

HOTSPUR PRESS, MANCHESTER

Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy

Job Number: LKC 23 1466
Date: October 2023
Client: Manner



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EXECUTIVE SUMMARY

Site Details

Location	To the west of Gloucester Street and Cambridge Street, Manchester. Centred at approximate National Grid Reference 383850E 397450N.
Area	3,000m ² .
Topography	Approximately 30 metres above ordnance datum (AOD). The site is occupied by an existing building over a number of levels.
Current Site Use	<u>Site</u> Currently occupied by vacant Hotspur Press building. The site boundary includes a section of Cambridge Road to the east and a small area of undeveloped land to the northwest. The building is split into two levels. The northern section of the building, the ground floor is at road level, within the southern section of the building, ground level is the basement level floor which is level with the adjacent River Medlock.
Proposed Development	Partial demolition of the current building with some retention of the historical building façade and multistorey student accommodation proposed in the south of the site and Public Open Space/Public realm decking area with tree pits in the north of the site.

Site Setting

Main Historical Features	Onsite: Medlock Mill, Factory, Unreferenced Buildings, Road, Printing Works, Gas Works, Rubber Works, Depot. Surrounding Area: River Medlock, Rochdale Canal, Mill, Railway Viaduct, Gas Works, Rubber Works, Timber Yard, Reservoir, Finishing Works, Pumping Station, Corporation Yard, Mill, Car Park.
Geology / Hydrogeology	Artificial: Made ground recorded on site. Superficial: Boulder clay/till. Secondary A Aquifer. Bedrock: Chester Formation (sandstone). Principal Aquifer.
Landfills / Infilled Ground	No recorded landfills. Potentially infilled ground identified.
Site Walkover	Site currently occupied by an L-shaped 4-5 storey vacant former mill building. The River Medlock is adjacent to the south. Ground cover is predominantly concrete. Potential ACM noted within the building. No evidence of significant contamination identified. Access restrictions present within the building due to floor level changes.
Recommendations	Site Investigation was recommended to further assess geo-environmental risk.

Ground Investigation Work Undertaken

Date of Investigation:	18 th to 19 th September 2023.
Intrusive Investigation Work Undertaken:	4no. window sample boreholes. 1no. follow on Dynamic Probes. 4no. hand excavated trial pits. Contamination and geotechnical testing. Groundwater monitoring. Surface water sampling.

Ground Conditions

Made Ground	Concrete present to 0.25mbgl. Made ground comprising gravel, sand silt and clay present to 4.00mbgl in WS101 and to a maximum depth of 1.60mbgl at all other locations. Anthropogenic material included ash, clinker and brick.
Superficial	Soft to firm clay interbedded with loose to medium dense gravelly sand.
Bedrock	Weathered sandstone present at 5.30-5.80mbgl.
Groundwater	No groundwater was noted during the site investigation or during the water monitoring visit.
Obstructions	Refusal within made ground at 3.37mbgl in WS101A. Metal pipe encountered at 0.30mbgl in HD103A.

Geotechnical Assessment

Founding Strata	Shallow sandstone bedrock encountered from 5.30m-5.80mbgl.
Anticipated Foundation Type	It is considered that a bored pile solution will provide the most suitable foundation option.
Other Considerations	Further investigation post demolition of existing structures required. Detailed design should be carried out by structural engineer. Concrete Requirements DS3-AC-3.

Contamination Risk Assessment

PL	Contaminant	Risk	Recommendations
1	Asbestos, Metals, PAHs, Petroleum hydrocarbons	Low	No remediation required.
2	Naphthalene Other volatile contaminants	Low	No remediation required.
3	Carbon dioxide Methane	Moderate / Low	No remediation required.
4	Groundwater Surface Water (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	UU risk assessment to be completed. Unlikely to require barrier piping.

Waste Assessment

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

Recommendations and Remedial Strategy

PL	Recommendation
1	No remediation required.
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.
Other Considerations	
Unexpected Contamination	
Decommissioning of Boreholes	
Grubbing Out of In-ground Structures	
Re-use of Site Generated Material	
Stockpile Management	
Disposal	
Control of Water	
Health and Safety Considerations	
Piling in Contaminated Land	

Soil Validation
Site Completion Report
Further Work Requirements
Update report once surface water results and geotechnical testing laboratory results have been received.
Additional geotechnical investigation to aid in pile design.

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Figure 3 – Site Investigation Location Plan

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Appendix A – Risk Matrix

Appendix B – Profile Logs

Appendix C – Certificates of Analysis (Soil and Leaching Tests)

Appendix D – Certificates of Analysis (Geotechnical)

Appendix E – Certificates of Analysis (Surface Water)

Appendix F – Generic Assessment Criteria Values

Appendix G – HazWaste Online Classification Report

Appendix H – References

1. Introduction

1.1. Background

LK Consult Ltd (LKC) has been commissioned to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Hotspur Press, 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 1196, dated June 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.

A post demolition geotechnical investigation is also proposed once the existing buildings have been demolished.

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

Location	To the west of Gloucester Street and Cambridge Street within Manchester city centre. Centred at approximate National Grid Reference 383850E 397450N.
Area	3,000m ² .
Topography	Approximately 30 metres above ordnance datum (AOD). The site is occupied by an existing building over a number of levels.
Current Site Use	<u>Site</u> Currently occupied by vacant Hotspur Press building. The site boundary includes a section of Cambridge Road to the east and a small area of undeveloped land to the northwest. The building is split into two levels. The northern section the ground floor is at road level. In the southern section there is a basement level floor which is level with the adjacent River Medlock. <u>Surrounding Area</u> North: Elevated railway line and Whitworth Street West. East: Gloucester Street and River Medlock. South: River Medlock. West: River Medlock with commercial development beyond.
Proposed Development	Partial demolition of the current building with some retention of the historical façade. New multistorey student accommodation proposed in the south of the site and Public Open Space/Public realm decking area with tree pits in the north of the site.

Table 1-1: Summary of site details.

2. Summary of Preliminary Risk Assessment (PRA)

2.1. Phase 1 Preliminary Risk Assessment (PRA)

Pertinent information has been summarised from the PRA in Table 2-1.

Main Historical Features	Onsite: Medlock Mill, Factory, Unreferenced Buildings, Road, Printing Works, Gas Works, Rubber Works, Depot. Surrounding Area: River Medlock, Rochdale Canal, Mill, Railway Viaduct, Gas Works, Rubber Works, Timber Yard, Reservoir, Finishing Works, Pumping Station, Corporation Yard, Mill, Car Park.
Geology / Hydrogeology	Artificial: Made ground recorded on site. Superficial: Boulder clay/till. Secondary A Aquifer. Bedrock: Chester Formation (sandstone). Principal Aquifer.
Landfills / Infilled Ground	No recorded landfills. Potentially infilled ground identified.
Site Reconnaissance	Site currently occupied by an L-shaped 4-5 storey vacant former mill building. The River Medlock is adjacent to the south. Ground cover is predominantly concrete. Potential ACM noted within the building. No evidence of significant contamination identified. Access restrictions present within the building due to floor level changes.

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

Table 2-2 summarises the geotechnical constraints. This has been updated to consider the previous site investigation work.

Coal Mining	Site is not within a Development High Risk Area. No further assessment required.
Slope Stability	No slope present on site. No further assessment required.
Made Ground	Unknown depth and constituent of made ground across the site.
Superficial	Unknown strength of soils for foundation design.
Bedrock	Unknown depth to bedrock.
Groundwater	Unknown depth and variability of groundwater.
Plasticity	Plasticity of clay deposits should be confirmed.
Sulphate	Unknown sulphate content of the made ground and natural.
Road / Pavement Design	Unknown CBR values for footpath and road design should be calculated.

Table 2-2: Summary of geotechnical constraints.

2.2. Site Walkover 2023

Prior to the site investigation, LKC personnel undertook an updated site reconnaissance visit. The site was similar to as described in the original PRA. No additional potential sources ground contamination were identified.

2.3. Conceptual Model

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM² has been summarised in Table 2-3.

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

Due to the minor consequence associated with the phytotoxic effect to flora (i.e., loss of plants in a landscaping scheme), the overall risk for most sites will be very low to low. Here soils contain significant concentrations of heavy metals, in general there will other pollutant linkages (i.e., the risk to human health) that will trigger the requirement for

remediation (e.g., a clean environmental cover system). As such the risk to flora associated with phytotoxic contaminants will not be considered further.

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

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk
1	Asbestos, metals, PAHs, petroleum hydrocarbons, inorganic and organic contaminants (made ground, cotton mill, printing works).	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust. Windblown dust.	Future site users.	Likely	Medium	Moderate (localised to soft landscaping areas)
2	Naphthalene, petroleum hydrocarbons, solvents (made ground, cotton mill, printing works, gas works).	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users.	Low Likelihood	Medium	Moderate / Low
3	Hazardous / ground gas: methane, carbon dioxide (potentially infilled features 250m of the site).	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings.	Unlikely	Severe	Moderate / Low
4	Metals, PAHs, petroleum hydrocarbons, volatile compounds (made ground, cotton mill, printing works).	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater. Surface water.	Low Likelihood	Medium	Moderate / Low
5	Naphthalene, petroleum hydrocarbons, other organic contaminants (made ground, cotton mill, printing works).	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Medium	Moderate / Low

Table 2-3: Preliminary Contamination Conceptual Model.

3. Ground Investigation

3.1. Site Investigation Design and Methodology

The investigation was carried out on 18th to 19th September 2023 and comprised the following:

- 4no. window sample boreholes drilled to 3.00-6.02 metres below ground level (mbgl) (ref. WS101A to WS103).
- Follow on Dynamic Probing through window sample borehole WS101B to a depth of 6.35mbgl (ref. DP101).
- 4no. hand excavated trial pits (using hand auger / spade) excavated to 0.30-1.20mbgl (ref. HD101 to HA103B).

All site investigation locations are shown in Figure 3.

The locations were chosen to allow an initial assessment of ground conditions across the site in accessible areas prior to demolition. Window sample boreholes (ref. WS101A to WS103) were positioned for general site coverage. Hand excavated trial pits (ref. HD101-HD103B) were located where access was restricted for the drilling rig, at current basement level.

The number of site investigation points corresponds to approximately one location per 22m square centres. This is considered to be a conservative sampling density and is in line with BS10175⁴ for a 'detailed investigation'.

All profile logs are provided in Appendix B and are in line with BS14688-1⁵ and BS5930⁶.

3.2. Well Installations

3no. (WS101B-WS103) of the boreholes were installed with monitoring wells for groundwater sampling. Monitoring wells were installed in accordance with BS10175 and CIRIA C665⁷ and generally comprised approximately 1m plain pipe over a length of slotted pipe surrounded by pea gravel and sealed at the top with bentonite and concrete.

WS102 comprised a 2m plain pipe over 3 metres of slotted pipe so that the response zone was within the natural strata.

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 investigation⁸.

Soil was collected for onsite testing for total volatile organic compounds (TVOCs) using a photoionisation detector (PID) fitted with a 10.6eV lamp and moisture trap. 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. Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665⁹ to aid in screening samples for volatile analysis.

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

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

Testing	No. Samples	Justification
Metals / metalloids, pH, sulphate, speciated PAHs and hardness.	4	A basic suite with a broad selection of contaminants where no significant evidence of contamination was identified (except for occasional ash, brick and coal).
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol, and hardness.	2	Although no evidence of contamination identified, detailed suite undertaken to confirm the absence of contamination.

Table 3-1: Summary of Soil Testing.

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. Soil Sampling (Geotechnical)

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

Many of the tests are UKAS accredited and further details are given in the laboratory report presented in Appendix C (BRE SD1 Tests) and Appendix D (plasticity and PSD tests). Table 3-2 shows the geotechnical testing undertaken.

Testing	No. Samples
BRE SD1 Short Suite	2
Atterberg Limits (plasticity testing)	2
Particle Size Distribution (PSD)	2

Table 3-2: Summary of Geotechnical Testing Undertaken.

3.3.3. Surface Water Sampling / Leaching Testing

No groundwater was encountered in the boreholes during drilling or on the return groundwater monitoring visit; therefore, leaching tests were undertaken as an alternative.

The leaching test is an aggressive test and may not give results that are truly representative of the groundwater on site.

In addition, a surface water sample was collected from the adjacent River Medlock.

Many of the tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C (leaching) and Appendix E (surface water). Table 3-3 shows the leachate and surface water testing undertaken.

Testing	No. Samples	Justification
Metals / metalloids, pH, sulphate, cyanide suite, TPHCWG, BTEX, MTBE, speciated PAHs, phenol, and hardness.	3	Detailed suite undertaken in WS101B, due to deep made ground, and HD103, due to deep made ground and proximity to the river, to confirm the absence of contamination. Also undertaken on the surface water sample.

Table 3-3: Summary of Surface water/Leachate Tests Undertaken.

Notes:

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. In-situ Testing

3.4.1. 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 at approximately 1m intervals.
- Pocket penetrometer tests (giving undrained shear strength) were performed in the window sample boreholes within cohesive strata.
- Follow on dynamic probes were performed in WS101B to provide continuous equivalent SPTs (strata not determined), once window sampling had been completed.

The results are provided within Appendix B.

3.5. Gas Monitoring

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

A low / moderate 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.

4. Ground Conditions

4.1. Geology

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

The window sample locations (WS101 to WS103) were undertaken in the northern part of the building where ground level is recorded as road level. The hand dug trial pits (HD101 to HD103) were undertaken in the southern part of the building, where ground level is in line with the River Medlock, one storey lower level than the road.

