

VICTORIA PARK PROBATION CENTRE – POST DEMOLITION SI REPORT

1 BACKGROUND

LK Consult Ltd (LKC) has been commissioned by Britttania Victoria Ltd to carry out a post demolition site investigation at Victoria Park Probation Centre in order to support the discharge of contaminated land conditions. The site is a former probation centre with associated grounds and car park which will be redeveloped for residential houses and apartments.

The following reports have been compiled for the site and should be read in conjunction with this report:

- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: CL-602-LKC 21 1679, dated 5th August 2022).
- Phase 2 Geo-Environmental Investigation, Risk Assessment and Remedial Strategy Report, undertaken by LKC (ref. CL-602-LKC 21 1679, dated 23rd September 2022).

A summary of the site details is presented in Table 1.1. Figure 1 indicates the site location and boundary. Figure 2 indicates the proposed development.

Location	South of Daisy Bank Road, east of Laindon Road, Manchester, M14 5YJ. Centred at approximate National Grid Reference 386180E 395730N.
Area	6,600m ²
Topography	118 metres Above Ordnance Datum (AOD). Site is approximately level.
Land Use	Vacant land with stockpiles of material following on from demolition of former buildings.
Proposed Development	34no. Low-rise residential houses with rear gardens, 33no. apartments with a resident garden, allotment area and 53no. parking spaces.

Table 1.1: Site Details.

2 POST DEMOLITION SITE INVESTIGATION – SCOPE OF WORKS

In order to gain information on the ground conditions beneath the former buildings on site, an intrusive investigation was undertaken.

The investigation was carried out on 21st July 2023 and comprised the following:

- 6no. machine excavated trial pits excavated to depths of 1.10-2.00mbgl (ref. TP201-TP206).

All site investigation locations are shown in Figure 6.

The locations were chosen to allow good coverage across the subject site as well as target areas of concern. Table 2-1 details the targeted and general coverage (non-targeted) site investigation locations.

Site Investigation Locations	Rationale
TP201-TP202	Excavated beneath former building.
TP203-TP206	Beneath former building in the location of an infilled pond. TP203-TP205 excavated to find the extents of the infilled pond.
TP206	To collect a sample of made ground strata from the infilled basement at location TP104/TP104B.

Table 2-1: Summary of sampling locations.

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

Soil Sampling Protocol

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation³. Soil was collected for onsite testing. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for total volatile organic compounds (TVOCs) using a PhoCheck Tiger photoionisation detector (PID). Results of the PID readings are presented on the profile logs (Appendix B). The on-site monitoring was carried out in line CIRIA C665⁴ to aid in screening samples for volatile analysis.

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

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 2-2 shows the soil testing undertaken.

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

² British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

⁴ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

Contaminants	No. Samples	Location & Depth	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	1	TP203 0.70-1.30m	A basic suite tested on a sample collected from the area of the infilled pond where no significant evidence of contamination was identified (with the exception of brick, glass and ceramic fragments) and no TVOCs identified from the PID tests.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, VOCs, SVOCs, SOM and asbestos screen.	1	TP202 0-0.90m	Detailed suite including volatile contaminants included tested on TP202 0-0.90m as pockets of paint and paint tins visible in trial pit and moderate solvent odour to paint. PID=119ppm.
CL:AIRE RB17 Forensic Logging	2	TP203 0.70-1.30m TP206 0.10-1.50m	Forensic logging undertaken to provide the information required to undertake a gas risk assessment in line with CL:AIRE RB17.
Asbestos Identification	5	TP201 0-0.40m TP201 0.40-0.60m TP203 0-0.40m TP203 0.40-0.70m TP204 0-1.00m	Asbestos identification undertaken to confirm the absence / presence of asbestos on a range of samples collected from across the site.

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

Notes:

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

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

3 GROUND INVESTIGATION

Geology – Generalised Sequence

The ground conditions beneath the site comprised made ground underlain by natural cohesive deposits. A summary section of the logs is provided in Plate 3-1, with additional comments below.

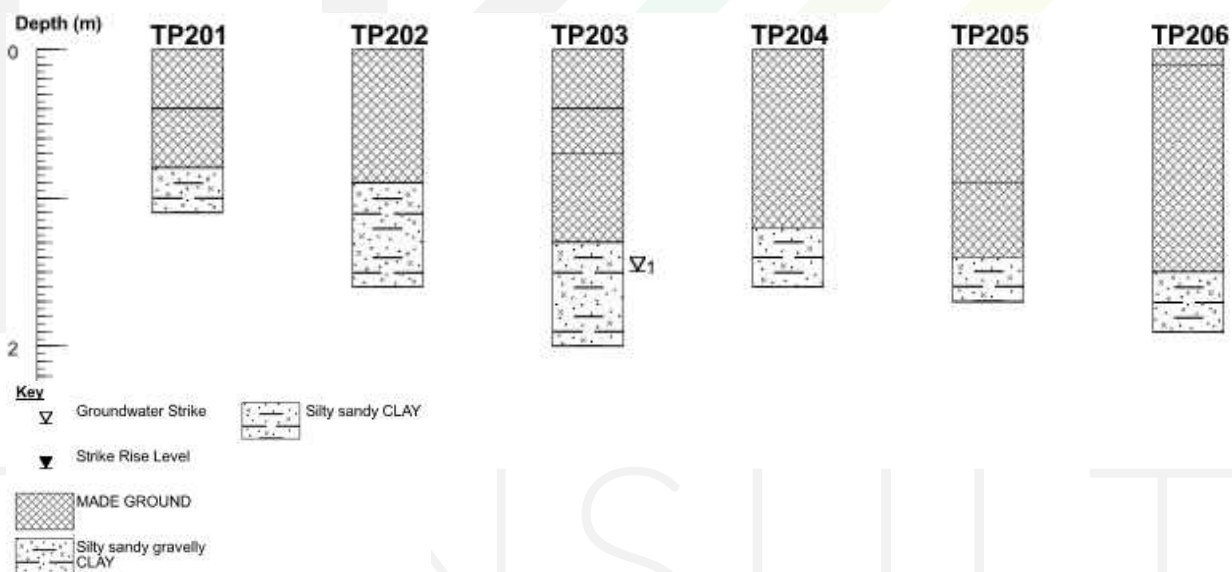


Plate 3-1: Summary of ground conditions.

Additional information on ground conditions:

- Made ground was recorded from ground level to depths of 0.80-1.50mbgl.
- The made ground generally consisted of SAND and GRAVEL / CLAY / SILT / SAND with anthropogenic material including: brick, concrete, metal, slate, coal, ash, ceramics and glass.
- 2no. paint tins and pockets of paint with a moderate solvent odour were identified between 0.00-0.90mbgl in TP202.
- TP206 was excavated in the location of an infilled basement and the made ground comprised slightly silty SAND with frequent whole bricks between 0.10-1.50mbgl.
- Natural strata consisted of firm to very stiff consistency variably gravelly variably sandy (silty) CLAY.

Infilled Pond in West of Site

Slightly organic very sandy SILT was recorded within the area of the infilled pond in TP203 between depths of 0.70-1.30mbgl and TP205 between depths of 0.90-1.40mbgl (location of former pond visible on historical mapping overlay on Figure 6).

The northern, western and eastern extents of the infilled pond were identified during the excavation of TP203 and TP205. No organic material was encountered in TP204, which proves the extent of the infilled pond does not reach the location of TP204. Further information is provided in the Profile Logs (Appendix B).

Groundwater

A seepage of perched water was recorded in TP203 at 1.50mbgl. The remainder of the pits were recorded as dry.

In-Situ Geotechnical Testing

Hand shear vanes were taken within the natural clay where possible. Results are contained in Appendix B.

4 SOIL RISK ASSESSMENT

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM⁵). Information gathered from the risk assessment has been collated in the revised contamination conceptual model at the end of the section.

Soil Risk Assessment Methodology

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

The proposed development has been zoned as shown in Figure 4. The following assessment criteria will be used for each zone:

⁵ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Zone	Proposed Use	Assessment Criteria
1	Residents garden	Residential without plant uptake
2	Apartment block with soft landscaping	POS residential
3	Kitchen garden	Allotments
4	Residential houses with gardens	Residential with plant uptake

Table 4-1: Summary of zones and associated assessment criteria.

All criteria have been generated using the CLEA V1.06 model⁶ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM and are contained in Appendix D.

