17		anthracene				1.2	mg/kg		1.056	mg/kg	0.000106 %		
			204-371-1	120-12-7									
18		fluoranthene				10	mg/kg		8.8	mg/kg	0.00088 %		
			205-912-4	206-44-0									
19		pyrene				10	mg/kg		8.8	mg/kg	0.00088 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				7.3	mg/kg		6.424	mg/kg	0.000642 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				7.6	mg/kg		6.688	mg/kg	0.000669 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				11	mg/kg		9.68	mg/kg	0.000968 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				4.2	mg/kg		3.696	mg/kg	0.00037 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				9.3	mg/kg		8.184	mg/kg	0.000818 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				6	mg/kg		5.28	mg/kg	0.000528 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				1.3	mg/kg		1.144	mg/kg	0.000114 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				6	mg/kg		5.28	mg/kg	0.000528 %		
			205-883-8	191-24-2									
										Total:	0.076 %		

Key

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

Classification of sample: WS104 D1

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

Sample details

Sample Name:
WS104 D1
Sample Depth:
0.30 m
Moisture content:
4.6%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 4.6% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17	mg/kg	1.32	21.413	mg/kg	0.00214 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.45	mg/kg	1.142	0.49	mg/kg	0.000049 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		9.8	mg/kg	1.462	13.664	mg/kg	0.00137 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20	mg/kg	1.126	21.482	mg/kg	0.00215 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.16	mg/kg	1.353	0.207	mg/kg	0.0000207 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		8	mg/kg	2.976	22.715	mg/kg	0.00227 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	55	mg/kg		52.47	mg/kg	0.00525 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		**<LOD**
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		7	mg/kg	1.785	11.921	mg/kg	0.00119 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		58	mg/kg	1.245	68.873	mg/kg	0.00689 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				0.7	mg/kg		0.668	mg/kg	0.0000668 %		
			201-581-5	85-01-8									
17		anthracene				0.14	mg/kg		0.134	mg/kg	0.0000134 %		
			204-371-1	120-12-7									
18		fluoranthene				1.6	mg/kg		1.526	mg/kg	0.000153 %		
			205-912-4	206-44-0									
19		pyrene				1.8	mg/kg		1.717	mg/kg	0.000172 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.99	mg/kg		0.944	mg/kg	0.0000944 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.2	mg/kg		1.145	mg/kg	0.000114 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.9	mg/kg		1.813	mg/kg	0.000181 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.53	mg/kg		0.506	mg/kg	0.0000506 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.4	mg/kg		1.336	mg/kg	0.000134 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.77	mg/kg		0.735	mg/kg	0.0000735 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.78	mg/kg		0.744	mg/kg	0.0000744 %		
			205-883-8	191-24-2									
										Total:	0.0226 %		

Key

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

Classification of sample: WS105 D1

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

Sample details

Sample Name:
WS105 D1
Sample Depth:
1.20 m
Moisture content:
15%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	17.956	mg/kg	0.0018 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.11	mg/kg	1.142	0.107	mg/kg	0.0000107 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	19.877	mg/kg	0.00199 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		57	mg/kg	1.126	54.549	mg/kg	0.00545 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		3.2	mg/kg	1.353	3.681	mg/kg	0.000368 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22	mg/kg	2.976	55.656	mg/kg	0.00557 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	70	mg/kg		59.5	mg/kg	0.00595 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.4	mg/kg	2.554	0.868	mg/kg	0.0000868 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		21	mg/kg	1.785	31.866	mg/kg	0.00319 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		45	mg/kg	1.245	47.61	mg/kg	0.00476 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				0.22	mg/kg		0.187	mg/kg	0.0000187 %		
			201-581-5	85-01-8									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.11	mg/kg		0.0935	mg/kg	0.00000935 %		
			205-912-4	206-44-0									
19		pyrene				0.12	mg/kg		0.102	mg/kg	0.0000102 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0294 %		

Key

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

Classification of sample: WS106 D1

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS106 D1
Sample Depth:
0.30 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex: (Note 1 conc.: 0.26%)