4.1.1. Made Ground

Concrete was present at the surface of all sample locations to a maximum depth of 0.25mbgl.

At locations WS101A and WS101B, made ground was recorded to a maximum depth of 4.00mbgl. At all other locations, made ground was recorded to a depths of between 0.57-1.60mbgl. The made ground comprised horizons of gravel, sand, silt, clay with anthropogenic material including ash, clinker and brick.

4.1.2. Natural Strata

Superficial strata comprised horizons of soft to firm clay, interbedded with horizons of loose to medium dense, becoming dense with depth, variably gravelly sand. A horizon of sandy gravelly silt was encountered from 3.00mbgl within WS102.

Weathered sandstone bedrock was encountered from 5.30-5.80mbgl.

4.1.3. Contamination

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

There was no visual / olfactory evidence of hydrocarbons or volatile contaminants in any locations. The PID recorded a maximum of 0.7ppm TVOC in the samples.

4.1.4. Obstructions

The following obstructions were encountered:

- WS101A: SPT refusal within the made ground at 3.37mbgl. WS101B was undertaken approximately 1.00m to the north east.
- HD103A: metal pipe encountered at 0.30mbgl. HD103B was undertaken approximately 1.00m to the west.

4.2. Groundwater

4.2.1. Groundwater Levels

Groundwater strikes were recorded during the investigation in the hand dug trial pits and boreholes. No groundwater strikes were recorded in any of the boreholes. This data is provided in the profile logs (Appendix B).

Groundwater monitoring within the borehole wells has been undertaken on one occasion. An oil-water interface probe was used to detect the presence of free phase

hydrocarbons within each borehole. No groundwater was encountered in any of the borehole wells.

4.2.2. Contamination

No evidence of contamination was identified in the groundwater during investigation work or monitoring. No free phase hydrocarbons were detected.

5. Geotechnical Assessment

5.1. Proposed Development

It is understood that the proposed development will comprise student accommodation / residential apartments with associated infrastructure. The proposed structure will comprise 34 storeys.

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

The depths of any underground engineering works (sewers etc.) are unknown and therefore have not been considered in the following assessment. Any such works should be designed so as not to influence, or compromise, proposed or existing foundations or ground stability.

It is anticipated that some enabling works including demolition of the existing structures will be required to create a level developable platform.

Given the nature of the proposed development the structure meets the criteria of Geotechnical Category 2 of Eurocode 7¹⁰.

5.2. Summary of Ground Conditions

Ground conditions identified at the site are detailed in Section 4.1, and typically comprises made ground up to a proven depth of 4.00mbgl (from road level) (WS101B) over natural granular and cohesive superficial deposits of sand, gravel and clay to c. 5.30-5.80mbgl (from road level) whereupon weathered Sandstone bedrock was encountered within WS102 and WS103 respectively.

5.3. Site Preparation

The site should be cleared with existing structures demolished and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works¹¹. This should include:

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

Near surface soils may require some treatment or reinforcing to allow safe movement of construction plant and labour. A working platform will be required for piling plant.

5.4. Foundation Conditions and Bearing Capacity

5.4.1. General

Details of the proposed structure have not been supplied but it is envisaged that the development will comprise multi storey student accommodation. Depth to bedrock is relatively shallow (less than 6mbgl) (from road level) and it is considered that a piled foundation solution will likely be utilised to support the structure.

5.4.2. Plasticity

Clay samples were selected for Atterberg Limits (plasticity) and Moisture Content testing. Results are presented in Appendix D.

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%) returned values between 20% and 24% indicative of a Clay of medium plasticity and volume change potential.

5.4.3. Piled Foundations

Bored piles are recommended due to the shallow depth to sandstone along with the presence of infrastructure and historic buildings in the local area that could be affected by vibrations. Arisings from bored piles will have to be disposed of and should be subject to waste classification testing for off-site disposal.

It is recommended that the present hard standing and made ground is first removed down to at least 0.30mbgl and replaced with a suitably compacted material to allow safe deployment of piling rigs. Any obstructions, such as old foundations, should be grubbed out at the same time to not interfere with the bored piles, or pre-bored in advance of the piles being installed. It is recommended that the emplaced fill is of a granular type and is tested and rolled in line with Specification For Highways Works Series 600¹². Plate Load and CBR Tests should be used to ensure the working platform is suitable for rig loadings. It may be possible to crush and reuse hardstanding, or excavate the existing made ground, riddle, and sort it to remove any unsuitable deleterious materials.

Static load tests should be undertaken on the first few piles installed to confirm the pile design.

Dynamic load tests may also be recommended to ensure the concrete has cured well and that there is no bulging or thinning of the pile shaft once it has been drilled.

Warranty providers such as the NHBC or Premier Guarantee will require further information on ground conditions to a minimum of 5m below the base of the pile.

5.5. Concrete Durability

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

5.6. Excavations

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

Groundwater was not encountered in any of the exploratory holes. Generally trial pits were stable.

5.7. Further Works

During this phase of the investigation, buildings and structures still present on site restricted the areas which could be investigated and the exploratory techniques which could be used.

Post demolition of the buildings it is recommended and that further investigation by rotary coring techniques is undertaken to establish the strength and Rock Quality Designation (RQD) of the existing Sandstone and to recover core for subsequent laboratory testing to include Unconfined Compressive Strength (UCS) and Point Load tests.

5.8. Enabling Works

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

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

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

6. Generic Risk Assessment

6.1. Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM¹³). 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) ^{14, 15}.
- LQM Suitable 4 Use Levels (S4ULs) ^{16, 17, 18, 19}.

The proposed development is for a non-standard land use of student accommodation and public open space/ public realm with the building comprising basement level plant rooms, refuse areas, cycle bays and amenity space.

POS_{resi} generic assessment criteria is considered the most appropriate for all direct contact routes. As an initial screen, the use of POS_{resi} is considered suitably conservative on account of the annual and daily exposure time and age categories of site users. Furthermore, the proposed landscaping shows the majority of shared open space comprising decking (or similar) with only small areas of soft landscaping associated with tree pits and raised planters, etc.

As volatiles are not modelled in POS_{resi}, LKC will use the residential without plant uptake assessment criteria as a very conservative initial screen for volatile analysis.

All criteria have been generated using the CLEA V1.06 model²⁰ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

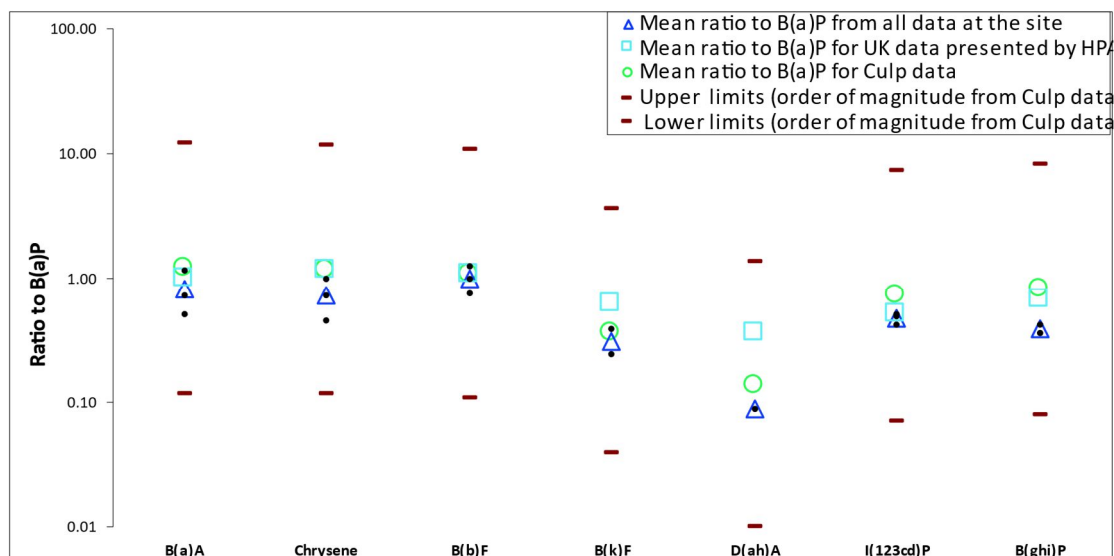
A summary of the generic assessment criteria used in this assessment is provided in Appendix F.

B(a)P as Surrogate Marker

LKC consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the PAHs^{21,22} and naphthalene the most volatile and soluble²³. The C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, if it falls within appropriate limits, since the risk from other non-carcinogenic PAHs are considered negligible²⁴. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)²⁵ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

LKC undertook an assessment of the PAH data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*²⁶, 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 5 samples (where values were >LOD to allow the calculation of a ratio).

Notes:

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

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

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

6.2.2. Soil Results Comparison against Assessment Criteria

All analysis sheets are presented in Appendix C.

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

No asbestos was identified in any soil samples analysed.

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 Agency²⁷ technical report should be calculated for the samples. As no significant concentrations of petroleum hydrocarbons were identified in any of the soil samples this has not been undertaken.

6.2.4. Direct Contact Risk – Pollutant Linkage 1

No elevated levels of PAHs, metals or petroleum hydrocarbons have been identified on site and no asbestos was detected in any of the samples analysed.

The probability of PAH, metal and petroleum hydrocarbon contamination affecting site users is unlikely. With a medium consequence, the risk is considered to be low and no remediation is recommended.

No asbestos was identified in any of the samples; therefore, the probability of asbestos affected site users is considered to be unlikely. With a severe consequence, the risk is moderate / low. At this stage, a low risk is assumed (as no asbestos identified) and remediation is not required. However, as a precaution, construction workers should be and vigilant for any suspected ACM during groundworks (discussed further in Section 8.2).

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. Confirmatory soil analysis did not detect any naphthalene or volatile fraction TPH above assessment criteria.

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.

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 only if a significant depth of organic / putrescible material was identified.

No organic / putrescible material was encountered on site. Made ground comprised between approximately 0.57 to 4.00m of made ground with an average depth of 1.61m comprising reworked natural ground frequent brick and occasional to rare ash, clinker and coal. The depth of made ground within the proposed building footprint is 0.57m to >1.20mbgl.

NHBC 2023²⁸ document discusses that Made Ground soils are not inherently a source of hazardous gas and that substantial portions of putrescible materials such as vegetation, food waste, paper, cardboard and wood would be required to be a viable source of gas. No significant proportions of putrescible materials were recorded across site.

The Hotspur Press building has been present on site since c.1900s. NHBC 2023 discusses how the age of infilling affects the risk posed from hazardous gasses. The NHBC suggests that pre-1960's landfills typically contained non-degradable materials and are unlikely to pose a significant risk. Moreover, over time the volume of a source reduces and the rate of gas emission and potential for emissions falls. It is likely that any gas generation from the infilling will have initially been low (due to the likely nature of the infilling) and have since significantly declined (due to the age of the infilling)

Furthermore, BS8576²⁹ Figure 6 describes *“made ground with low degradable organic content (e.g. up to 5% organic materials such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste) and natural soil strata with a low degradable organic content, e.g. alluvium, peat”* as *“very low generation potential”*.

There is no evidence of such material within the borehole logs on site.

Furthermore, the basement level is proposed to be primarily plant rooms, refuse areas, cycle bays and amenity space, it is like that it will be well ventilated with minimal enclosed confined spaces and no regular occupation by residents.

Given the ground conditions encountered and the proposed building plans, LKC considers the probability of gas posing a risk to site users as unlikely. The consequence is severe, which gives a moderate / 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 River Medlock and the Principal Aquifer as the primary receptors.

LKC have compared the surface water and leaching test 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 Standards³⁰ and updated Water Framework Directive³¹ for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2016 private water supply standards (UKDWS potable)³².
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)³³.
- Resource Protection Values (RPVs)³⁴.

With regards to hydrocarbon mixtures (TPHCWG) for UKDWS, LKC will use the CL:AIRE guidance on petroleum hydrocarbons in groundwater³⁵ based on WHO guidelines.

The leaching test is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This may cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants³⁶ such as B(a)P, it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable concentrations³⁷. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood³⁸.

No elevated contaminants were identified in any leaching test sample.

A marginal exceedance was identified for total chromium in the surface water sample (SW101, 9µg/l) when compared to the assessment criteria of 4.7 µg/l for Chromium III and 3.4 µg/l for Chromium VI.

The leachate data does not indicate any leachable concentrations of Chromium are present within made ground on site.

Given the River Medlock has a River Quality 'E' classification and is situated in an urban environment, LKC consider this marginal exceedance is unlikely to have a significant impact on the River Medlock.

Based on the data available to date, LKC considers the probability of contaminants on site affecting the River Medlock and Principal Aquifer as unlikely. Given the medium

consequence, a low risk is anticipated (Pollutant Linkage 4) and no remediation is required.

6.5. Potable Water Supply (Pollutant Linkage 5)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed.

At this stage, no elevated contaminants were identified when compared to UU assessment criteria.

The probability of organic contaminants affecting potable water pipes is unlikely. Given the consequence is considered to be moderate, the risk (Pollutant Linkage 5) is anticipated to be low risk and no remediation is likely to be required.

Once details of the pipeline location and depths are known a UU Water Pipe Risk Assessment in line with the utility provider should be undertaken to confirm the most appropriate pipework for potable water.

6.6. Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-3) has been revised following the risk assessments undertaken in Sections 6.1-6.4. 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 1.