Other Contaminants with no C4SLs, LQM S4ULs, ATRISK SSVs or CL:AIRE GACs

Where generic assessment criteria have not been derived (mainly due to insufficient toxicological data), the results were compared against contaminants of assumed likely similar toxicity (with some conservatism) as shown below:

- 2-methylnaphthalene: compared to residential with plant uptake S4UL for naphthalene (2.3mg/kg 1% SOM). LKC considers this appropriate given that the guidance provided on the ATSDR website indicates that the oral toxicity of 2-methylnaphthalene is within an order of magnitude to that of naphthalene, although it was unknown what an appropriate inhalation reference dose is.
- Carbazole: compared to residential with plant uptake C4SL for benzo(a)pyrene (5mg/kg 6% SOM). This contaminant is a bi-product of organic combustion but can be naturally occurring. The Material Safety Sheets indicates this compound is not volatile and considering there is no toxicological information available, LKC compared the analytical results to one of the most toxic PAH as a precaution.
- Trichlorofluoromethane: no GAC available.

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^{7,8} and naphthalene the most volatile and soluble⁹. 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 negligible¹⁰. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)¹¹ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

Based on the above assumption for PAHs, LKC undertook an assessment of the data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*¹², which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

⁶ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

⁷ EA (2002). "Contaminants in Soils: Collation of Toxicological Data and Intake Values for Humans. Benzo[a]pyrene." R&D Publication TOX2.

⁸ USEPA (1984). "Health Effects Assessment of Polycyclic Aromatic Hydrocarbons (PAHs). EPA 540/1-86-013."

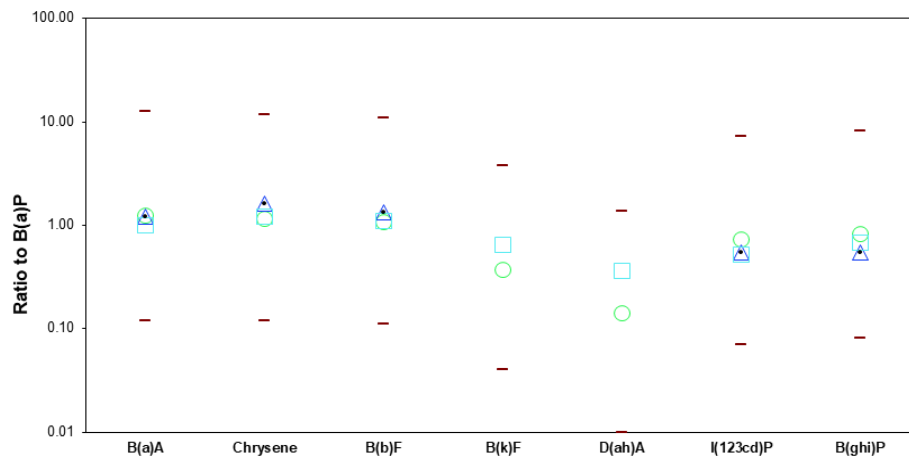
⁹ EA (2003). "Review of the Fate and Transport of Selected Contaminants in the Soil Environment." Draft technical report P5-079/TR1.

¹⁰ CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

¹¹ HPA (2010). "HPA Contaminated Land Information Sheet: Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)." Version 3.

¹² Culp, S; Gaylor, D; Sheldon, W; Goldstein, L and Beland, F (1998). "A Comparison of Tumours Induced by Coal Tar and Benzo-a-pyrene in a 2-Year Bioassay." *Carcinogenesis*. Vol 19, no. 1, pp. 117-124.

Graph 4-1 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 4-1: 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

● = Ratio to B(a)P for all data ○ = Mean ratio to B(a)P for Culp data ▲ = Mean ratio to B(a)P from all data at the site
 □ = Mean ratio to B(a)P for UK data presented by HPA ■ = Upper and Lower limits (order of magnitude from Culp data)

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

Soil Results Compared Against Assessment Criteria

Elevated and pertinent results are provided in Table 4.2.

Contaminant	Units	No. of samples	Elevated Results	Sample Location	Criteria (1%)	Source of Criteria
TPH						
Aliphatic C8-10	mg/kg	7	30	TP202 (0.00-0.90m)	27	S4UL
VOCs						
Trichlorofluoro methane	µg/kg	1	16	TP202 (0.00-0.90m)	-	-
GENERAL						
pH	pH	7	Range 8.5-8.9			
SOM	%	7	Range 1.7-4.8			
Asbestos	N/A	7	Detected, see Table 4.3.			

Table 4-2: Summary of elevated and pertinent analytical results.

Notes:

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

Asbestos was identified in the made ground soils, as detailed in Table 4-3.

Sample Location	ID	Type	Total Asbestos (%)
TP203 (0.70-1.30)	Chrysotile	Free Fibres	0.029

Table 4-3: Details of asbestos identified.

Hazard Quotient

As no significant concentrations of petroleum hydrocarbons were identified in any of the soil samples a hazard index (HI) as described by the Environment Agency¹³ technical report (to examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions) has not been undertaken as part of this assessment.

Direct Contact Risk – Pollutant Linkage 1

Heavy metals / PAHs

No elevated heavy metals or PAHs were identified during the post demolition site investigation. Elevated heavy metals and PAHs were identified across the site during the first phase of site investigation. An environmental cover system in proposed residential gardens / shared landscaping, as recommended in the Phase 2 SI report, is recommended. Further detail on the cover systems required in each zone is provided in Table 5-2.

Petroleum Hydrocarbons

No visual or olfactory evidence of TPHs were identified during the post demolition investigation, expect for light end hydrocarbons (aliphatic C8-10 – associated with paint identified during investigation) which is detailed under Pollutant Linkage 2 – inhalation of vapours.

The likelihood of petroleum hydrocarbons affecting site users by direct contact is considered to be unlikely. With a medium consequence, the risk is low, and no remediation is required.

Asbestos

Chrysotile fibres were identified in the made ground at TP203 (0.029%), in the location of the infilled pond. A risk assessment was undertaken using the Joint Industry Working Group (JIWG) Receptor Risk Ranking. This is contained in Appendix E.

Asbestos may affect site users in soft landscaping and garden areas in localised areas of the site via the inhalation of fibres. Taking into account the recommended environmental cover system (assuming a break layer is in place) associated with the heavy metal and PAH contamination identified during the first phase of site investigation, the JIWG receptor risk ranking suggests a low risk associated with asbestos fibres.

Additional consideration should also be given to the risk to workers and offsite receptors during groundworks and construction.

Inhalation of Vapours – Pollutant Linkage 2

Marginally elevated aliphatic C8-10 was identified in TP202 (0-0.90m). BTEX compounds were recorded above detection limits in the sample however concentrations are low and not above assessment criteria. All other VOCs and SVOCs were recorded as less than limits of detection except for a low concentration of trichlorofluoromethane (16ug/kg). 2no. paint tins and pockets of paint with a moderate solvent odour were identified in TP202 during the post demolition investigation and is the likely source of the elevated concentrations. The PID recorded TVOCs of 119ppm. The source of the elevated aliphatic C8-10 is considered to be the paint identified in the pit and is likely to be localised to TP202.

¹³ EA (2005). "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils." Science Report P5-080/TR3.

These contaminants may pose a risk to site users via the inhalation of vapours.

Given the high PID readings and elevated aliphatic C8-10 identified, the probability of vapours posing a risk to site users in the localised area is considered to be likely. With a medium consequence, the risk is expected to be moderate and localised removal of the paint impacted made ground strata is recommended. No assessment criteria is available for trichlorofluoromethane however given the very low concentration recorded, and the volatile nature of the contaminant at room temperature, the risk is anticipated to be low. Source removal of the made ground will further reduce the risk.

The probability of vapours posing a risk to site users across the remainder of the site is considered to be unlikely. With a medium consequence, the risk is expected to be low, and no further investigation / assessment is recommended.

Gas Risk Assessment – Pollutant Linkage 3

Hazardous Gas Source

The PRA identified a moderate risk with respect to hazardous and ground gas given that a potentially infilled pond was identified on site on the 1848-1891 mapping, no longer present by the 1910 mapping. No credible offsite sources were identified based on the age of infilling / size of the features and the anticipated underlying Till was also expected to reduce any gas migration to site.

Based upon the site investigation there may be a localised risk for the generation of hazardous gas from made ground onsite. Made ground was identified to a maximum depth of 2.20mbgl at (TP103 / TP104 / TP105 / TP206) comprising of predominately brick with coal, clinker, metal / copper pipe, timber, concrete, glass, plastic, rootlets and ceramic. This made ground strata was encountered with an infilled basement identified in the north of the site likely associated with Stafford House present on the 1891-1956 mapping, demolished by the 1968 mapping.

A second area of slightly organic deeper made ground to a maximum depth of 1.30-1.40mbgl was identified at TP203 and TP205 in the central west of the site, comprising brick, glass, ceramic, timber and rootlets. This made ground is likely associated with the infilled pond.

During the previous site investigation undertaken in 2022, general made ground was recorded in all other locations from ground level to a maximum depth of 0.30-<1.00mbgl, associated with a former road, footpaths and former nursery school / probation centre buildings. The made ground comprised horizons of gravel, sand, silt, clay with anthropogenic material including ash, brick, coal, clinker, ceramic, plastic, rebar, timber, metal and glass. The upper organic rich layer of made ground to c. 0.30mbgl has been stripped across the site as part of the demolition process.