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		35	mg/kg	1.32	38.818	mg/kg	0.00388 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.1	mg/kg	1.142	1.056	mg/kg	0.000106 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		62	mg/kg	1.462	76.118	mg/kg	0.00761 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		160	mg/kg	1.126	151.319	mg/kg	0.0151 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.7	mg/kg	1.353	1.933	mg/kg	0.000193 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		41	mg/kg	2.976	102.503	mg/kg	0.0103 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	3100	mg/kg		2604	mg/kg	0.26 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.36	mg/kg	2.554	0.772	mg/kg	0.0000772 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		54	mg/kg	1.785	80.976	mg/kg	0.0081 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		340	mg/kg	1.245	355.49	mg/kg	0.0355 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
11		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
		024-001-00-0	215-607-8	1333-82-0									
12		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
13		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				1.3	mg/kg		1.092	mg/kg	0.000109 %		
			201-581-5	85-01-8									
17		anthracene				0.26	mg/kg		0.218	mg/kg	0.0000218 %		
			204-371-1	120-12-7									
18		fluoranthene				3	mg/kg		2.52	mg/kg	0.000252 %		
			205-912-4	206-44-0									
19		pyrene				2.9	mg/kg		2.436	mg/kg	0.000244 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.4	mg/kg		1.176	mg/kg	0.000118 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.7	mg/kg		1.428	mg/kg	0.000143 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3	mg/kg		2.52	mg/kg	0.000252 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.87	mg/kg		0.731	mg/kg	0.0000731 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.5	mg/kg		2.1	mg/kg	0.00021 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				2	mg/kg		1.68	mg/kg	0.000168 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.14	mg/kg		0.118	mg/kg	0.0000118 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				2.1	mg/kg		1.764	mg/kg	0.000176 %		
			205-883-8	191-24-2									
										Total:	0.343 %		

Key

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

Classification of sample: WS107 D1

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

Sample details

Sample Name:
WS107 D1
Sample Depth:
0.40 m
Moisture content:
15%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		24	mg/kg	1.32	26.935	mg/kg	0.00269 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4	mg/kg	1.142	0.388	mg/kg	0.0000388 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		25	mg/kg	1.462	31.058	mg/kg	0.00311 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		66	mg/kg	1.126	63.162	mg/kg	0.00632 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.71	mg/kg	1.353	0.817	mg/kg	0.0000817 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30	mg/kg	2.976	75.895	mg/kg	0.00759 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	840	mg/kg		714	mg/kg	0.0714 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.48	mg/kg	2.554	1.042	mg/kg	0.000104 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		34	mg/kg	1.785	51.592	mg/kg	0.00516 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		100	mg/kg	1.245	105.801	mg/kg	0.0106 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				1.9	mg/kg		1.615	mg/kg	0.000162 %		
			201-581-5	85-01-8									
17		anthracene				0.46	mg/kg		0.391	mg/kg	0.0000391 %		
			204-371-1	120-12-7									
18		fluoranthene				4.3	mg/kg		3.655	mg/kg	0.000366 %		
			205-912-4	206-44-0									
19		pyrene				4.1	mg/kg		3.485	mg/kg	0.000349 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.9	mg/kg		1.615	mg/kg	0.000162 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.3	mg/kg		1.955	mg/kg	0.000195 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.9	mg/kg		3.315	mg/kg	0.000331 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.1	mg/kg		0.935	mg/kg	0.0000935 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.9	mg/kg		2.465	mg/kg	0.000246 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				2.1	mg/kg		1.785	mg/kg	0.000179 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.15	mg/kg		0.128	mg/kg	0.0000128 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				2.1	mg/kg		1.785	mg/kg	0.000179 %		
			205-883-8	191-24-2									
										Total:	0.11 %		

Key

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

Classification of sample: WS108 D1

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

Sample details

Sample Name:
WS108 D1
Sample Depth:
0.30 m
Moisture content:
19%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	17.111	mg/kg	0.00171 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.13	mg/kg	1.142	0.12	mg/kg	0.000012 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19	mg/kg	1.462	22.493	mg/kg	0.00225 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		52	mg/kg	1.126	47.422	mg/kg	0.00474 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.44	mg/kg	1.353	0.482	mg/kg	0.0000482 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		25	mg/kg	2.976	60.269	mg/kg	0.00603 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	120	mg/kg		97.2	mg/kg	0.00972 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.54	mg/kg	2.554	1.117	mg/kg	0.000112 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		27	mg/kg	1.785	39.042	mg/kg	0.0039 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		140	mg/kg	1.245	141.151	mg/kg	0.0141 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				0.39	mg/kg		0.316	mg/kg	0.0000316 %		
			201-581-5	85-01-8									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.64	mg/kg		0.518	mg/kg	0.0000518 %		
			205-912-4	206-44-0									
19		pyrene				0.64	mg/kg		0.518	mg/kg	0.0000518 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.12	mg/kg		0.0972	mg/kg	0.00000972 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.18	mg/kg		0.146	mg/kg	0.0000146 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.043 %		