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

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

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Recommendations
1	Asbestos, metals, PAHs, petroleum hydrocarbons, inorganic and organic contaminants (made ground, cotton mill, printing works).	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust. Windblown dust.	Future site users.	Unlikely	Medium	Low	No remediation recommended
2	Naphthalene, petroleum hydrocarbons, solvents (made ground, cotton mill, printing works, gas works).	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users.	Unlikely	Medium	Low	No remediation recommended
3	Hazardous / ground gas: methane, carbon dioxide (potentially infilled features 250m of the site).	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings.	Unlikely	Severe	Moderate / Low	No remediation recommended
4	Metals, PAHs, petroleum hydrocarbons, volatile compounds (made ground, cotton mill, printing works).	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater Surface water	Unlikely	Medium	Low	No remediation recommended
5	Naphthalene, petroleum hydrocarbons, other organic contaminants (made ground, cotton mill, printing works).	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Unlikely	Medium	Low	No remediation recommended

Table 6-1: Revised Contamination Conceptual Model.

7. Waste Disposal Assessment

7.1. HazWaste Assessment

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

As an initial screen the soil results were inputted into HazWasteOnline™. This is a web-based facility that allows an assessment waste as either hazardous or non-hazardous waste based on relevant guidance and legislation.

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

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

Where applicable, contaminants were selected based on observations during sampling, site history, ground conditions and likely species present in soils (e.g., metal oxides relating to an ash-based source).

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

8. Conclusions

8.1. Ground Conditions

Ground conditions are summarised in Table 8-1 below.

Made Ground	Concrete present to 0.25mbgl. Made ground comprising gravel, sand silt and clay present to 4.00mbgl in WS101 and to a maximum depth of 1.60mbgl at all other locations. Anthropogenic material included ash, clinker and brick.
Superficial	Soft to firm clay interbedded with loose to medium dense gravelly sand.
Bedrock	Weathered sandstone present at 5.30-5.80mbgl.
Groundwater	No groundwater was noted during the site investigation or during the water monitoring visit.
Obstructions	Refusal within made ground at 3.37mbgl in WS101A. Metal pipe encountered at 0.30mbgl in HD103A.

Table 8-1: Summary of Ground Conditions.

8.2. Geotechnical

Geotechnical observations and conclusions are contained in Table 8-2 below, more detailed discussions are contained within Section 5.

Anticipated Foundation Type	It is understood that the proposed development will comprise a multi-storey student/residential apartment block. Sandstone bedrock was recorded at depths of between 5.30m and 5.80mbgl and it is considered that a bored pile solution will provide the most suitable foundation option.
Shallow Groundwater	Not encountered during the course of this investigation.
Concrete Requirements	Based on BRE Digest 2005 ³⁹ – DS-3 AC-3 recommended.
Services	Services – consideration to the presence of services running through the site. Services may need to be re-routed.
Temporary Support of Excavation	May be required; however, trial pits were generally recorded as stable.
Further Works	Post demolition of the existing buildings and structures occupying the site, further investigation should be undertaken to assist in foundation design and should include as a minimum, rotary cored boreholes to recover core samples for logging to obtain the RQD of the material along with subsequent laboratory testing to establish the UCS of the recovered rock core.

Table 8-2: Geotechnical Conclusions Table.

8.3. Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 8-3 below (more detailed model provided in Section 6).

PL	Contaminant	Risk	Recommendations
1	Asbestos Metals PAHs Petroleum hydrocarbons Inorganic / inorganic contaminants	Low	No remediation required.
2	Naphthalene Other volatile contaminants	Low	No remediation required.
3	Carbon dioxide Methane	Moderate / Low	No remediation required.
4	Groundwater Surface Water (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	UU risk assessment to be completed. Unlikely to require barrier piping.

Table 8-3: Summary Risk Table.

PL=Pollutant Linkage, see Table 6-1 for details.

8.4. Waste Assessment

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

9. Recommendations and Remediation Strategy

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

The local authority may require a standalone Build-Phase Remediation Strategy and Verification Plan in accordance with LCRM Stage 3 remediation and verification⁴⁰. This should be produced once details of design, contractors and installation are known.

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

PL	Recommendation
1	No remediation required.
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Table 9-1: Remediation Summary.

9.1. Remediation and Validation Recommendations

9.1.1. Potable Water Pipe Remediation (PL5)

It is recommended that a Water Pipeline Assessment⁴¹ is undertaken once the location and depth of potable water pipes are known. It is unlikely that barrier pipe will be required.

Validation of pipeline installation should include delivery notes of pipe materials, photographs of installed pipe and confirmation of connections.

9.2. Other Considerations

9.2.1. Unexpected Contamination

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

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

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

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

9.2.2. Decommissioning of Boreholes

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

All borehole and borehole installation decommissioning is to be undertaken in accordance with current EA guidelines⁴².

9.2.3. Grubbing Out of In-ground Structures

Surface hard standing and relict features including former foundations and current foundation can be expected across the site wide. It is recommended that in-ground structures are grubbed out as part of the groundworks.

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

9.2.4. Re-use of Site Generated Material

To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used⁴³):

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

A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice⁴⁴ may be required if volumes exceed exemption limits. This must be registered before material movement starts onsite.

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

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

9.2.5. Stockpile Management

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

9.2.6. Disposal

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

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

9.2.7. Control of Water

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

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

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

9.2.8. Health and Safety Considerations

In working with, removing, or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance⁴⁵) should be adopted by all workers involved with site enabling and construction works.

9.2.9. Piling in Contaminated Land

If a piled foundation is being considered this may provide a preferential pathway for contaminants to the underlying aquifer. A piling risk assessment may be required. Good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency⁴⁶.

9.3. Validation of Imported / Site Won Soils

Chemical validation of all imported and site-won soils to be used on site in soft landscaping 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 9-3, based on MCC 'Guidelines to Developer' (2021)⁴⁷. LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

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

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

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

Notes:

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

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

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

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

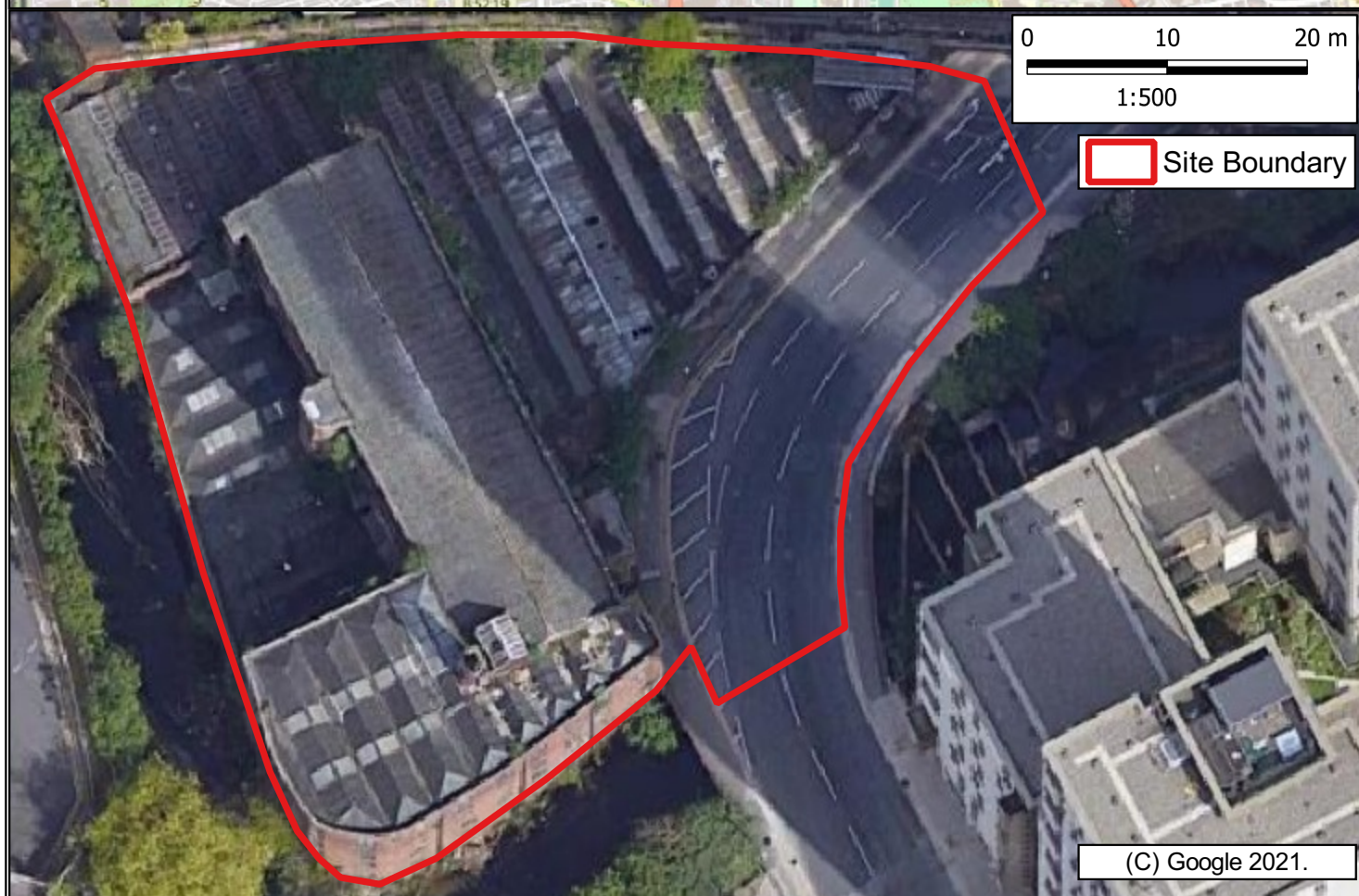
In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882⁴⁸). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in soft landscaping will be compared against POS_{resi} criteria (as used in the contamination risk assessment in Section 6).

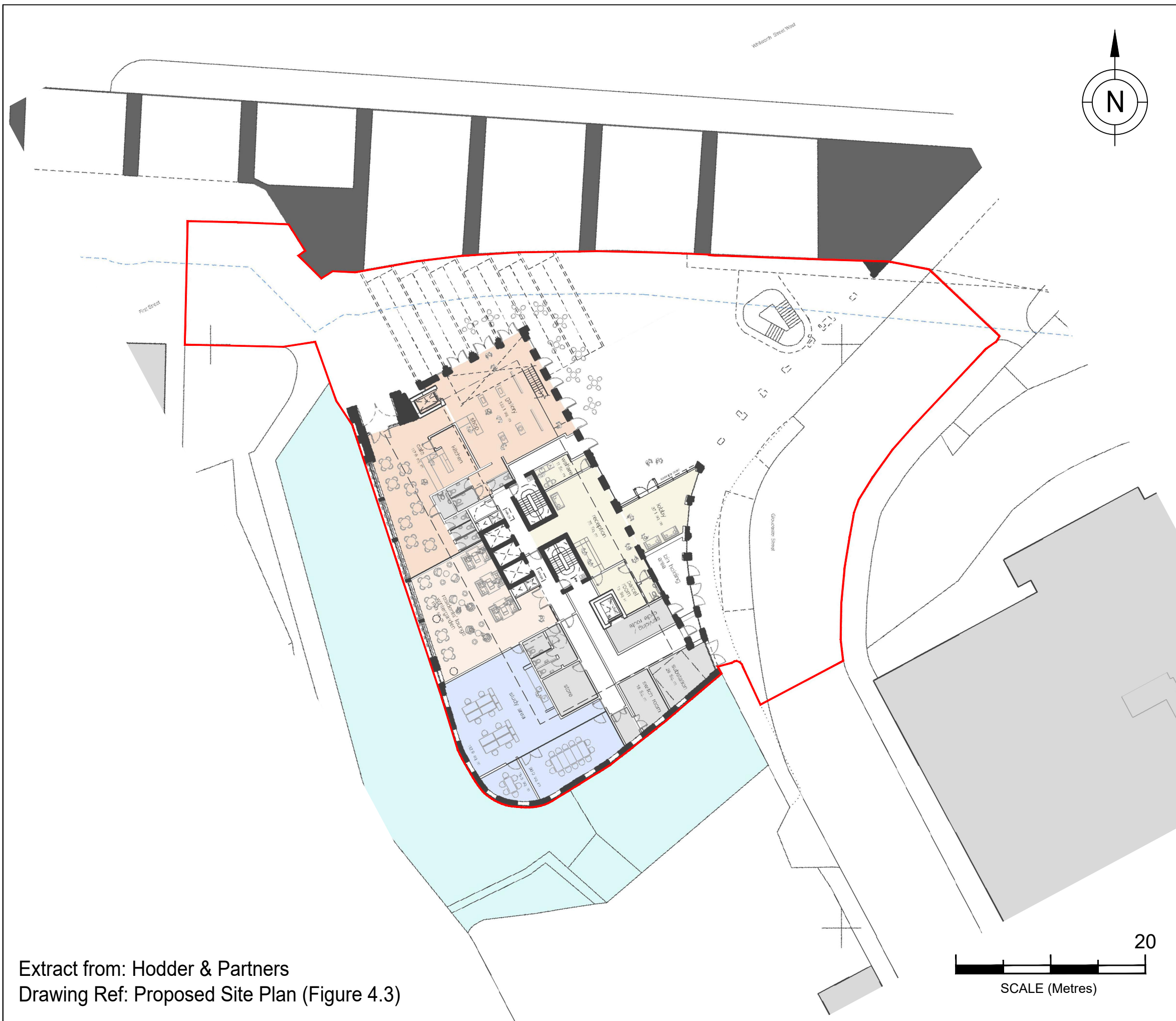
9.4. Site Completion Report

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

Figures



Client: Manner				Title: Site Location & Boundary Plan		
Site: Hotspur Press, Manchester				Scale (see scale bar): 1:25,000 & 1:500 @ A4		
Job No.: LKC 23 1466	Drawn By: RP	Checked By: PD	Drawn: Sept 2023	Figure: 1	Revision:	