Assessment

Guidance given in CIRIA C665¹⁴, BS8485¹⁵ and CL:AIRE RB17¹⁶ has been used to assess the risk.

¹⁴ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665.

¹⁵ BSI (2019). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings." BS8485:2015+A1 2019.

¹⁶ CL:AIRE Research Bulletin 17. "A Pragmatic Approach to Ground Gas Risk Assessment". November 2012.

Sample Location	Material	Estimated Age of Material (yrs)	Source	SOM (%)	TOC (%)	<10mm Soil Fraction TOC* (%)	Corrected for inorganic content**
TP203 (0.70-1.30)	MADE GROUND: SILT	113	Infilled pond	4.8	2.8	2.8	1.8
TP104B 0.10-1.00m / TP105 / TP206 0.10-0.50m	MADE GROUND: GRAVEL	55	Infilled basement	3.9-8.2 Average: 6.1	Average: 3.5	3.0	1.9

Table 4-4: TOC and SOM of deeper made ground samples.

Notes

*Using Appendix A, forensic logging approach, organic and inorganic not separated from <10mm fraction.

** As ash likely to be present, TOC adjusted for non-degradable fraction.

TOC= SOM/1.72

Forensic soil logging has been undertaken on soil samples from the deeper areas of made ground identified on site. The TOC of the <10mm soil fraction contains both inorganics and organics, ash and clinker may skew the TOC results generating a false positive for degradable material and not necessarily generating gas. The TOC may be adjusted for non-degradability by approximately 60% for ash and 13% for soil¹⁷. By adjusting the average TOC by 63%, assuming 37% is non-degradable (for a mixed ash soil matrix). Considering the difficulty in undertaking detailed forensic work on the sample (due to limited volume), this assumption is still considered reasonable.

Infilled pond

The adjusted <10mm soil fraction TOC from forensic soil logging is 1.8%. While the TOC and depth of made ground is above the criteria for Characteristic Situation (CS) 1 and within the criteria for CS2 (Table 1, RB17¹⁸), given that the estimated age of the organic source is 113 years and that the total percentage of putrescible material from the forensic logging (i.e. wood, vegetable matter, textile, paper and card) is 0.4%, LKC do not consider the made ground associated with the infilled pond to be a significant source of hazardous gas.

Infilled basement

The <10mm soil fraction TOC from forensic soil logging is 1.9%. While the TOC and depth of made ground is above the criteria for CS1 and within the criteria for CS2 (Table 1, RB17¹⁹), given that the estimated age of the organic source is 55 years and that the total percentage of putrescible material from the forensic logging (i.e. wood, vegetable matter, textile, paper and card) is 0.7%, LKC do not consider the made ground associated with the infilled basement to be a significant source of hazardous gas.

General made ground associated with other historic features

Made ground across the remainder of the site is <1m and no significant depth of putrescible material was encountered. The organic rich upper made ground strata has been stripped. A qualitative assessment using CL:AIRE RB17 (Table A1)²⁰ where made ground is 1m or less

¹⁷ Kumpiene, J; Robinson, R; Brannvall, E, Nordmark D, Bjurstrom, H, Andreas, L; Lagerkvist, A, Ecke, H (2010). "Carbon Speciation in Ash, Residual Waste and Contaminated Soil by Thermal Chemical Analysis." *Waste Manag.* 2011 Jan; **31**(1): 18-25.

¹⁸ CL:AIRE Research Bulletin 17. "A Pragmatic Approach to Ground Gas Risk Assessment". November 2012.

¹⁹ CL:AIRE Research Bulletin 17. "A Pragmatic Approach to Ground Gas Risk Assessment". November 2012.

²⁰ CL:AIRE Research Bulletin (RB17) "A Pragmatic Approach to Ground Gas Risk Assessment" November 2012.

and no significant organic /putrescible material is present, the site can be classified as Characteristic Situation 1 and no gas protection measures are required.

Based on the above assessments, the risk from Pollutant Linkage 3 is considered as unlikely and a low risk, and no gas protection measures are required.

Controlled Waters Risk Assessment – Pollutant Linkage 4

No groundwater sampling was undertaken during the post demolition site investigation. The previous Phase 2 identified a low risk to controlled waters as the site investigation did not identify any significant sources of likely mobile contamination within the soils. Although a Secondary Undifferentiated and Principal Aquifers are present below the site, no abstractions have been identified within 1000m of the site. There are no surface water receptors within influencing distance of the site. Only perched water was encountered during the post demolition site investigation, in one location, the remainder of the locations were recorded as dry. The perched water encountered was underlain by cohesive natural strata, which should prevent the vertical migration of any perched water and offer protection to the Principal Aquifer within the bedrock.

Elevated aliphatic C8-10 was identified in TP202 during the post demolition investigation. The source of the contamination is expected to be the paint which was identified within the strata (pockets of paint visible and 2no. paint tins identified). Excavation and removal of impacted strata at location TP202 is recommended as part of Pollutants Linkage 2, which will remove the source and remove any risk associated with controlled waters.

No evidence of significant mobile contamination was encountered across the remainder of the site during the post demolition investigation. Although elevated metals and PAHs were identified within the soils during the first phase of investigation, the source is anticipated to be ash and clinker noted within the made ground. Contamination associated with ash and clinker is not anticipated to be mobile due to the residual crystalline nature of the matrix.

The post demolition site investigation did not identify any significant sources of likely mobile contamination within the soils. This confirms the probability of onsite contamination affecting controlled waters as unlikely. With a medium consequence the risk is anticipated to be low and no remediation is required.

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 contamination²¹. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed. The following contaminants were not considered to be a risk and therefore not included in the analysis suites: ketones and aldehydes.

Elevated petroleum hydrocarbons have been identified in TP202 (0-0.90m). However, the remediation associated with Pollutant Linkage 2 (removal of paint impacted strata in vicinity of location of TP202) will remove the source.

Elevated naphthalene was identified across the site during the first phase of investigation. Despite elevated naphthalene recorded in the made ground strata in the central and southern area of site, new pipe is likely to be laid within the underlying natural clay. The probability of organic contaminants affecting potable water pipes is likely in the north of the site. Given the consequence is considered to be medium, the risk is anticipated to be moderate and

²¹ UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."

remediation (i.e. barrier pipe) is likely to be required (subject to results of United Utilities Risk Assessment).

The probability of organic contaminants affecting potable water pipes is unlikely in the central and southern areas of site. Given the consequence is considered to be medium, the risk is anticipated to be low and barrier pipe is unlikely to be required (subject to results of United Utilities Risk Assessment).

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

5 CONCLUSIONS AND RECOMMENDATIONS

Ground Conditions

Ground conditions encountered during the post demolition site investigation comprised made ground to depths of 0.80-1.50mbgl underlain by cohesive superficial deposits. Perched water was encountered in one location.

Contamination Assessment

The contamination assessment is summarised in Table 5-1 below.

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to future residents via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	Moderate (asbestos, arsenic, lead, PAHs)	- Elevated asbestos, arsenic, lead and PAHs identified across the site. - Recommendations: Remediation (environmental cover system) required in garden / soft landscaping areas.
		Low (petroleum hydrocarbons)	- No visual / olfactory evidence of petroleum hydrocarbons identified, except for aliphatic C8-10 which is detailed under Pollutant Linkage 2. - Recommendations: No remediation required.
2	Volatile contaminants posing a risk to future residents via the inhalation of vapours.	Likely (localised to TP202)	- Elevated aliphatic C8-10, visual and olfactory evidence of paint identified in TP202 0-0.90mbgl. - Recommendations: Removal of paint impacted strata at location TP202.
		Unlikely (remainder of site)	- No volatile contamination identified. - Recommendations: No remediation required.
3	Gas posing a risk to buildings and future residents via the migration of gas into building causing explosion and asphyxiation.	Moderate / Low	- RB17 gas risk assessment undertaken using depth of made ground and TOC. - Recommendations: No remediation required.

Table 5-1: Summary Risk Table.

Pollutant Linkage		Risk	Recommendations
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Low	-No elevated contaminants identified in groundwater. - Recommendations: No remediation required.
5	Organic contaminants posing a risk to water pipes.	Moderate (north of site)	-Organic contamination identified at potable pipe depth of 0.75-1.35mbgl. - Recommendations: UU risk assessment to be completed. Barrier pipe likely required. However, this will need to be confirmed once UU risk assessment undertaken.
		Low (central & south of site)	-Although elevated naphthalene encountered in the made ground, new pipe likely to be laid in natural clay. - Recommendation: Barrier piping unlikely to be required. However, this will need to be confirmed once UU risk assessment undertaken.

Table 5-1 (cont.): Summary Risk Table.

Remediation and Validation Recommendations

Table 5-2 details the further works and remedial recommendations / requirements. This information should be documented in a Site Completion Report for submission to the local authority.