Key

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

Classification of sample: WS109 D1

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

Sample details

Sample Name:
WS109 D1
Sample Depth:
0.30 m
Moisture content:
9.9%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 9.9% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14	mg/kg	1.32	16.655	mg/kg	0.00167 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.5	mg/kg	1.142	0.515	mg/kg	0.0000515 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19	mg/kg	1.462	25.02	mg/kg	0.0025 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		130	mg/kg	1.126	131.875	mg/kg	0.0132 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.37	mg/kg	1.353	0.451	mg/kg	0.0000451 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		21	mg/kg	2.976	56.314	mg/kg	0.00563 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	190	mg/kg		171.19	mg/kg	0.0171 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.2	mg/kg	2.554	<0.511	mg/kg	<0.0000511 %		**<LOD**
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		21	mg/kg	1.785	33.777	mg/kg	0.00338 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		140	mg/kg	1.245	157.008	mg/kg	0.0157 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.45	mg/kg		0.405	mg/kg	0.0000405 %		
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				0.54	mg/kg		0.487	mg/kg	0.0000487 %		
			201-469-6	83-32-9									
15		fluorene				0.32	mg/kg		0.288	mg/kg	0.0000288 %		
			201-695-5	86-73-7									
16		phenanthrene				4.1	mg/kg		3.694	mg/kg	0.000369 %		
			201-581-5	85-01-8									
17		anthracene				0.77	mg/kg		0.694	mg/kg	0.0000694 %		
			204-371-1	120-12-7									
18		fluoranthene				4.5	mg/kg		4.055	mg/kg	0.000405 %		
			205-912-4	206-44-0									
19		pyrene				4.2	mg/kg		3.784	mg/kg	0.000378 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.5	mg/kg		1.351	mg/kg	0.000135 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.7	mg/kg		1.532	mg/kg	0.000153 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.1	mg/kg		1.892	mg/kg	0.000189 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.54	mg/kg		0.487	mg/kg	0.0000487 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.4	mg/kg		1.261	mg/kg	0.000126 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.83	mg/kg		0.748	mg/kg	0.0000748 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.84	mg/kg		0.757	mg/kg	0.0000757 %		
			205-883-8	191-24-2									
										Total:	0.0616 %		

Key

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

Classification of sample: WS110 D1

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

Sample details

Sample Name:
WS110 D1
Sample Depth:
0.30 m
Moisture content:
21%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		76	mg/kg	1.32	79.272	mg/kg	0.00793 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.5	mg/kg	1.142	1.354	mg/kg	0.000135 %		
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		25	mg/kg	1.462	28.866	mg/kg	0.00289 %		
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		150	mg/kg	1.126	133.418	mg/kg	0.0133 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.2	mg/kg	1.353	1.283	mg/kg	0.000128 %		
6		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		49	mg/kg	2.976	115.211	mg/kg	0.0115 %		
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	380	mg/kg		300.2	mg/kg	0.03 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.99	mg/kg	2.554	1.997	mg/kg	0.0002 %		
9		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		51	mg/kg	1.785	71.925	mg/kg	0.00719 %		
10		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		550	mg/kg	1.245	540.828	mg/kg	0.0541 %		
11		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
16		phenanthrene				1.5	mg/kg		1.185	mg/kg	0.000119 %		
			201-581-5	85-01-8									
17		anthracene				0.27	mg/kg		0.213	mg/kg	0.0000213 %		
			204-371-1	120-12-7									
18		fluoranthene				2.2	mg/kg		1.738	mg/kg	0.000174 %		
			205-912-4	206-44-0									
19		pyrene				2.1	mg/kg		1.659	mg/kg	0.000166 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.74	mg/kg		0.585	mg/kg	0.0000585 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.96	mg/kg		0.758	mg/kg	0.0000758 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.3	mg/kg		1.027	mg/kg	0.000103 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.31	mg/kg		0.245	mg/kg	0.0000245 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.76	mg/kg		0.6	mg/kg	0.00006 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.51	mg/kg		0.403	mg/kg	0.0000403 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.52	mg/kg		0.411	mg/kg	0.0000411 %		
			205-883-8	191-24-2									
										Total:	0.128 %		

Key

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

Classification of sample: U95

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

Sample details

Sample Name:
U95

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

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	1230 mg/kg		1230 mg/kg	0.123 %		
		082-001-00-6									
								Total:	0.123 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

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

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: Lead REACH Consortium considers some lead compounds Carcinogenic category 2B
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - 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

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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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 Chronic 1 H410 , Aquatic Acute 1 H400

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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

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 Chronic 1 H410 , Aquatic Acute 1 H400

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

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

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

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

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

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

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

copper {dicopper oxide; copper (I) oxide}

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

mercury {mercury dichloride}

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

nickel {nickel chromate}

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

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

Worst case compound based on absence of CrVI and assumed lead oxide 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. (edit as required)