KEY

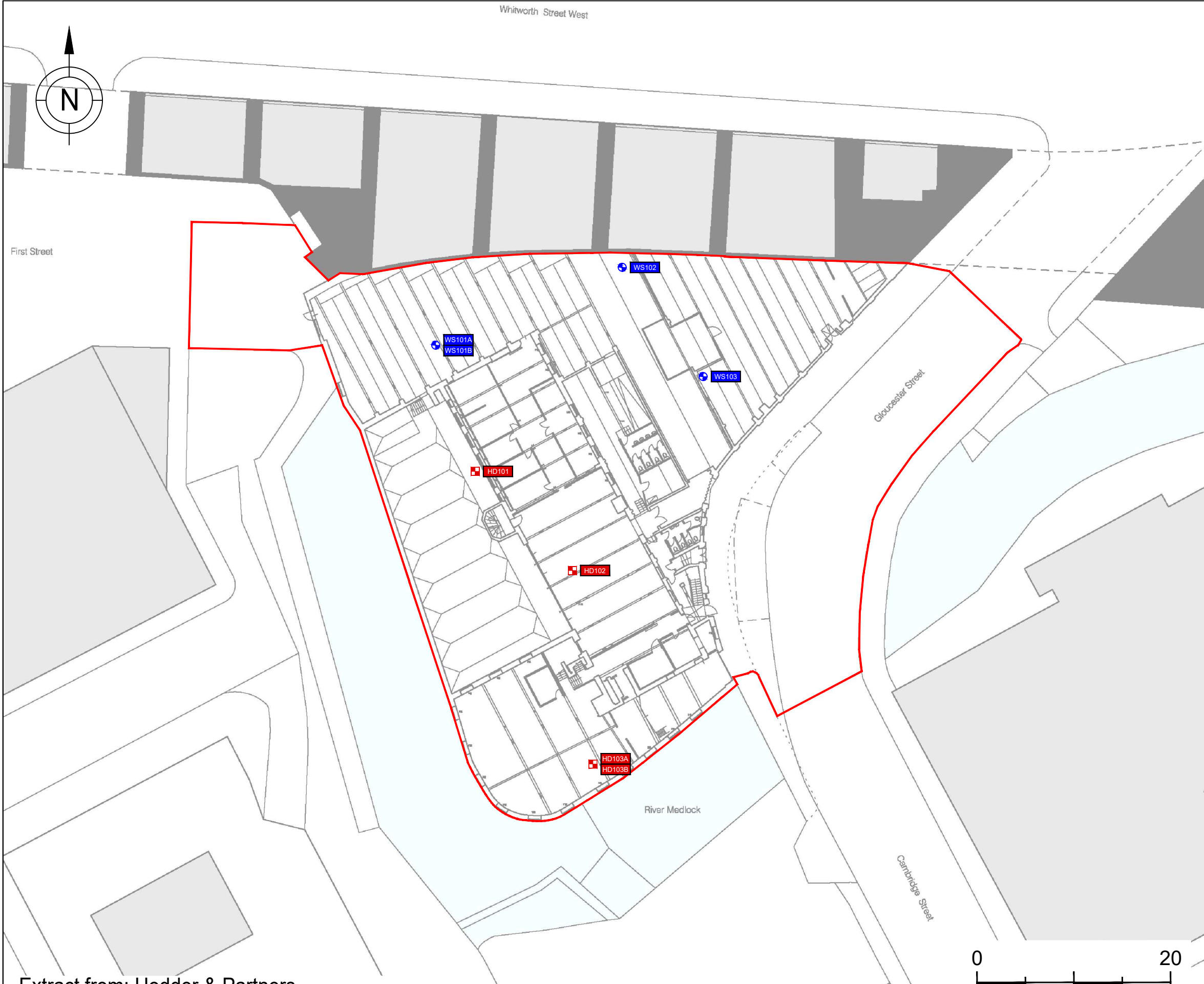
 Site Boundary

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



Client:			
Manner			
Site:			
Hotspur Press, Manchester			
Title:			
Proposed Site Plan			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 23 1466	See Scale Bar	2	
Drawn By:	Checked By:	Date:	
AC	RP	Sep 2023	

Extract from: Hodder & Partners
Drawing Ref: Proposed Site Plan (Figure 4.3)



KEY

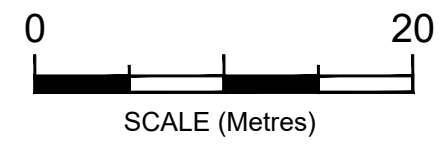
- Site Boundary
- Window Sample Borehole (WS)
- Hand Dug Trial Pit (HD)

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



Client:		Manner	
Site:		Hotspur Press, Manchester	
Title:		Site Investigation Location Plan	
Job No.:	LKC 23 1466	Scale (See Scale Bar):	See Scale Bar
Drawn By:	AC	Checked By:	RP
Figure:		Revision:	
3		Sep 2023	

Extract from: Hodder & Partners
Drawing Ref: Existing Site Plan (Figure 4.1)



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 552⁴⁹. It involves the classification of the:

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

Consequence (Severity)		
Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to 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.

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

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

Table C: Comparison of Consequence against Probability.

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

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

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

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

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

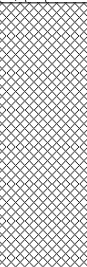
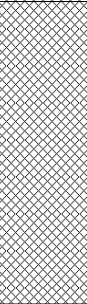
Where there is a moderate/low risk identified, an assessment will be undertaken to establish what category the pollutant linkage will fall into.

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

Appendix B – Profile Logs

Trial Pit Log

Project: Hotspur Press, Manchester		Client: Manner		Date: 19/09/2023	
Project No. : LKC 23 1466		Contractor: D&I Drilling		Equipment:	
Location Number HD101	Location Type TP	Level	Logged By JW	Scale 1:10	Page Number Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)
0.25 - 0.60	PID=0.0ppm ES	0.25		CONCRETE and BRICK.	
				MADE GROUND: Dark brown very gravelly sandy SILT with frequent brick fragments, occasional clinker and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.	0.5
0.60 - 1.00	PID=0.0ppm ES	0.60		MADE GROUND: Dark grey sandy silty GRAVEL with abundant ash and clinker and occasional coal fragments.	
		1.00		End of Trial Pit at 1.00m	1.0
					1.5
					2.0



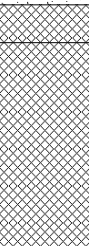
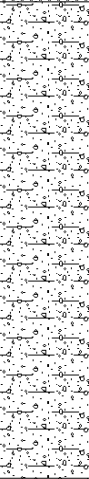
Pit Dimensions			Pit Stability
Length (m)	Width (m)	Depth (m)	Stable
0.30	0.30	1.00	

Remarks:

Hand excavated trial pit dry and stable.
Refusal on brick. Possible flooring.

Trial Pit Log

Project: Hotspur Press, Manchester		Client: Manner		Date: 19/09/2023	
Project No. : LKC 23 1466		Contractor: D&I Drilling		Equipment:	
Location Number HD102	Location Type TP	Level	Logged By JW	Scale 1:10	Page Number Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description		Level (m)
0.30 - 0.50	PID=0.7ppm ES	0.25		CONCRETE. No rebar. Moderate condition.		0.5
		0.30		MADE GROUND: Brick flooring.		
0.60 - 1.20 0.60 - 1.20	PID=0.1ppm D ES	0.57		MADE GROUND: Dark brown very gravelly sandy SILT with occasional brick fragments, rare whole bricks clinker and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.		1.0
		1.20		Brown slightly gravelly silty SAND with occasional clay inclusions. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.		
				End of Trial Pit at 1.20m		1.5
						2.0



Pit Dimensions			Pit Stability
Length (m)	Width (m)	Depth (m)	Stable
0.30	0.30	1.20	

Remarks:

Hand excavated trial pit dry and stable.

Trial Pit Log

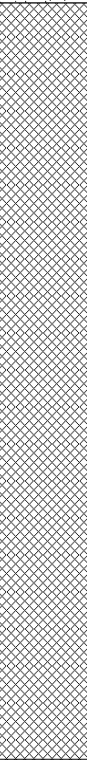
Project: Hotspur Press, Manchester		Client: Manner		Date: 19/09/2023	
Project No. : LKC 23 1466		Contractor: D&I Drilling		Equipment:	
Location Number HD103A	Location Type TP	Level	Logged By JW	Scale 1:10	Page Number Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)
				CONCRETE. No rebar. Moderate condition.	
		0.20			
		0.30		MADE GROUND: Dark brown very gravelly sandy SILT with occasional brick fragments, whole bricks, rare clinker and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.	
				End of Trial Pit at 0.30m	
					0.5
					1.0
					1.5
					2.0

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Trial Pit Log

Project: Hotspur Press, Manchester		Client: Manner		Date: 19/09/2023	
Project No. : LKC 23 1466		Contractor: D&I Drilling		Equipment:	
Location Number HD103B	Location Type TP	Level	Logged By JW	Scale 1:10	Page Number Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)
0.20 - 1.20	PID=0.0ppm ES	0.20		CONCRETE. No rebar. Moderate condition.	
				MADE GROUND: Dark brown very gravelly sandy SILT with occasional brick fragments, whole bricks, rare clinker and ash. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.	0.5 1.0 1.5 2.0
		1.20		End of Trial Pit at 1.20m	



Pit Dimensions			Pit Stability
Length (m)	Width (m)	Depth (m)	Stable
0.30	0.30	1.20	

Remarks:
Hand excavated trial pit dry and stable.

Window Sample Borehole Log

Project Name: Hotspur Press, Manchester		Client: Manner		Date: 18/09/2023	
		Contractor: D&I Drilling			
Project No. : LKC 23 1466					
Borehole Number WS101A	Hole Type WS	Level	Logged By JW	Scale 1:40	Page Number Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)
		0.19		CONCRETE. No rebar. Moderate condition.	
1.20	N=5 (1,1/1,2,1,1)			MADE GROUND: Dark brown sandy silty GRAVEL with frequent brick fragments, occasional clay inclusions, ash, clinker and rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.	1
2.00	N=5 (1,1/1,0,2,2)				2
3.00	50 (25 for 115mm/50 for 180mm)				3
		3.37		End of Borehole at 3.37m	4
					5
					6
					7
					8

Remarks:
 Borehole dry and stable.
 SPT refusal at 3.37mbgl.

Window Sample Borehole Log

Project Name: Hotspur Press,
Manchester

Client: Manner

Date: 18/09/2023

Contractor: D&I Drilling

Project No. : LKC 23 1466

Borehole Number
WS101B

Hole Type
WS

Level

Logged By
JW

Scale
1:40

Page Number
Sheet 1 of 1

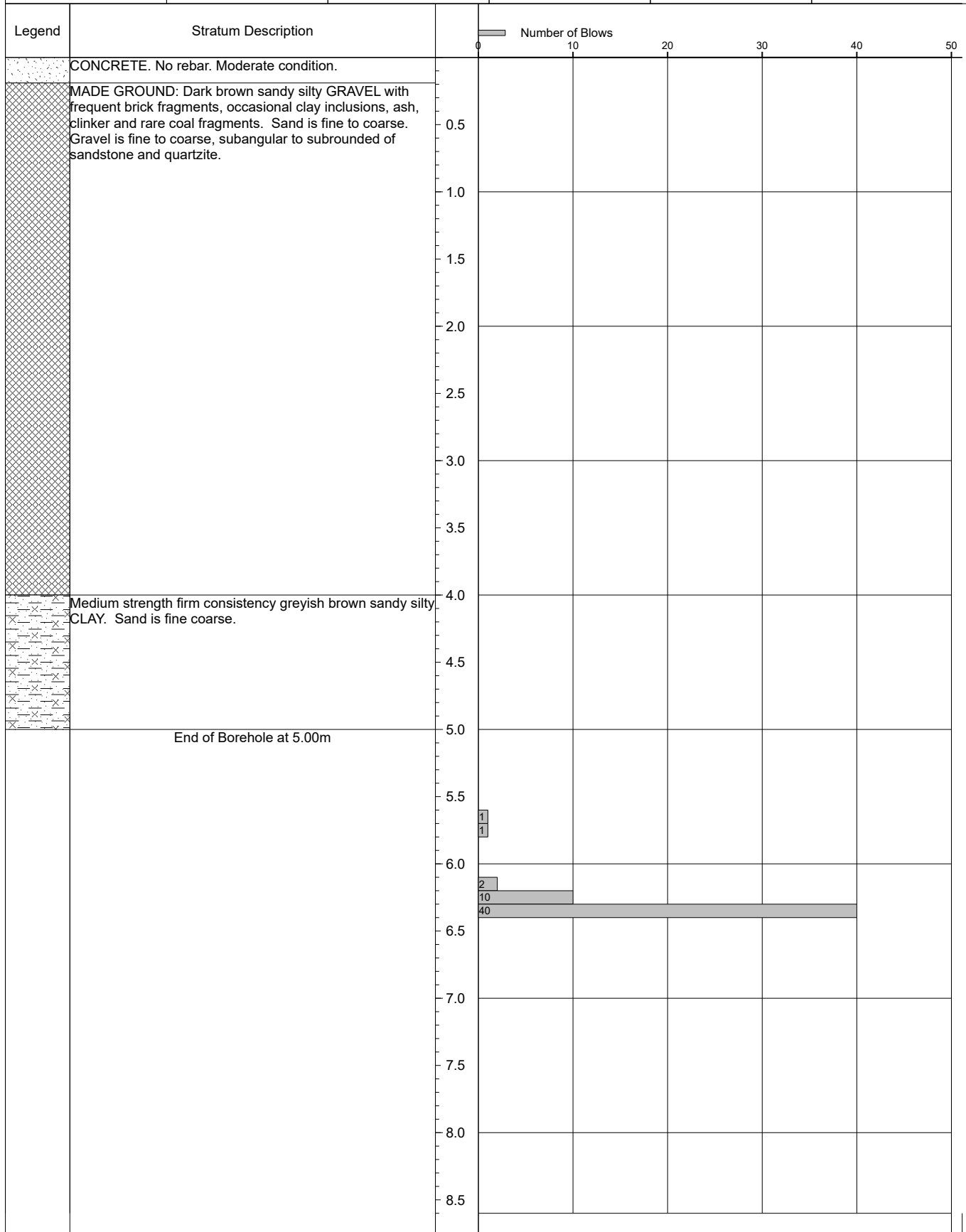
Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)	Well
0.20 - 1.00	PID=0.0ppm ES	0.19		CONCRETE. No rebar. Moderate condition.		
1.20	N=6 (1,1/2,1,1,2)			MADE GROUND: Dark brown sandy silty GRAVEL with frequent brick fragments, occasional clay inclusions, ash, clinker and rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.	1	
1.50 - 2.00	PID=0.0ppm ES					
2.00	N=5 (1,1/0,1,1,3)				2	
2.50 - 3.00	PID=0.0ppm ES					
3.00	N=13 (3,2/3,3,3,4)				3	
3.50 - 4.00	PID=0.0ppm ES					
4.00 4.00	N=6 (4,3/2,1,1,2) D	4.00		Medium strength firm consistency greyish brown sandy silty CLAY. Sand is fine coarse.	4	
4.50 - 5.00	PID=0.0ppm ES					
4.80	PP=44.0kPa	5.00		End of Borehole at 5.00m	5	
					6	
					7	
					8	