Phase	PL	Remediation Requirements	Validation Requirements
Pre-Construction	ALL	<u>Earthworks Inspections / Unexpected Contamination</u> The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.	Log of work undertaken including photographs. Details of any sampling undertaken and validation of any potential additional remedial work.
	2	<u>Removal of Volatile TPH Impacted Made Ground in Location of TP202</u> Made ground soils at location TP202 0-0.90mbgl with visual and olfactory evidence of paint (as identified during the post demolition investigation) and with use of a PID should be excavated and removed. Impacted soils should be placed on an impermeable surface to await 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. If all impacted ground cannot be removed and contamination remains on the ground, further remediation may need to be considered.	Details of work undertaken including photographs. Confirmatory samples of the remaining in-situ soils. Consignment notes confirming the removal of impacted soil

Table 5-2: Summary of further work, validation and remediation requirements.

Note: See Table 5-1 for Pollutant Linkage details

Phase	PL	Remediation Requirements	Validation Requirements
Building Construction Phase	1	<p>Environmental Cover System As made ground is relatively deep, it is unlikely to be viable to remove the contaminated soils. Therefore, an environmental cover system is recommended. The environmental cover system should be as follows:</p> <p>Residents Garden: 450mm thick environmental cover system comprising: 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 350mm comprising clean inert fill and sufficient topsoil for a growing medium.</p> <p>As raised planters are proposed for growing vegetables, or fruit trees are proposed, remediation as below required (described for Kitchen Garden).</p> <p>Kitchen Garden / Raised Planters: Vegetables: Raised planters comprising: <u>600mm</u> sufficient compost / topsoil for a growing medium, 250mm granular material for drainage (MOT type 1), hard stood base (paving slabs).</p> <p>Fruit Trees: 1m x 1m tree pit with 1000mm thick environmental cover system comprising: 750mm compost / topsoil, 250mm granular material for drainage (MOT type 1), hard stood base (paving slabs).</p> <p>Private Rear Gardens: 600mm thick environmental cover system comprising: 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 500mm comprising clean inert fill and sufficient topsoil for a growing medium.</p> <p>Private Front Garden / Shared Landscaping / Residents Garden: 450mm thick environmental cover system comprising: 100mm physical break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 350mm comprising clean inert fill and sufficient topsoil for a growing medium.</p> <p>The subsoil layer can be replaced by additional topsoil. A diagram of a typical environmental cover system is shown in Appendix F.</p> <p>Areas of TPO's Please note where there are TPO's in influencing distance of the gardens it is likely the arboriculture officer may only allow a 150mm clean cover system over a geotextile membrane.</p>	<p>Measuring depth of environmental cover system using a staff and providing photographic evidence.</p> <p>Photographic evidence of the granular physical break or geotextile layer will also be collected.</p> <p>Chemical validation of imported soils: See Table 5-3.</p>

Table 5-2 (cont.): Summary of further work, validation and remediation requirements.

Note: See Table 5-1 for Pollutant Linkage details

Phase	PL	Remediation Requirements	Validation Requirements
Building Construction Phase	5	<u>Potable Water Pipes</u> It is recommended that a Water Pipeline Assessment is undertaken once the location and depth of potable water pipes are known. It is likely that barrier pipe will be required in the north of the site.	Delivery Notes of Pipe Material. Photographs of the Installed Pipe.
	3, 4	No remediation anticipated with respect to PL3 (ground gas), PL4 (controlled waters)..	N/A
Other Considerations		<u>Grubbing Out of In-Ground Structures</u> It is recommended that in-ground structures are grubbed out as part of the groundworks. In-ground structures expected across the site associated with the former buildings.	
		<u>Re-use of site won material</u> To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used ²²): 5,000 tonnes (c. 2,500m ³) <u>treatment</u> of crushed concrete / stone. 1,000 tonnes (c. 500 ³) <u>use of</u> non-hazardous soil 5,000 tonnes (c. 2,500m ³) <u>use of</u> clays, sand, gravel, brick, concrete, stone etc. 50,000 tonnes (c. 25,000m ³) <u>use of</u> bituminous material to be used in roadways. A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice may be required if volumes exceed exemption limits. This must be registered before material movement starts onsite. If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'. For all the above material will need to be tested at the rate and analytical suites presented in Table 5-3.	

Table 5-2 (cont.): Summary of further work, validation and remediation requirements.

Note: See Table 5-1 for Pollutant Linkage details

²² <https://www.gov.uk/guidance/waste-exemptions-using-waste>

Other Considerations	<p><u>Asbestos Management Plan</u></p> <p>Due to the presence of asbestos containing material, it is recommended that additional precautions are taken during site clearance, earthworks and construction in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations.</p> <p>This risk can be managed by careful procedures and site monitoring to reduce the risk of airborne fibres, and it is recommended that an appropriate 'Asbestos Management Strategy' is developed and adopted for all intrusive ground works which disturb the made ground in the area of concern. This should be carried out in line with CIRIA C733²³.</p> <p>This may include asbestos awareness training for all site staff, provision of suitable personal and respiratory protective equipment and air monitoring.</p> <p>With regards to cement bound asbestos, this can be handpicked, doubled bagged and disposed of appropriately to a licenced landfill. Guidance on removing asbestos cement is described in HSE (2012)²⁴.</p> <p>If ACM is identified in soil arisings then soil should be placed directly into covered skips and disposed of at a suitable licenced landfill, after further testing to quantify the extent of asbestos contamination of the soils. It should be considered that blue asbestos is notifiable and must be removed by a licenced contractor.</p> <p><u>Health and Safety Considerations</u></p> <p>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 guidance²⁵) should be adopted by all workers involved with site enabling and construction works.</p> <p><u>Asbestos Survey</u></p> <p>A Pre-Demolition and Major Refurbishment Asbestos Survey should be undertaken, and any ACMs removed and properly disposed of, prior to the demolition of the existing buildings, by a suitably qualified professional.</p>
----------------------	--

Table 5-2 (cont.): Summary of further work, validation and remediation requirements.

Note: See Table 5-1 for Pollutant Linkage details.

Validation of Subsoil / Topsoil

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

A summary of the required imported material sampling requirements is presented in Table 5-3, based on MCC 'Guidelines to Developer' (2021)²⁶. LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. However, where this is not possible then material imported should be segregated based on source and soil type. Validation samples should be taken prior to placement in gardens / soft landscaping to ensure suitability for use.

²³ CIRIA (2014). "Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks". C733.

²⁴ HSE (2012). "Removing Asbestos Cement (AC) Debris." A11 Asbestos Essential – Non-licenced Tasks.

²⁵ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land" London HMSO.

²⁶ MCC (2021). 'Guidelines to Developer'.

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

Table 5-3: Sampling requirements for imported soils.

Notes:

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

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

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

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

In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882²⁷). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against the relevant assessment criteria (as used in the contamination risk assessment (Section 4) and detailed in Table 4-1). Appropriate remedial target criteria are presented in Appendix D.

Site Completion Report

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

- Validation of the hydrocarbon hotspot removal at location TP202.
- Environmental capping layer: Validation of environmental cover system in each zone.
- Provision of waste transfer documents.
- Verification testing of all imported soil for garden and soft landscaping areas.
- Information on the installation of protective pipes and / or sterile trenches.
- Details of any unexpected contamination identified onsite, suitably risk assessed and / or validated.

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

²⁷ BS (2015). "Specifications for Topsoil and Requirements for use." BS3882:2015.

Report prepared by:

**Ella Mcleod
Geo-Environmental Consultant**

Report checked by:

**Emma Khadun
Principal Geo-Environmental Consultant**

Enc:

Figures

Appendix A: Figures

Appendix B: Profile Logs

Appendix C: Certificates of Analysis – Chemical

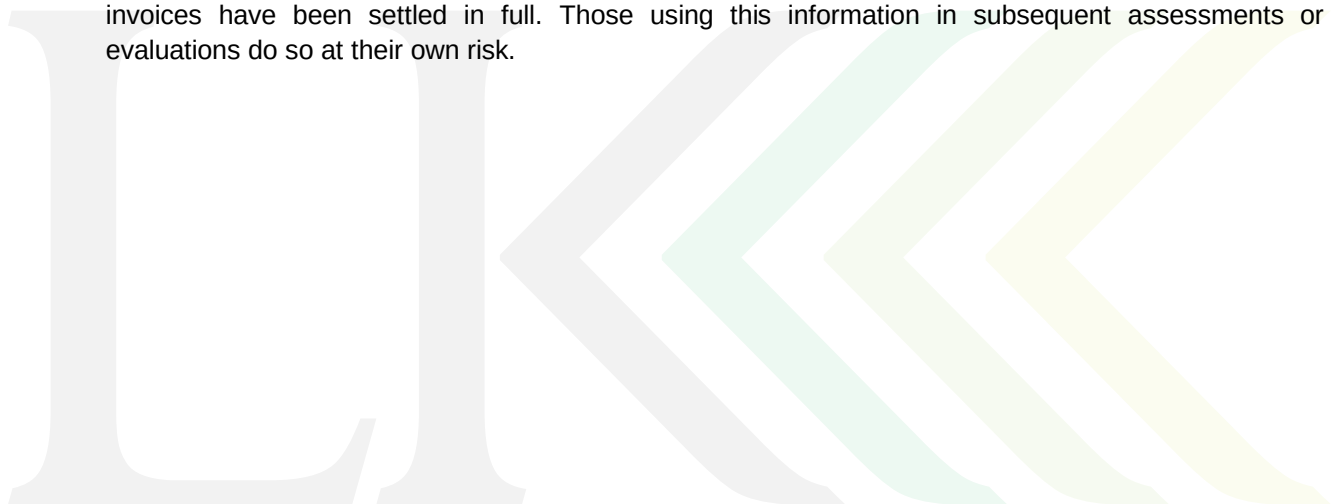
Appendix D: Generic Assessment Criteria

Appendix E: JIWG Assessment

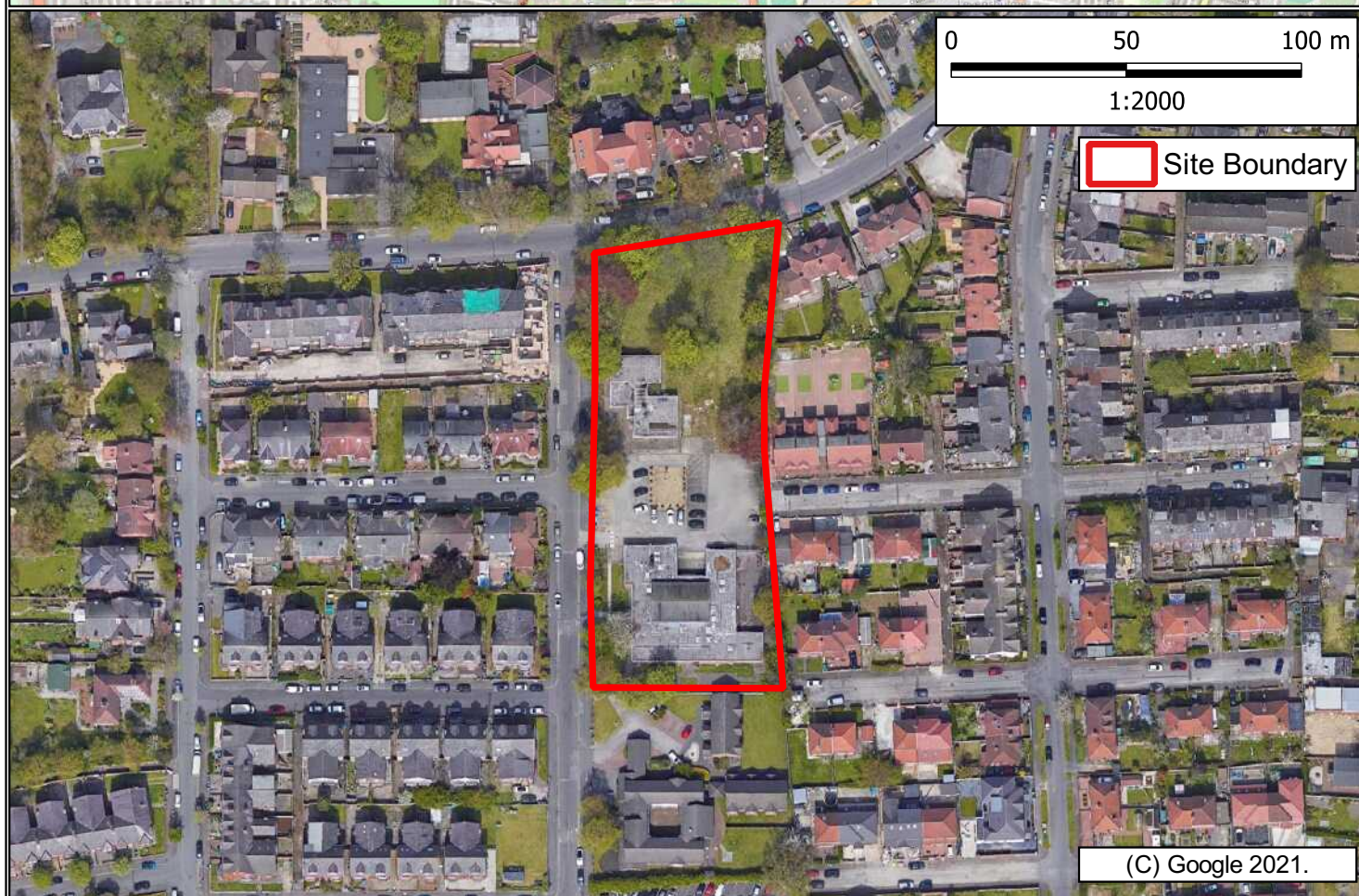
Appendix F: Environmental Cover System

Disclaimer

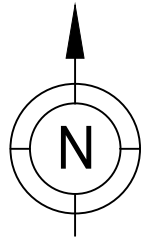
This report has been prepared by LKC who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant experienced in preparing reports of a similar scope. However, to the extent that the report is based on or relies upon information contained in records, reports or other materials provided to LKC which have not been independently produced or verified, LKC gives no warranty, representation or assurance as to the accuracy or completeness of such information. This report is issued on the condition that LKC will not be held liable for any loss arising from ground conditions between sampling points (i.e. boreholes/trial pits/hand augers/surface samples) which have not been shown by the sampling points or related testing carried out during the investigation, nor for any loss arising from conditions below the maximum depth of the investigation, or for any works done to the garden areas following the date of inspection. Opinions on such conditions, where given, are for general guidance only. This report is prepared solely for the benefit of Victoria Britannia Ltd. It may not be relied upon by, or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full. Those using this information in subsequent assessments or evaluations do so at their own risk.



Appendix A - Figures



Client: Britannia Victoria Ltd				Title: Site Location & Boundary Plan			
Site: Victoria Park Probation Centre				Scale (see scale bar): 1:25,000 & 1:2,000 @ A4			Figure: 1
Job No.: LKC 21 1679	Drawn By: CC	Checked By: MT	Drawn: June 2022	Revision:			



KEY

 Site Boundary

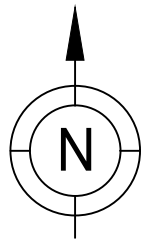
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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: Britannia Victoria Ltd			
Site: Victoria Park Probation Centre			
Title: Proposed Development Plan			
Job No.: LKC 21 1679	Scale (See Scale Bar): See Scale Bar	Figure: 2	Revision: B
Drawn By: AC	Checked By: EM	Drawn: Aug 2023	

Extract from: Ollier Smurthwaite Architects
Drawing Ref: Block Plan, No.A662_P_002H, Rev:H (17/04/2023)





KEY

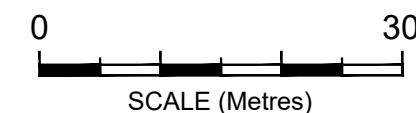
-  Site Boundary
-  Window Sample Borehole (WS)
-  Trial Pit (TP)
-  Cable Percussive Borehole (CP)
-  Installation