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most conservative species.

zinc {zinc oxide}

Worst case compound based on absence of CrVI and assumed zinc oxide 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 (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.106.3838.7837 (16 Apr 2019)
HazWasteOnline Database: 2019.106.3838.7837 (16 Apr 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

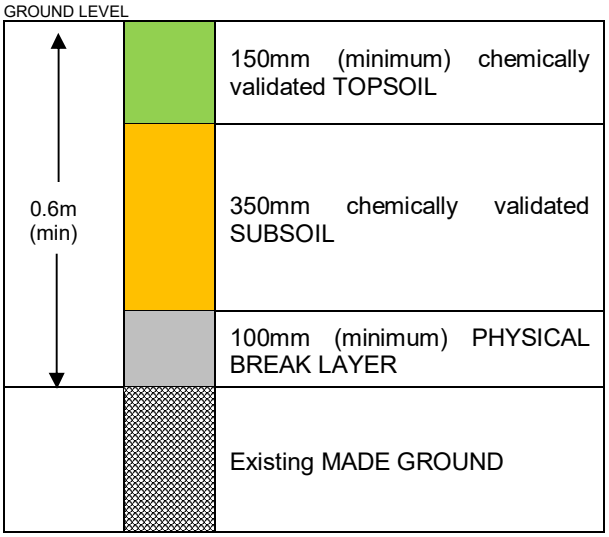
Appendix I

Environmental Cover System Construction

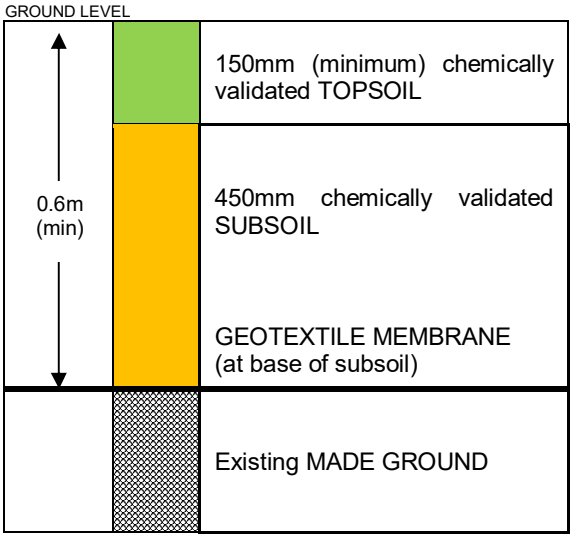
Private Gardens
Shared Landscaping

PRIVATE BACK GARDENS:

Either (physical break layer)

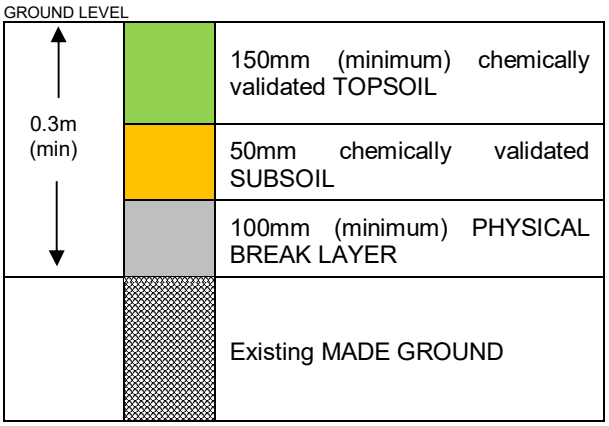


Or (geotextile membrane)

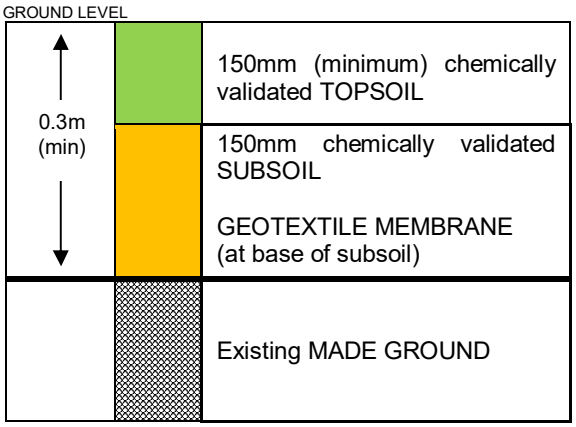


PRIVATE FRONT GARDENS / SHARED LANDSCAPING:

Either (physical break layer)



Or (geotextile membrane)



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- Land Drilling