Remarks:

Borehole dry and stable.
Dynamic probing undertaken from 5.00mbgl.

Dynamic Probe Test Log

Project Name: Hotspur Press, Manchester		Client: Manner		Date: 18/09/2023	
Project No. : LKC 23 1466		Contractor: D&I Drilling			
Borehole Number WS101B	Hole Type WS	Level	Logged By JW	Scale 1:40	Page Number Sheet 1 of 1



Remarks

Dynamic probe refusal at 6.35mbgl.

Window Sample Borehole Log

Project Name: Hotspur Press,
Manchester

Client: Manner

Date: 18/09/2023

Contractor: D&I Drilling

Project No. : LKC 23 1466

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS102	WS		JW	1:40	Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)	Well
		0.19		CONCRETE. No rebar. Moderate condition.		
0.50 - 1.00	PID=0.0ppm ES			MADE GROUND: Brown very sandy silty GRAVEL with occasional brick fragments, clinker, ash and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.	1	
1.20	N=4 (1,1/1,0,1,2)					
1.70 - 2.00	PID=0.0ppm B	1.60		Brown slightly gravelly silty SAND with occasional clay inclusions. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.	2	
1.70 - 3.00	ES					
2.00	N=5 (1,1/1,1,1,2)					
3.00	N=6 (2,1/1,2,1,2)	3.00		Medium strength firm consistency brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded comprising sandstone and quartzite.	3	
3.50 - 4.00	D					
4.00	N=8 (2,2/2,2,2,2)				4	
4.50 - 4.70	D	4.20		Brown slightly gravelly silty SAND with occasional clay inclusions. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite.		
4.80	PP=44.0kPa					
5.00	30 (10,10/30 for 200mm)	4.95		Brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.	5	
		5.30		Red SANDSTONE.		
		5.43		End of Borehole at 5.42m		
					6	
					7	
					8	

Remarks:

Borehole dry and stable.
SPT refusal at 5.425mbgl.

Window Sample Borehole Log

Project Name: Hotspur Press,
Manchester

Client: Manner

Date: 19/09/2023

Contractor: D&I Drilling

Project No. : LKC 23 1466

Borehole Number
WS103

Hole Type
WS

Level

Logged By
JW

Scale
1:40

Page Number
Sheet 1 of 1

Depth	Samples / Tests	Depth (m)	Legend	Stratum Description	Level (m)	Well
0.50 - 1.00	PID=0.0ppm ES	0.17		CONCRETE. No rebar. Moderate condition.		
1.20	N=3 (1,1/1,1,0,1)	1.30		MADE GROUND: Dark brown very gravelly sandy SILT with occasional brick fragments, ash and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and quartzite.	1	
1.70 - 2.00	PID=0.0ppm ES			Loose brown slightly gravelly silty SAND with occasional clay inclusions. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of sandstone and quartzite. Frequent clay inclusions below 2.50mbgl.	2	
2.00 - 5.00 2.00	N=4 (1,0/1,1,1,1) B				3	
3.00	N=8 (1,2/2,2,1,3)				4	
4.00	N=6 (2,2/1,2,2,1)				5	
5.00	N=24 (8,5/5,8,5,6)	5.00		Medium strength firm consistency brown slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded comprising sandstone and quartzite.	6	
5.50 - 5.80	D					
5.80	PP=49.0kPa	5.80		Red weathered SANDSTONE recovered as sand.		
5.80	50 (25 for 115mm/50 for 100mm)	6.02		End of Borehole at 6.02m		
					7	
					8	

Remarks:

Borehole dry and stable.
SPT refusal at 6.015mbgl.

Appendix C – Certificates of Analysis (Soil and Leaching Tests)



Peter Dunn
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-11863

Site Reference: Hotspur Press, Manchester

Project / Job Ref: LKC 23 1466

Order No: None Supplied

Sample Receipt Date: 21/09/2023

Sample Scheduled Date: 21/09/2023

Report Issue Number: 1

Reporting Date: 28/09/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23	18/09/23	18/09/23	18/09/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS101B	WS101B	WS102	WS103
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00	4.50 - 5.00	0.20 - 1.20	0.50 - 1.00
Reporting Date: 28/09/2023	DETS Sample No	676038	676039	676040	676041	676042

Determinand	Unit	RL	Accreditation				
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.6		7.3	7.3
Total Cyanide	mg/kg	< 1	NONE	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	1440		600	421
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	1.44		0.60	0.42
Organic Matter (SOM)	%	< 0.1	MCERTS	7.3			6.1
W/S Chloride (2:1)	mg/kg	< 1	MCERTS			35	
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS			17.3	
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS			41	
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS			20.6	
Arsenic (As)	mg/kg	< 2	MCERTS	17			13
W/S Boron	mg/kg	< 1	NONE	1.1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2			< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	12			12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			< 2
Copper (Cu)	mg/kg	< 4	MCERTS	112			78
Lead (Pb)	mg/kg	< 3	MCERTS	342			98
W/S Magnesium	mg/l	< 0.1	NONE			19	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	14			17
Selenium (Se)	mg/kg	< 2	MCERTS	< 2			< 2
Vanadium (V)	mg/kg	< 1	MCERTS	24			21
Zinc (Zn)	mg/kg	< 3	MCERTS	77			46
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			

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

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



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Soil Analysis Certificate						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23	18/09/23	18/09/23	18/09/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Hotspur Press, Manchester	TP / BH No	HD101	HD102	HD102	WS102B	WS102B
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.60 - 1.00	0.30 - 0.50	0.60 - 1.20	0.20 - 1.00	0.20 - 1.00
Reporting Date: 28/09/2023	DETS Sample No	676043	676044	676045	676046	676047

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected		Not Detected
pH	pH Units	N/a	MCERTS	7.6	10.7	8.2	7.8
Total Cyanide	mg/kg	< 1	NONE				< 1
Free Cyanide	mg/kg	< 1	NONE				< 1
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	580	212	187	571
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.58	0.21	0.19	0.57
Organic Matter (SOM)	%	< 0.1	MCERTS	22.6	5.6		4.4
W/S Chloride (2:1)	mg/kg	< 1	MCERTS			113	
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS			56.6	
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS			114	
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS			57.2	
Arsenic (As)	mg/kg	< 2	MCERTS	27	9		39
W/S Boron	mg/kg	< 1	NONE				< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.5	15.9		0.6
Chromium (Cr)	mg/kg	< 2	MCERTS	15	13		15
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS	164	58		150
Lead (Pb)	mg/kg	< 3	MCERTS	172	319		414
W/S Magnesium	mg/l	< 0.1	NONE			4.2	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	41	13		17
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2		< 2
Vanadium (V)	mg/kg	< 1	MCERTS	59	20		28
Zinc (Zn)	mg/kg	< 3	MCERTS	89	1060		316
Total Phenols (monohydric)	mg/kg	< 2	NONE				< 2

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



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23	18/09/23	18/09/23	18/09/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS102	WS103	HD101	HD102
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.20	0.50 - 1.00	0.60 - 1.00	0.30 - 0.50
Reporting Date: 28/09/2023	DETS Sample No	676038	676041	676042	676043	676044

Determinand	Unit	RL	Accreditation	(n)		(n)
Naphthalene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.82	< 0.1	0.21
Anthracene	mg/kg	< 0.1	MCERTS	0.18	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	1.74	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	1.97	< 0.1	0.13
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.10	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	1.07	< 0.1	0.13
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.48	< 0.1	0.15
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.57	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.47	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.74	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.13	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.53	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	12	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-11863	Date Sampled	18/09/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Hotspur Press, Manchester	TP / BH No	WS102B				
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied				
Order No: None Supplied	Depth (m)	0.20 - 1.00				
Reporting Date: 28/09/2023	DETS Sample No	676046				

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	0.49				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	0.36				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	0.42				
Pyrene	mg/kg	< 0.1	MCERTS	0.48				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.39				
Chrysene	mg/kg	< 0.1	MCERTS	0.34				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.56				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.18				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.74				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.39				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.32				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.7				



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23	18/09/23	18/09/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS101B	WS102B	WS102B
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00	0.20 - 1.00	0.20 - 1.00
Reporting Date: 28/09/2023	DETS Sample No	676038	676039	676046	676047

Determinand	Unit	RL	Accreditation	(n)			
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01		< 0.01	
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05		< 0.05	
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2		< 2	
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2		< 2	
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3		< 3	
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3		< 3	
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10		< 10	
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10		< 10	
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21		< 21	
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01		< 0.01	
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05		< 0.05	
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2		< 2	
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2		2	
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	4		4	
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	14		6	
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	42		15	
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10		< 10	
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	60		28	
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	60		< 42	

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS102B			
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00			
Reporting Date: 28/09/2023	DETS Sample No	676038	676046			

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

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Leachate Analysis Certificate						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23	18/09/23	18/09/23	
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS101B	WS102B	WS102B	
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00	0.20 - 1.00	0.20 - 1.00	
Reporting Date: 28/09/2023	DETS Sample No	676038	676039	676046	676047	

Determinand	Unit	RL	Accreditation	(n)			
pH	pH Units	N/a	ISO17025		7.3		7.5
Total Cyanide	ug/l	< 5	ISO17025		< 5		< 5
Free Cyanide	ug/l	< 5	ISO17025		< 5		< 5
Sulphate as SO ₄	mg/l	< 1	ISO17025		308		36
Dissolved Organic Carbon (DOC)	mg/l	< 1.0	ISO17025		5.9		8.2
Hardness - Total	mgCaCO ₃ /l	< 1	NONE		411		107
Arsenic	ug/l	< 5	ISO17025		< 5		8
Boron	ug/l	< 5	ISO17025		83		61
Cadmium	ug/l	< 0.4	ISO17025		< 0.4		< 0.4
Chromium	ug/l	< 5	ISO17025		< 5		< 5
Chromium (hexavalent)	ug/l	< 20	NONE		< 20		< 20
Copper	ug/l	< 5	ISO17025		< 5		< 5
Lead	ug/l	< 5	ISO17025		< 5		< 5
Mercury	ug/l	< 0.05	ISO17025		< 0.05		< 0.05
Nickel	ug/l	< 5	ISO17025		< 5		< 5
Selenium	ug/l	< 5	ISO17025		< 5		< 5
Vanadium	ug/l	< 5	ISO17025		< 5		< 5
Zinc	ug/l	< 2	ISO17025		10		7
Calcium	mg/l	< 0.2	ISO17025		142		32.2
Total Phenols (monohydric)	ug/l	< 10	ISO17025		< 10		< 10

Subcontracted analysis ⁽⁵⁾

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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS102B			
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00			
Reporting Date: 28/09/2023	DETS Sample No	676039	676047			

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	0.08	< 0.01		
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Phenanthrene	ug/l	< 0.01	NONE	0.02	< 0.01		
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Fluoranthene	ug/l	< 0.01	NONE	0.06	< 0.01		
Pyrene	ug/l	< 0.01	NONE	0.06	< 0.01		
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008		
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.22	< 0.16		



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Leachate Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS102B			
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00			
Reporting Date: 28/09/2023	DETS Sample No	676039	676047			

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS 1D MS AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C6 - C8 : HS 1D MS AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C8 - C10 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C10 - C12 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C12 - C16 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C16 - C21 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C21 - C34 : EH CU 1D AL	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C5 - C7 : HS 1D MS AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C7 - C8 : HS 1D MS AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C8 - C10 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C10 - C12 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C12 - C16 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C16 - C21 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C21 - C35 : EH CU 1D AR	ug/l	< 10	NONE	< 10	< 10			