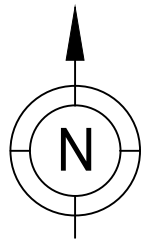
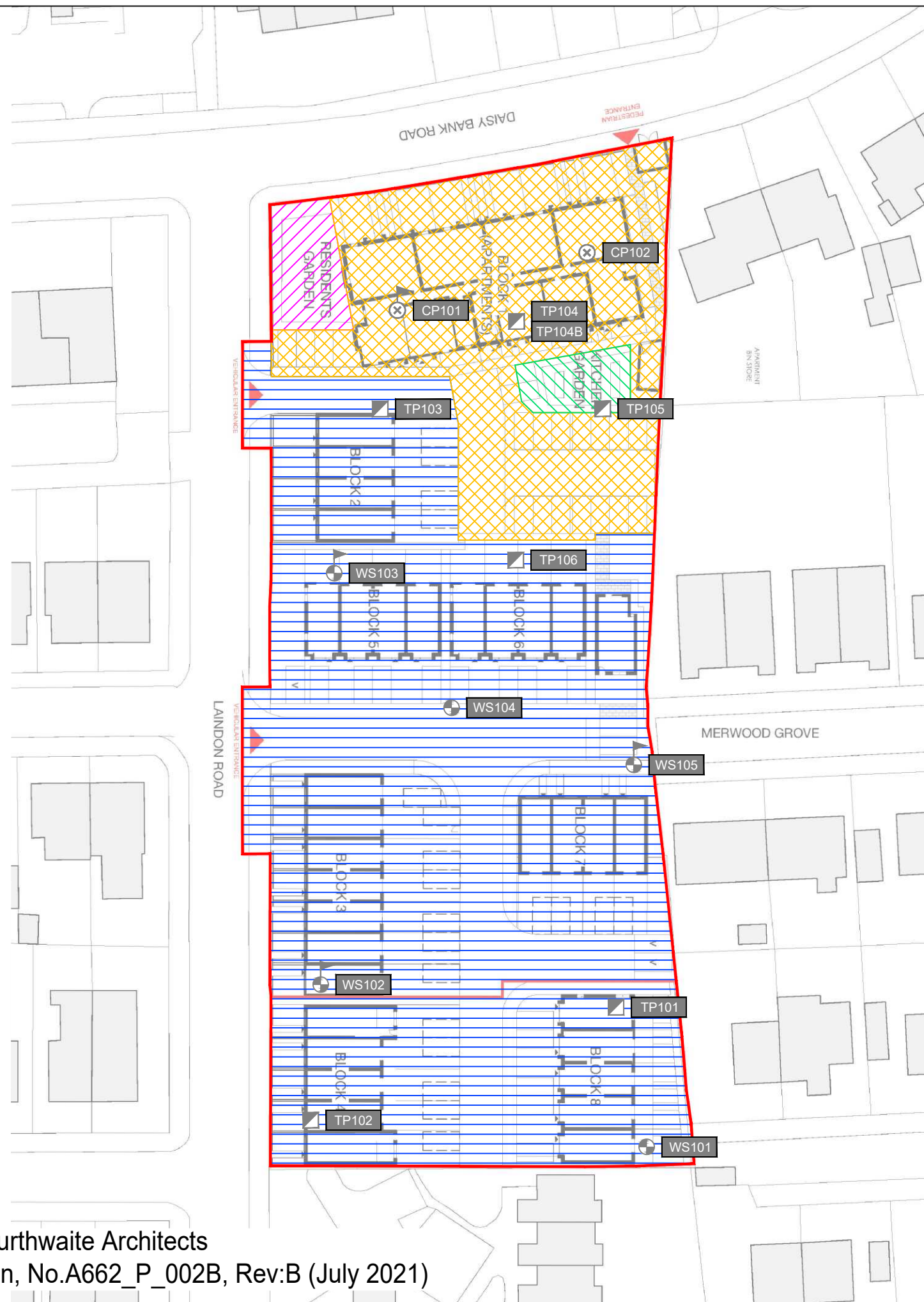
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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: Britannia Victoria Ltd			
Site: Victoria Park Probation Centre			
Title: Site Investigation Location Plan			
Job No.: LKC 21 1679	Scale (See Scale Bar): See Scale Bar	Figure: 3	Revision: A
Drawn By: AC	Checked By: EK	Drawn: Sep 2022	

Extract from: Ollier Smurthwaite Architects
Drawing Ref: Block Plan, No.A662_P_002B, Rev:B (July 2021)





KEY

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

ZONING KEY:

-  Zone 1: Residents Garden
-  Zone 2: Apartment Block with Soft Landscaping
-  Zone 3: Kitchen Garden
-  Zone 4: Residential Houses with Gardens

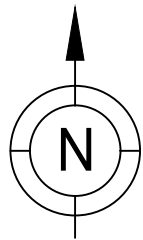
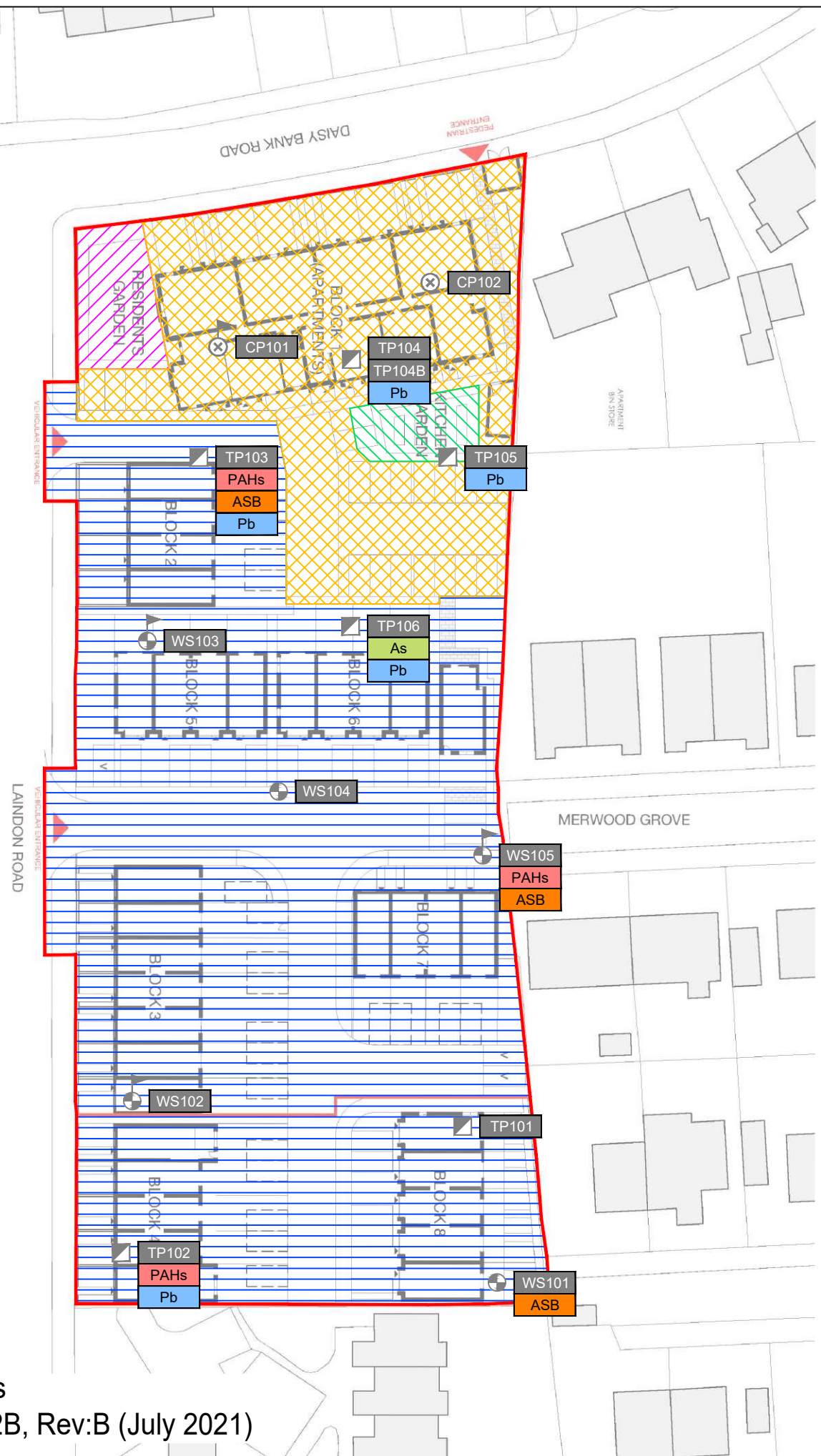
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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:			
Britannia Victoria Ltd			
Site:			
Victoria Park Probation Centre			
Title:			
Site Zoning Plan			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1679	See Scale Bar	4	
Drawn By:	Checked By:	Drawn:	
AC	EK	Sep 2022	

Extract from: Ollier Smurthwaite Architects
Drawing Ref: Block Plan, No.A662_P_002B, Rev:B (July 2021)





KEY

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

ZONING KEY:

- Zone 1: Residents Garden
- Zone 2: Apartment Block with Soft Landscaping
- Zone 3: Kitchen Garden
- Zone 4: Residential Houses with Gardens

CONTAMINANTS:

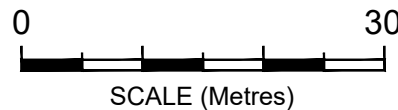
- Arsenic (As)
- PAHs (Polycyclic Aromatic Hydrocarbons)
- Asbestos (ASB)
- Lead (Pb)