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Leachate Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-11863	Date Sampled	18/09/23	18/09/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Hotspur Press, Manchester	TP / BH No	WS101B	WS102B			
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20 - 1.00	0.20 - 1.00			
Reporting Date: 28/09/2023	DETS Sample No	676039	676047			

Determinand	Unit	RL	Accreditation				
Benzene : HS 1D MS	ug/l	< 1	ISO17025	< 1	< 1		
Toluene : HS 1D MS	ug/l	< 5	ISO17025	< 5	< 5		
Ethylbenzene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5		
p & m-xylene : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10		
o-xylene : HS 1D MS	ug/l	< 5	ISO17025	< 5	< 5		
MTBE : HS 1D MS	ug/l	< 10	ISO17025	< 10	< 10		



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-11863	
LK Consult Limited	
Site Reference: Hotspur Press, Manchester	
Project / Job Ref: LKC 23 1466	
Order No: None Supplied	
Reporting Date: 28/09/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
676038	WS101B	None Supplied	0.20 - 1.00	13	Brown sandy clay with stones and concrete
676040	WS101B	None Supplied	4.50 - 5.00	17.2	Brown sandy clay
676041	WS102	None Supplied	0.20 - 1.20	16	Brown sandy clay with stones and concrete
676042	WS103	None Supplied	0.50 - 1.00	14.2	Brown sandy clay with brick
676043	HD101	None Supplied	0.60 - 1.00	14.4	Black sandy gravel with stones and concrete
676044	HD102	None Supplied	0.30 - 0.50	6.5	Brown sandy gravel with stones and concrete
676045	HD102	None Supplied	0.60 - 1.20	12.3	Brown sandy clay with stones
676046	WS102B	None Supplied	0.20 - 1.00	14.7	Brown sandy gravel with stones and concrete

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

Insufficient Sample ^{1/5}

Unsuitable Sample ^{u/s}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-11863

LK Consult Limited

Site Reference: Hotspur Press, Manchester

Project / Job Ref: LKC 23 1466

Order No: None Supplied

Reporting Date: 28/09/2023

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

D Dried
AR As Received



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



4480

Water Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-11863	
LK Consult Limited	
Site Reference: Hotspur Press, Manchester	
Project / Job Ref: LKC 23 1466	
Order No: None Supplied	
Reporting Date: 28/09/2023	

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

Key

F Filtered
UF Unfiltered



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List of HWOL Acronyms and Operators
DETS Report No: 23-11863
LK Consult Limited
Site Reference: Hotspur Press, Manchester
Project / Job Ref: LKC 23 1466
Order No: None Supplied
Reporting Date: 28/09/2023

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

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

Appendix D – Certificates of Analysis (Geotechnical)

TEST REPORT

Client LK Consult Ltd

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

Contract LKC 23 1466 -
Hotspur Press, Manchester

Job Number MRN 4606/110
Date of Issue 04 October 2023
Page 1 of 5

Approved Signatories

S J Hutchings, O P Davies

Notes

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



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

Also at: London: 020 8523 1999

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

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

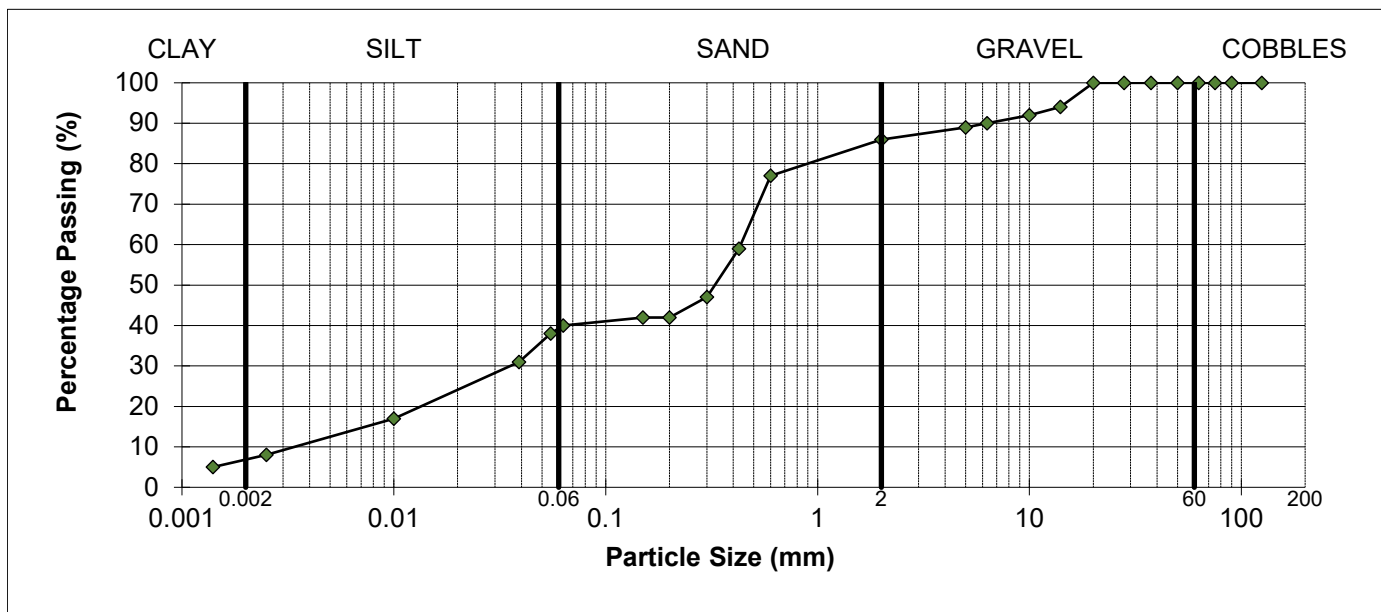
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 23 1466 - Hotspur Press, Manchester
JOB NUMBER	MRN 4606/110

SAMPLE LABEL	WS102 1.7-3m	DATE SAMPLED	18/19-Sep-23
LAB SAMPLE No	131657	DATE RECEIVED	26-Sep-23
DATE TESTED	27-Sep-23	SAMPLED BY	Client

MATERIAL	Brown clay bound silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	86	
90	100		0.6	77	
75	100		0.425	59	
63	100		0.3	47	
50	100		0.2	42	
37.5	100		0.15	42	
28	100		0.063	40	
20	100		0.055	38	
14	94		0.039	31	
10	92		0.01	17	
6.3	90		0.0025	8	
5	89		0.0014	5	



REMARKS

As received water content = 15.0%

SIGNED

NAME

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

DATE

04-Oct-23

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

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

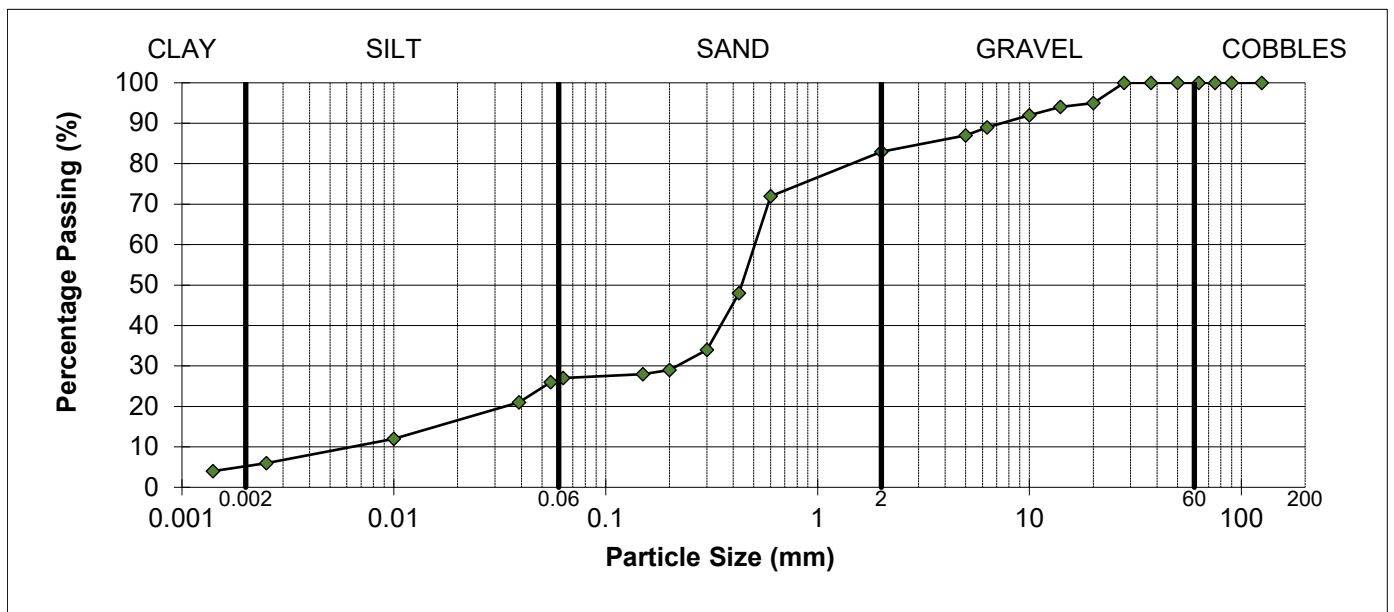
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	LK Consult Ltd
SITE	LKC 23 1466 - Hotspur Press, Manchester
JOB NUMBER	MRN 4606/110

SAMPLE LABEL	WS103 2-5m	DATE SAMPLED	18/19-Sep-23
LAB SAMPLE No	131659	DATE RECEIVED	26-Sep-23
DATE TESTED	27-Sep-23	SAMPLED BY	Client

MATERIAL	Brown clay bound silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	83	
90	100		0.6	72	
75	100		0.425	48	
63	100		0.3	34	
50	100		0.2	29	
37.5	100		0.15	28	
28	100		0.063	27	
20	95		0.055	26	
14	94		0.039	21	
10	92		0.01	12	
6.3	89		0.0025	6	
5	87		0.0014	4	



REMARKS

As received water content = 12.9%

SIGNED

NAME

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

DATE

04-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
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TEST CERTIFICATE

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

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

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

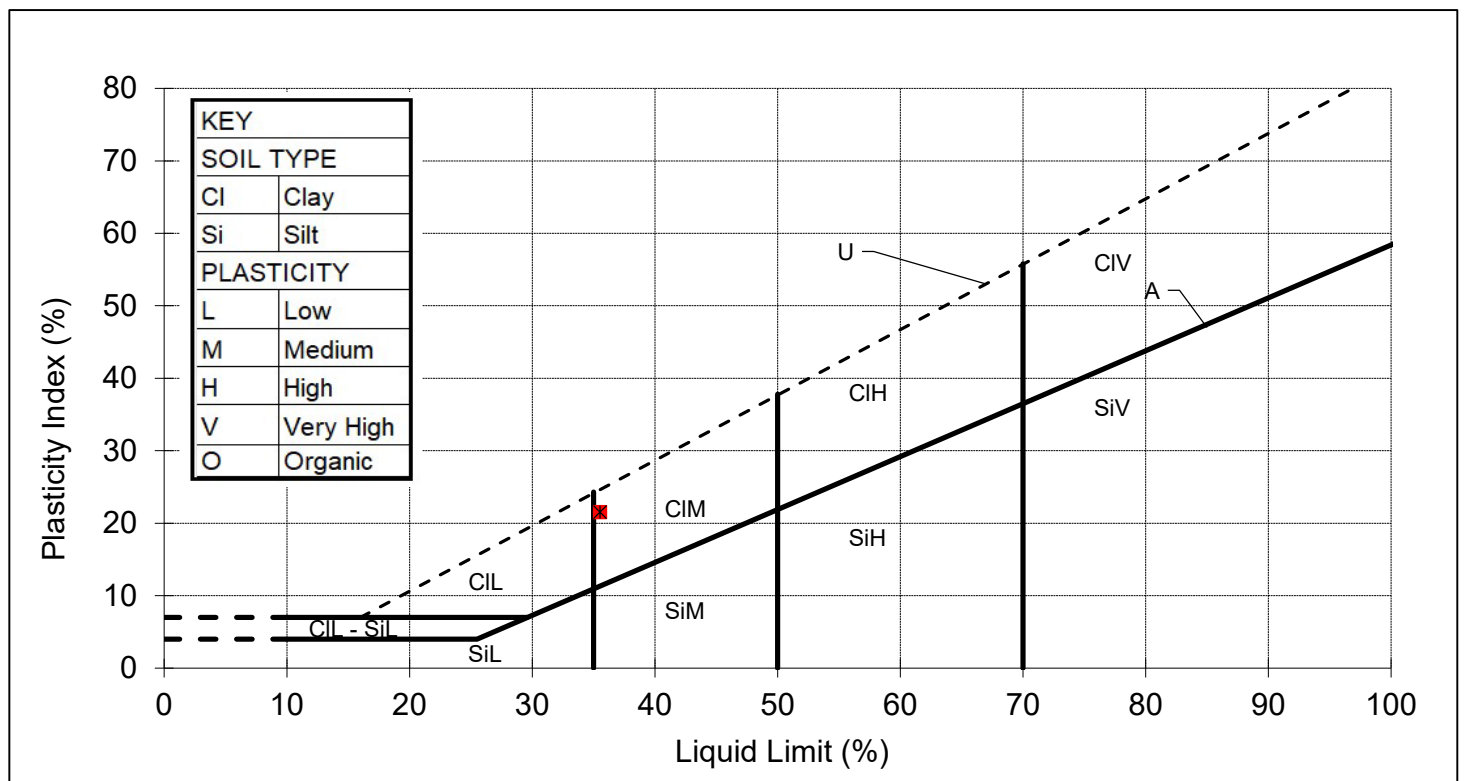
CLIENT	LK Consult Ltd
SITE	LKC 23 1466 - Hotspur Press, Manchester
JOB NUMBER	MRN 4606/110

SAMPLE LABEL	WS101B 4m	DATE SAMPLED	18/19-Sep-23
SAMPLE No.	131656	DATE RECEIVED	26-Sep-23
DATE TESTED	27-Sep-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	16.8	33.8	1.042	
Determination 2 (avg)	17.2	34.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.3	36	14	22	92



REMARKS

SIGNED

NAME

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

DATE

04-Oct-23

MURRAY RIX

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



TEST CERTIFICATE

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

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

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

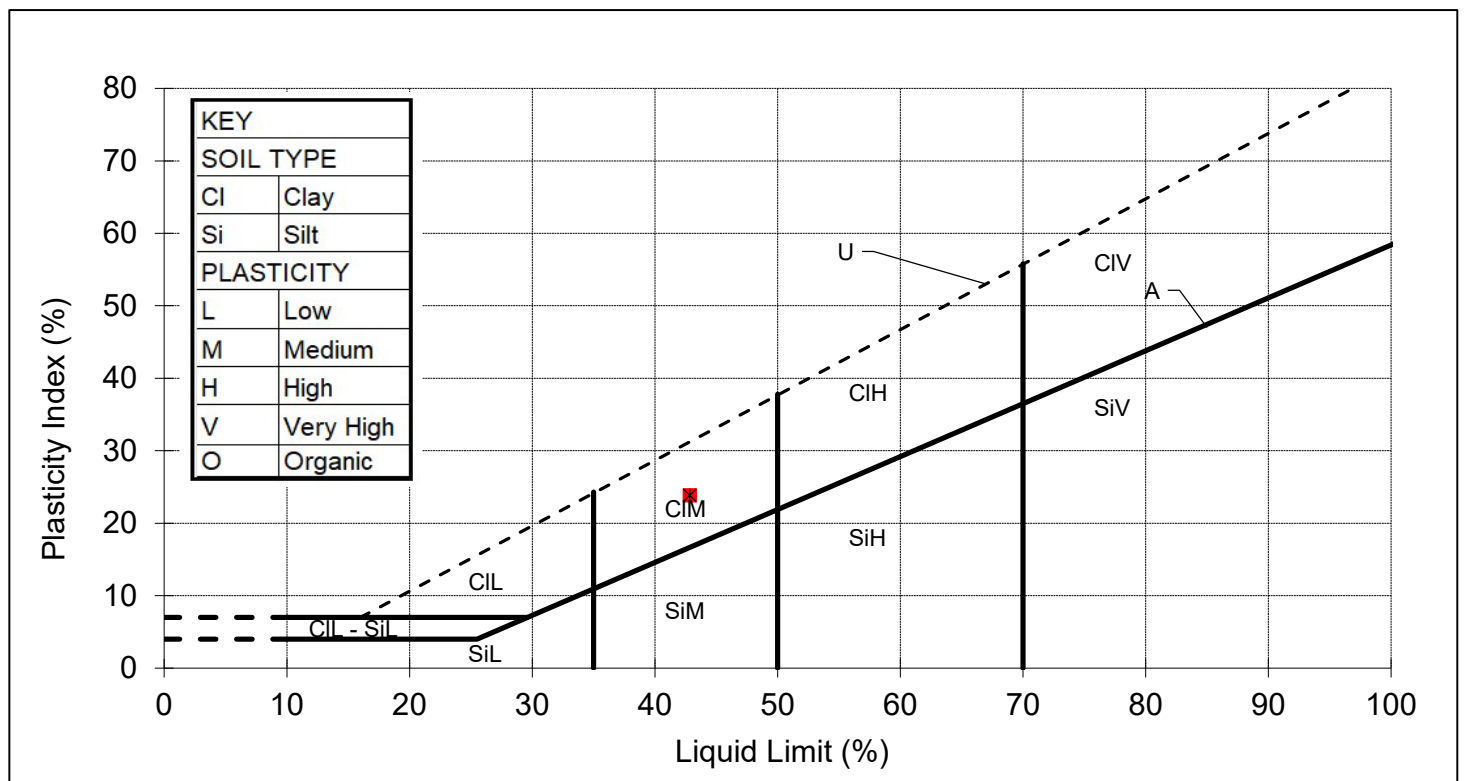
CLIENT	LK Consult Ltd
SITE	LKC 23 1466 - Hotspur Press, Manchester
JOB NUMBER	MRN 4606/110

SAMPLE LABEL	WS102 3.5-4m	DATE SAMPLED	18/19-Sep-23
SAMPLE No.	131658	DATE RECEIVED	26-Sep-23
DATE TESTED	27-Sep-23	SAMPLED BY	Client

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

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.4	41.8	1.021	
Determination 2 (avg)	19.1	42.1		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
27.6	43	19	24	98



REMARKS

SIGNED

NAME

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

DATE

04-Oct-23

Appendix E – Certificates of Analysis (Surface Water)



Peter Dunn
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

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

DETS Report No: 23-12131

Site Reference: Hotspur Press, Manchester

Project / Job Ref: LKC 23 1466

Order No: LKC231466-PD

Sample Receipt Date: 28/09/2023

Sample Scheduled Date: 28/09/2023

Report Issue Number: 1

Reporting Date: 03/10/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Water Analysis Certificate						
DETS Report No: 23-12131	Date Sampled	27/09/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Hotspur Press, Manchester	TP / BH No	SW101				
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied				
Order No: LKC231466-PD	Depth (m)	None Supplied				
Reporting Date: 03/10/2023	DETS Sample No	677278				

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	8.0			
Total Cyanide	ug/l	< 5	ISO17025	< 5			
Free Cyanide	ug/l	< 5	ISO17025	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	49			
Dissolved Organic Carbon (DOC)	mg/l	<1.0	ISO17025	15.7			
Hardness - Total	mgCaCO ₃ /l	< 1	NONE	195			
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5			
Boron (dissolved)	ug/l	< 5	ISO17025	80			
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4			
Chromium (dissolved)	ug/l	< 5	ISO17025	9			
Chromium (hexavalent)	ug/l	< 20	NONE	< 20			
Copper (dissolved)	ug/l	< 5	ISO17025	< 5			
Lead (dissolved)	ug/l	< 5	ISO17025	< 5			
Mercury (dissolved)	ug/l	< 0.05	ISO17025	0.06			
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5			
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5			
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5			
Zinc (dissolved)	ug/l	< 2	ISO17025	26			
Calcium (dissolved)	mg/l	< 0.2	ISO17025	60.2			
Total Phenols (monohydric)	ug/l	< 10	ISO17025	< 10			

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



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

Water Analysis Certificate - Speciated PAH						
DETS Report No: 23-12131	Date Sampled	27/09/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Hotspur Press, Manchester	TP / BH No	SW101				
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied				
Order No: LKC231466-PD	Depth (m)	None Supplied				
Reporting Date: 03/10/2023	DETS Sample No	677278				

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	0.46			
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01			
Acenaphthene	ug/l	< 0.01	NONE	0.03			
Fluorene	ug/l	< 0.01	NONE	0.02			
Phenanthrene	ug/l	< 0.01	NONE	0.05			
Anthracene	ug/l	< 0.01	NONE	0.01			
Fluoranthene	ug/l	< 0.01	NONE	0.03			
Pyrene	ug/l	< 0.01	NONE	0.03			
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01			
Chrysene	ug/l	< 0.01	NONE	< 0.01			
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01			
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01			
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01			
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008			
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.63			



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Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-12131	Date Sampled	27/09/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Hotspur Press, Manchester	TP / BH No	SW101				
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied				
Order No: LKC231466-PD	Depth (m)	None Supplied				
Reporting Date: 03/10/2023	DETS Sample No	677278				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C6 - C8 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C8 - C10 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C10 - C12 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C12 - C16 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C16 - C21 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C21 - C34 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10			
Aliphatic >C34 - C44	ug/l	< 10	NONE	< 10			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	ug/l	< 70	NONE	< 70			
Aromatic >C5 - C7 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10			
Aromatic >C7 - C8 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10			
Aromatic >C8 - C10 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10			
Aromatic >C10 - C12 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10			
Aromatic >C12 - C16 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10			
Aromatic >C16 - C21 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10			
Aromatic >C21 - C35 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10			
Aromatic >C35 - C44	ug/l	< 10	NONE	< 10			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	ug/l	< 70	NONE	< 70			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	ug/l	< 140	NONE	< 140			



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Water Analysis Certificate - BTEX / MTBE

DETS Report No: 23-12131	Date Sampled	27/09/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Hotspur Press, Manchester	TP / BH No	SW101				
Project / Job Ref: LKC 23 1466	Additional Refs	None Supplied				
Order No: LKC231466-PD	Depth (m)	None Supplied				
Reporting Date: 03/10/2023	DETS Sample No	677278				

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



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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-12131

LK Consult Limited

Site Reference: Hotspur Press, Manchester

Project / Job Ref: LKC 23 1466

Order No: LKC231466-PD

Reporting Date: 03/10/2023

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

Key

F Filtered
UF Unfiltered



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List of HWOL Acronyms and Operators

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

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

Appendix F – Generic Assessment Criteria Values

CATEGORY 4 SCREENING LEVELS

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

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

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

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

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

NOTES

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

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

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

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

NOTES

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

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

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

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

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

NOTES

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

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

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

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

NOTES

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

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

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

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

NOTES

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

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

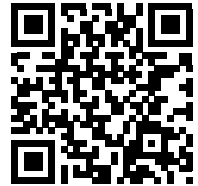
^g = derived based on 2,3,4,6-tetrachlorophenol.

Appendix G – HazWaste Online Classification Reports

Waste Classification Report

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

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



5MAWW-2BEGO-3SH90

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

Job name

LKC 23 1466

Description/Comments

Project

LKC 23 1466

Site

Hotspur Press

Classified by

Name: **Peter Dunn**
 Date: **28 Sep 2023 13:54 GMT**
 Telephone: **0161 763 7200**
 Company: **LK Group**

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification
 Most recent 3 year Refresher

Date

26 Mar 2015 *
 02 Aug 2022

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

Purpose of classification

2 - Material Characterisation

Address of the waste

Hotspur Press, Gloucester Street, Manchester

Post Code **M1 5QR**

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development of brownfield land

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

Construction

Description of the waste

made ground and soil

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101B-0.20 - 1.00-18/09/2023	0.20 - 1.00	Non Hazardous		3
2	WS101B-4.50 - 5.00-18/09/2023	4.50 - 5.00	Non Hazardous		6
3	WS102-0.20 - 1.20-18/09/2023	0.20 - 1.20	Non Hazardous		7
4	WS103-0.50 - 1.00-18/09/2023	0.50 - 1.00	Non Hazardous		9
5	HD101-0.60 - 1.00-18/09/2023	0.60 - 1.00	Non Hazardous		11
6	HD102-0.30 - 0.50-18/09/2023	0.30 - 0.50	Non Hazardous		13
7	HD102-0.60 - 1.20-18/09/2023	0.60 - 1.20	Non Hazardous		15
8	HD103-0.20 - 1.00-18/09/2023	0.20 - 1.00	Non Hazardous		16

Related documents

#	Name	Description
1	23-11863.1.hwol	DETS South .hwol file used to populate the Job
2	LK SUITE 1 - 5	waste stream template used to create this Job

Report

Created by: Peter Dunn

Created date: 28 Sep 2023 13:54 GMT

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

Classification of sample: WS101B-0.20 - 1.00-18/09/2023

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

Sample details

Sample name:	LoW Code:	
WS101B-0.20 - 1.00-18/09/2023	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.20 - 1.00 m		
Moisture content:		
13%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				17 mg/kg	1.32	19.528 mg/kg	0.00195 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.199 mg/kg	0.0000199 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				12 mg/kg	1.462	15.259 mg/kg	0.00153 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				112 mg/kg	1.126	109.707 mg/kg	0.011 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				14 mg/kg	1.273	15.5 mg/kg	0.00155 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	342 mg/kg		297.54 mg/kg	0.0298 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				24 mg/kg	1.785	37.275 mg/kg	0.00373 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				77 mg/kg	1.245	83.383 mg/kg	0.00834 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				1.1 mg/kg	3.22	3.081 mg/kg	0.000308 %	✓	
	005-008-00-8	215-125-8	1303-86-2							
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
15	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
16	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
17	xylene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
18	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
19	pH		PH		7.6 pH		7.6 pH	7.6 pH			
20	naphthalene				0.17 mg/kg		0.148 mg/kg	0.0000148 %	✓		
	601-052-00-2	202-049-5	91-20-3								
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-917-1	208-96-8								
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-469-6	83-32-9								
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-695-5	86-73-7								
24	phenanthrene				0.82 mg/kg		0.713 mg/kg	0.0000713 %	✓		
		201-581-5	85-01-8								
25	anthracene				0.18 mg/kg		0.157 mg/kg	0.0000157 %	✓		
		204-371-1	120-12-7								
26	fluoranthene				1.74 mg/kg		1.514 mg/kg	0.000151 %	✓		
		205-912-4	206-44-0								
27	pyrene				1.97 mg/kg		1.714 mg/kg	0.000171 %	✓		
		204-927-3	129-00-0								
28	benzo[a]anthracene				1.1 mg/kg		0.957 mg/kg	0.0000957 %	✓		
	601-033-00-9	200-280-6	56-55-3								
29	chrysene				1.07 mg/kg		0.931 mg/kg	0.0000931 %	✓		
	601-048-00-0	205-923-4	218-01-9								
30	benzo[b]fluoranthene				1.48 mg/kg		1.288 mg/kg	0.000129 %	✓		
	601-034-00-4	205-911-9	205-99-2								
31	benzo[k]fluoranthene				0.57 mg/kg		0.496 mg/kg	0.0000496 %	✓		
	601-036-00-5	205-916-6	207-08-9								
32	benzo[a]pyrene; benzo[def]chrysene				1.47 mg/kg		1.279 mg/kg	0.000128 %	✓		
	601-032-00-3	200-028-5	50-32-8								
33	indeno[123-cd]pyrene				0.74 mg/kg		0.644 mg/kg	0.0000644 %	✓		
		205-893-2	193-39-5								
34	dibenz[a,h]anthracene				0.13 mg/kg		0.113 mg/kg	0.0000113 %	✓		
	601-041-00-2	200-181-8	53-70-3								
35	benzo[ghi]perylene				0.53 mg/kg		0.461 mg/kg	0.0000461 %	✓		
		205-883-8	191-24-2								
36	monohydric phenols		P1186		<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
Total:									0.0604 %		