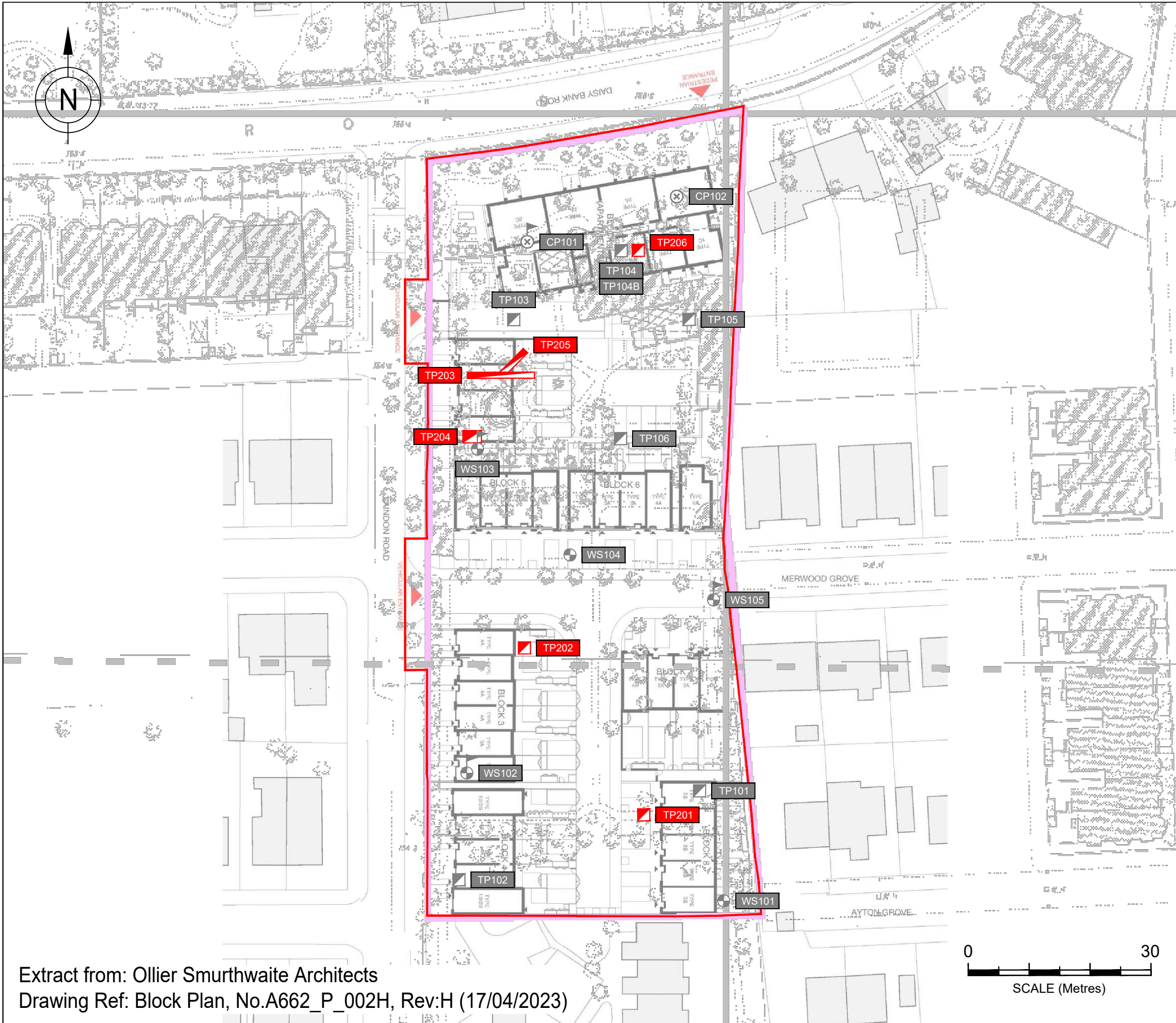
Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing 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: Britannia Victoria Ltd			
Site: Victoria Park Probation Centre			
Title: Contamination Location Plan			
Job No.: LKC 21 1679	Scale (See Scale Bar): See Scale Bar	Figure: 5	Revision:
Drawn By: AC	Checked By: EK	Drawn: Sep 2022	

Extract from: Ollier Smurthwaite Architects
Drawing Ref: Block Plan, No.A662_P_002B, Rev:B (July 2021)





KEY

-  Site Boundary
-  Trial Pit (TP)

PREVIOUS SI UNDERTAKEN BY LKC (08/2022):

-  Window Sample Borehole (WS)
-  Trial Pit (TP)
-  Cable Percussive Borehole (CP)
-  Installation

ADDITIONAL MAP OVERLAY:

Ordnance Survey Map - 1:500, 1891

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:			
Britannia Victoria Ltd			
Site:			
Victoria Park Probation Centre			
Title:			
Post Demolition Site Investigation Location Plan			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC 21 1679	See Scale Bar	6	
Drawn By:	Checked By:	Date:	
AC	EM	Jul 2023	

Extract from: Ollier Smurthwaite Architects
Drawing Ref: Block Plan, No.A662_P_002H, Rev:H (17/04/2023)

Appendix B – Profile Logs

Boring Method

Cased to 3.00mbgl.

Casing Diameter

150mm cased to 3.00m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location (Observed measurements)

386171 E 395780 N

Dates

18/08/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.40 0.20	ES PID=0.4ppm D				49.60	(0.40) 0.40	MADE GROUND: Dark brown gravelly sandy SILT with occasional brick fragments, rare coal fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.			
0.50 0.70-1.00	D B									
1.20-1.65 1.20-1.65	SPT N=31 D			3,5/7,7,8,9			Very stiff consistency brown and grey mottled slightly gravelly CLAY with occasional coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies. Occasional rootlets to 1.20mbgl.			
2.20-2.65 2.20-2.65	SPT N=32 D			5,6/7,8,8,9						
3.30-3.75 3.80	U D									
4.30-4.71 4.30-4.70 4.70-5.00	SPT 50/255 D B			7,7/10,12,18,10						
5.10-5.50 5.10-5.50	SPT 50/245 D			8,10/13,15,15,7		(9.60)				
6.70-7.13 6.70-7.10	SPT 50/275 D			7,9/12,13,13,12						
8.00-8.41 8.00-8.40	SPT 50/255 D			5,8/10,12,18,10						
9.50-9.95 10.00	U D				40.00	10.00	Complete at 10.00m			

Remarks

Installed to 10.00mbgl.
Borehole is stable and dry.
Chiselling from 4.30m to 9.50m for 1.5 hours.

Scale (approx)

1:75

Logged By

JW

Figure No.

LKC 21 1679.CP101

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

Victoria Park Probation Centre

**Borehole
Number
CP102****Boring Method**

Cased to 3.00mbgl.

Casing Diameter

150mm cased to 3.00m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location (Observed measurements)

386171 E 395780 N

Dates

18/08/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.30 0.20	ES PID=0.5ppm D				49.60	(0.40) 0.40	MADE GROUND: Dark brown gravelly sandy SILT with occasional brick fragments, rare coal fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
0.70	D					(0.80)			
1.20-1.65 1.20-1.65	SPT N=15 D			3,4/4,3,4,4	48.80	1.20	MADE GROUND: Dark brown gravelly sandy CLAY with occasional brick fragments, coal fragments, clinker and rootlets. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
1.80-2.10	B						Stiff to very stiff consistency brown and grey mottled slightly gravelly CLAY with occasional coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.		
2.30-2.75	U						Stiff consistency from 0.40-3.20mbgl.		
2.80	D								
3.20-3.65 3.20-3.65	SPT N=24 D			4,4/5,6,6,7			Very stiff consistency from 3.20-10.125mbgl.		
4.20-4.65 4.20-4.65	SPT N=42 D			7,7/8,10,12,12					
4.70-5.00	B								
5.10-5.53 5.10-5.50	SPT 50/275 D			8,9/11,13,13,13					
						(8.93)			
6.50-6.95	U								
7.00	D								
8.20-8.65 8.20-8.60 8.60-8.90	SPT 50/295 S B			7,7/8,12,13,17					
9.70-10.13 9.70-10.10	SPT 50/275 D			8,9/11,14,14,11	39.87	10.13	Complete at 10.13m		

RemarksBackfilled with arisings.
Borehole is stable and dry.
Chiselling from 5.10m to 9.70m for 1.25 hours.**Scale
(approx)**

1:75

**Logged
By**

JW

Figure No.

LKC 21 1679.CP102

Excavation Method

Machine excavated trial pit.

Dimensions

2.00m x 0.60m x 2.20m

Ground Level (mOD)

51.00

Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location (Observed measurements)

386197 E 395691 N

Dates

18/08/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.60	ES D PID=1.2ppm			50.95 50.90	0.05 0.10	MADE GROUND: Tarmacadam.		
					(0.50)	MADE GROUND: Light brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
0.60-1.00	ES PID=0.4ppm			50.40	0.60	MADE GROUND: Soft to firm consistency dark brown gravelly sandy CLAY with occasional brick fragments, glass fragments, ceramic fragments, coal fragments, rootlets and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies. Pockets of dark grey organic gravelly sandy clay at 0.60mbgl.		
1.00-2.00	D					Very stiff consistency high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.		
1.50	SV >140kPa		SV = 140 kPa, 140 kPa, 140 kPa. Av. = 140Kpa.		(1.60)			
				48.80	2.20	Complete at 2.20m		

Remarks

Trial pit dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.

No image available

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP101

Excavation Method

Machine excavated trial pit to 2.60mbgl.