Key

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

Classification of sample: WS101B-4.50 - 5.00-18/09/2023



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

Sample details

Sample name:	LoW Code:	
WS101B-4.50 - 5.00-18/09/2023	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
4.50 - 5.00 m		
Moisture content:		
17.2%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 17.2% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH PH				7.3 pH		7.3 pH	7.3 pH		
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS102-0.20 - 1.20-18/09/2023

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

Sample details

Sample name:	LoW Code:
WS102-0.20 - 1.20-18/09/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 - 1.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16%	
(wet weight correction)	

Hazard properties

None identified

Determinands

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

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }			13	mg/kg	1.32	14.418	mg/kg	0.00144 %	✓	
		033-003-00-0	215-481-4	1327-53-3								
2		cadmium { cadmium oxide }			<0.2	mg/kg	1.142	<0.228	mg/kg	<0.0000228 %		<LOD
		048-002-00-0	215-146-2	1306-19-0								
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }			12	mg/kg	1.462	14.732	mg/kg	0.00147 %	✓	
			215-160-9	1308-38-9								
4		copper { dicopper oxide; copper (I) oxide }			78	mg/kg	1.126	73.768	mg/kg	0.00738 %	✓	
		029-002-00-X	215-270-7	1317-39-1								
5		mercury { mercury dichloride }			<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7								
6		nickel { nickel(II) oxide (nickel monoxide) }			17	mg/kg	1.273	18.173	mg/kg	0.00182 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			98	mg/kg		82.32	mg/kg	0.00823 %	✓	
		082-001-00-6										
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }			<2	mg/kg	1.405	<2.81	mg/kg	<0.000281 %		<LOD
		034-002-00-8										
9		vanadium { divanadium pentaoxide; vanadium pentoxide }			21	mg/kg	1.785	31.491	mg/kg	0.00315 %	✓	
		023-001-00-8	215-239-8	1314-62-1								
10		zinc { zinc oxide }			46	mg/kg	1.245	48.096	mg/kg	0.00481 %	✓	
		030-013-00-7	215-222-5	1314-13-2								
11		chromium in chromium(VI) compounds { chromium(VI) oxide }			<2	mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
		024-001-00-0	215-607-8	1333-82-0								
12		pH			7.5	pH		7.5	pH	7.5 pH		
				PH								
13		naphthalene			<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	• pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0293 %		

Key

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

Classification of sample: WS103-0.50 - 1.00-18/09/2023

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

Sample details

Sample name:	LoW Code:
WS103-0.50 - 1.00-18/09/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14.2%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14.2% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				22 mg/kg	1.32	24.922 mg/kg	0.00249 %	✓		
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %			<LOD
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10 mg/kg	1.462	12.54 mg/kg	0.00125 %	✓		
		215-160-9	1308-38-9								
4	copper { dicopper oxide; copper (I) oxide }				99 mg/kg	1.126	95.635 mg/kg	0.00956 %	✓		
	029-002-00-X	215-270-7	1317-39-1								
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel(II) oxide (nickel monoxide) }				21 mg/kg	1.273	22.93 mg/kg	0.00229 %	✓		
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	86 mg/kg		73.788 mg/kg	0.00738 %	✓		
	082-001-00-6										
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %			<LOD
	034-002-00-8										
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				28 mg/kg	1.785	42.887 mg/kg	0.00429 %	✓		
	023-001-00-8	215-239-8	1314-62-1								
10	zinc { zinc oxide }				41 mg/kg	1.245	43.787 mg/kg	0.00438 %	✓		
	030-013-00-7	215-222-5	1314-13-2								
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	pH				7.3 pH		7.3 pH	7.3 pH			
			PH								
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	● acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	● acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	● fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	● phenanthrene	201-581-5	85-01-8		0.21 mg/kg		0.18 mg/kg	0.000018 %	✓	
18	● anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	● fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	● pyrene	204-927-3	129-00-0		0.13 mg/kg		0.112 mg/kg	0.0000112 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		0.13 mg/kg		0.112 mg/kg	0.0000112 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.15 mg/kg		0.129 mg/kg	0.0000129 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	● indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	● benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0326 %		

Key

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

Classification of sample: HD101-0.60 - 1.00-18/09/2023

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

Sample details

Sample name:	LoW Code:
HD101-0.60 - 1.00-18/09/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.60 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14.4%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				27 mg/kg	1.32	30.515 mg/kg	0.00305 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.5 mg/kg	1.142	0.489 mg/kg	0.0000489 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	18.766 mg/kg	0.00188 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				164 mg/kg	1.126	158.057 mg/kg	0.0158 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				41 mg/kg	1.273	44.663 mg/kg	0.00447 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	172 mg/kg		147.232 mg/kg	0.0147 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				59 mg/kg	1.785	90.159 mg/kg	0.00902 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				89 mg/kg	1.245	94.827 mg/kg	0.00948 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	pH				7.6 pH		7.6 pH	7.6 pH		
			PH							
13	naphthalene				0.15 mg/kg		0.128 mg/kg	0.0000128 %	✓	
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		0.51 mg/kg		0.437 mg/kg	0.0000437 %	✓	
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		0.4 mg/kg		0.342 mg/kg	0.0000342 %	✓	
20	pyrene	204-927-3	129-00-0		0.47 mg/kg		0.402 mg/kg	0.0000402 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.33 mg/kg		0.282 mg/kg	0.0000282 %	✓	
22	chrysene	601-048-00-0	205-923-4		0.28 mg/kg		0.24 mg/kg	0.000024 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.36 mg/kg		0.308 mg/kg	0.0000308 %	✓	
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.28 mg/kg		0.24 mg/kg	0.000024 %	✓	
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.12 mg/kg		0.103 mg/kg	0.0000103 %	✓	
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0596 %		

Key

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

Classification of sample: HD102-0.30 - 0.50-18/09/2023

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

Sample details

Sample name:	LoW Code:
HD102-0.30 - 0.50-18/09/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 - 0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
6.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 6.5% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }			9	mg/kg	1.32	11.111 mg/kg	0.00111 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }			15.9	mg/kg	1.142	16.982 mg/kg	0.0017 %	✓	
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }			13	mg/kg	1.462	17.765 mg/kg	0.00178 %	✓	
			215-160-9	1308-38-9							
4		copper { dicopper oxide; copper (I) oxide }			58	mg/kg	1.126	61.057 mg/kg	0.00611 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		mercury { mercury dichloride }			<1	mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
6		nickel { nickel(II) oxide (nickel monoxide) }			13	mg/kg	1.273	15.468 mg/kg	0.00155 %	✓	
		028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	319	mg/kg	298.265 mg/kg	0.0298 %	✓	
		082-001-00-6									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }			<2	mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
		034-002-00-8									
9		vanadium { divanadium pentaoxide; vanadium pentoxide }			20	mg/kg	1.785	33.383 mg/kg	0.00334 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
10		zinc { zinc oxide }			1060	mg/kg	1.245	1233.636 mg/kg	0.123 %	✓	
		030-013-00-7	215-222-5	1314-13-2							
11		chromium in chromium(VI) compounds { chromium(VI) oxide }			<2	mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
12		pH			10.7	pH		10.7 pH	10.7 pH		
				PH							
13		naphthalene			<0.1	mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	• acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	• acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	• fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	• phenanthrene	201-581-5	85-01-8		0.29 mg/kg		0.271 mg/kg	0.0000271 %	✓	
18	• anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	• fluoranthene	205-912-4	206-44-0		0.42 mg/kg		0.393 mg/kg	0.0000393 %	✓	
20	• pyrene	204-927-3	129-00-0		0.44 mg/kg		0.411 mg/kg	0.0000411 %	✓	
21	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.31 mg/kg		0.29 mg/kg	0.000029 %	✓	
22	chrysene	601-048-00-0	205-923-4	218-01-9	0.45 mg/kg		0.421 mg/kg	0.0000421 %	✓	
23	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	• indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	• benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.17 %		

Key

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

Classification of sample: HD102-0.60 - 1.20-18/09/2023

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

Sample details

Sample name:	LoW Code:	
HD102-0.60 - 1.20-18/09/2023	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.60 - 1.20 m		
Moisture content:		
12.3%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 12.3% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				8.2 pH		8.2 pH	8.2 pH		
			PH							
Total:								0%		

Key

 User supplied data
• Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: HD103-0.20 - 1.00-18/09/2023

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

Sample details

Sample name:	LoW Code:
HD103-0.20 - 1.00-18/09/2023	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 - 1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14.7%	
(wet weight correction)	

Hazard properties

None identified

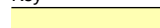
Determinands

Moisture content: 14.7% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				39 mg/kg	1.32	43.923 mg/kg	0.00439 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.6 mg/kg	1.142	0.585 mg/kg	0.0000585 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	18.701 mg/kg	0.00187 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				150 mg/kg	1.126	144.057 mg/kg	0.0144 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	mercury { mercury dichloride }				<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
6	nickel { nickel(II) oxide (nickel monoxide) }				17 mg/kg	1.273	18.454 mg/kg	0.00185 %	✓	
	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	414 mg/kg		353.142 mg/kg	0.0353 %	✓	
	082-001-00-6									
8	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<2 mg/kg	1.405	<2.81 mg/kg	<0.000281 %		<LOD
	034-002-00-8									
9	vanadium { divanadium pentaoxide; vanadium pentoxide }				28 mg/kg	1.785	42.637 mg/kg	0.00426 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
10	zinc { zinc oxide }				316 mg/kg	1.245	335.51 mg/kg	0.0336 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	benzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
15	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
16	ethylbenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
17	xylene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
18	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
19	pH				7.8 pH		7.8 pH	7.8 pH			
20	naphthalene				0.49 mg/kg		0.418 mg/kg	0.0000418 %	✓		
	601-052-00-2	202-049-5	91-20-3								
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		205-917-1	208-96-8								
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-469-6	83-32-9								
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		201-695-5	86-73-7								
24	phenanthrene				0.36 mg/kg		0.307 mg/kg	0.0000307 %	✓		
		201-581-5	85-01-8								
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
		204-371-1	120-12-7								
26	fluoranthene				0.42 mg/kg		0.358 mg/kg	0.0000358 %	✓		
		205-912-4	206-44-0								
27	pyrene				0.48 mg/kg		0.409 mg/kg	0.0000409 %	✓		
		204-927-3	129-00-0								
28	benzo[a]anthracene				0.39 mg/kg		0.333 mg/kg	0.0000333 %	✓		
	601-033-00-9	200-280-6	56-55-3								
29	chrysene				0.34 mg/kg		0.29 mg/kg	0.000029 %	✓		
	601-048-00-0	205-923-4	218-01-9								
30	benzo[b]fluoranthene				0.56 mg/kg		0.478 mg/kg	0.0000478 %	✓		
	601-034-00-4	205-911-9	205-99-2								
31	benzo[k]fluoranthene				0.18 mg/kg		0.154 mg/kg	0.0000154 %	✓		
	601-036-00-5	205-916-6	207-08-9								
32	benzo[a]pyrene; benzo[def]chrysene				0.74 mg/kg		0.631 mg/kg	0.0000631 %	✓		
	601-032-00-3	200-028-5	50-32-8								
33	indeno[123-cd]pyrene				0.39 mg/kg		0.333 mg/kg	0.0000333 %	✓		
		205-893-2	193-39-5								
34	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
35	benzo[ghi]perylene				0.32 mg/kg		0.273 mg/kg	0.0000273 %	✓		
		205-883-8	191-24-2								
36	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
Total:									0.0977 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

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

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

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

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

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

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

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

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

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

Reason for additional Hazards Statement(s):

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

Substance has therefore been self-classified.

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

Substance has therefore been self-classified.

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

Substance has therefore been self-classified.

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

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

• pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 £ conc. < 3 % , Eye Irrit. 2; H319 1 £ conc. < 3 % , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

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

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

copper {dicopper oxide; copper (I) oxide}

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

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

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

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

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

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

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

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

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most conservative species.

zinc {zinc oxide}

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

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

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

boron {diboron trioxide; boric oxide}

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

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

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

Appendix C: Version

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

HazWasteOnline Classification Engine Version: 2023.270.5761.10634 (27 Sep 2023)

HazWasteOnline Database: 2023.270.5761.10634 (27 Sep 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

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

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

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

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

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

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

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

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

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

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

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

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