Dimensions

2.50m x 0.60m x 2.60m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location (Observed measurements)

386154 E 395676 N

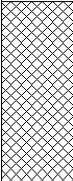
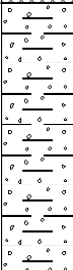
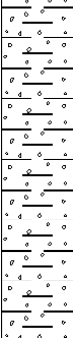
Dates

18/08/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES D PID=1.1ppm				(0.60)	MADE GROUND: Dark brown gravelly sandy SILT with frequent rootlets, rare brick fragments, glass fragments, coal fragments, rebar and plastic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
0.60-1.00	ES PID=0.4ppm			49.40	0.60	Very stiff consistency brown and grey mottled slightly gravelly CLAY with occasional rootlets and rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies. Clay is friable. Recovered as gravel.		
1.50-2.50	D				(2.00)	No shear vane reading due to friable nature of clay.		
				47.40	2.60	Complete at 2.60m		

No image available

Remarks

No shear vane readings at 0.60-2.60mbgl due to friable nature of the clay.
Trial pit dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP102

Excavation Method

Machine excavated trial pit to 3.00mbgl.

Dimensions

2.50m x 0.60m x 3.00m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location (Observed measurements)

386166 E 395770 N

Dates

18/08/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES PID=0.3ppm					MADE GROUND: Dark brown gravelly sandy SILT with frequent whole bricks, brick fragments, occasional rootlets, concrete fragments, coal fragments, clinker, rare glass fragments and timber. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
0.40-1.40	D PID=0.3ppm				(1.40)			
1.40-2.00	ES PID=0.4ppm			48.60	1.40	Firm to very stiff consistency high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.		
2.00 2.00-3.00	SV >140kPa D		SV = 140 kPa, 140 kPa, 140 kPa. Av. = 140kPa.		(1.60)	Firm to stiff consistency to 2.30mbgl. Very stiff consistency below 2.30mbgl.		
2.80	SV >140kPa		SV = 140 kPa, 140 kPa, 140 kPa. Av. = 140kPa.	47.00	3.00	Complete at 3.00m		

No image available

Remarks

Trial pit dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP103

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

Victoria Park Probation Centre

**Trial Pit
Number
TP104****Excavation Method**Machine excavated trial pit tp
1.42mbgl.**Dimensions**

2.50m x 1.10m x 1.42m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number
LKC 21 1679****Location (Observed measurements)**

386187 E 395783 N

Dates

18/08/2022

Engineer

LKC

**Sheet
1/1**

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				49.90	0.10 0.10	MADE GROUND: Dark brown slightly gravelly sandy SILT with frequent rootlets, occasional brick fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
					(1.30)	MADE GROUND: Dark brown and red sandy GRAVEL with frequent whole bricks, brick fragments, occasional metal fragments, concrete fragments, glass fragments, plastic fragments and rare ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of predominantly brick.		
				48.60 48.58	1.40 1.42	CONCRETE. Abandoned at 1.42m		

No image available

Remarks

Trial pit dry.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.
Refusal on concrete floor. Trial pit repositioned approximately 4m E (Ref. TP104B).
Trial pit unstable, collapse at 0.10-1.40mbgl.

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP104

Excavation Method

Machine excavated trial pit to 3.00mbgl.

Dimensions

2.50m x 1.40m x 3.00m

Ground Level (mOD)

50.00

Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location (Observed measurements)

386188 E 395784 N

Dates

18/08/2022

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.10	ES PID=0.4ppm			49.90	(0.10)	MADE GROUND: Dark brown slightly gravelly sandy SILT with frequent rootlets, occasional brick fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
0.10-1.00	ES PID=0.9ppm					MADE GROUND: Dark brown and red sandy GRAVEL with frequent whole bricks, brick fragments, occasional metal fragments, concrete fragments, glass fragments, plastic fragments and rare ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of predominantly brick.		
					(1.40)			
				48.50	1.50			
				48.40	(0.10)	CONCRETE.		
					1.60	Firm to very stiff consistency high strength brown and grey mottled slightly gravelly CLAY with occasional coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.		
2.00-3.00	D							
					(1.40)			
2.40	SV >140kPa		SV = 140 kPa, 140 kPa, 140 kPa. Av. = 140Kpa.					
				47.00	3.00	Complete at 3.00m		

No image available

Remarks

Trial pit unstable, made ground collapse at 0.10-1.50mbgl.
Trial pit dry.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP104B

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

Victoria Park Probation Centre

**Trial Pit
Number
TP105****Excavation Method**

Machine excavated trial pit to 3.00mbgl.

Dimensions

2.50m x 0.60m x 3.00m

Ground Level (mOD)

52.00

Client

Britannia Victoria Ltd

**Job
Number
LKC 21 1679****Location** (Observed measurements)

386196 E 395769 N

Dates

18/08/2022

Engineer

LKC

**Sheet
1/1**

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-1.50	ES D PID=0.7ppm					MADE GROUND: Dark brown very gravelly sandy SILT with frequent whole bricks, brick fragments, occasional rootlets, coal fragments, clinker, concrete fragments, rare copper pipe, glass fragments, timber and plastic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
2.20-3.00	ES D PID=0.4ppm			49.80	2.20	Very stiff consistency brown and grey mottled slightly gravelly CLAY with occasional coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies. Recovered as gravel.		
					(0.80)	No shear vane readings due to friable nature of clay.		
				49.00	3.00	Complete at 3.00m		

No image available

RemarksNo shear vane readings at 2.20-3.00mbgl due to friable nature of the clay.
Trial pit dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.**Scale (approx)**

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP105

Excavation Method

Machine excavated trial pit to 3.00mbgl.

Dimensions

2.50m x 0.60m x 3.00m

Ground Level (mOD)

52.00

Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location (Observed measurements)

386186 E 395748 N

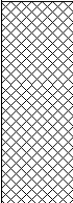
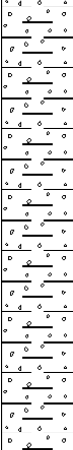
Dates

18/08/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	ES D PID=0.7ppm				(0.70)	MADE GROUND: Dark brown gravelly sandy SILT with occasional brick fragments, coal fragments, clinker, rare glass fragments and ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.		
1.00-2.00	ES PID=0.4ppm			51.30	0.70	Very stiff consistency high strength brown and grey mottled slightly gravelly CLAY with occasional coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies. Recovered as gravel.		
1.50-2.50	D				(2.30)	No shear vane readings above 2.00mbgl due to friable nature of clay.		
2.00	SV >140kPa		SV = 140 kPa, 140 kPa, 140 kPa. Av. = 140Kpa.	49.00	3.00	Complete at 3.00m		

No image available

Remarks

No shear vane readings above 2.00mbgl due to friable nature of the clay.
Trial pit dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from:
www.freemaptools.com/elevation-finder.htm.

Scale (approx)

1:25

Logged By

JW

Figure No.

LKC 21 1679.TP106

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Observed measurements)
386201 E 395674 N

Ground Level (mOD)

51.00

Client

Britannia Victoria Ltd

Job
Number
LKC 21 1679

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.30	ES PID=0.2ppm				(0.30)	<p>MADE GROUND: Dark brown gravelly sandy SILT with occasional coal fragments, rootlets, rare clinker, plastic fragments and brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.</p> <p>Firm to very stiff consistency very high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.</p> <p>Firm consistency at 0.30-0.90mbgl.</p> <p>Stiff consistency at 0.90-1.40mbgl.</p> <p>Very stiff consistency at 1.40-5.45mbgl.</p>		
0.30-1.00	ES PID=0.3ppm			50.70	0.30			
1.00	PP 157kPa							
1.20-1.65	SPT N=17		3,3/4,4,4,5					
1.80	PP 196kPa							
2.00-2.45	SPT N=18		2,3/4,4,4,6					
2.00-3.00	D							
2.80	PP 206kPa				(5.15)			
3.00-3.45	SPT N=24		4,4/5,6,6,7					
3.80	PP 211kPa							
4.00-4.45	SPT N=30		5,6/6,7,7,10					
4.00-5.00	D							
4.80	PP >221kPa					Complete at 5.45m		
5.00-5.45	SPT N=25		5,5/5,6,6,8	45.55	5.45			

Remarks

Borehole dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.

Scale
(approx)

1:40

Logged
By

JW

Figure No.

LKC 21 1679.WS101

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Observed measurements)
386158 E 395696 N

Ground Level (mOD)

50.00

Dates

19/08/2022

Client

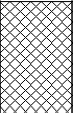
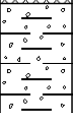
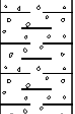
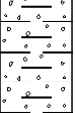
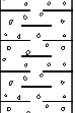
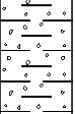
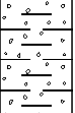
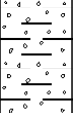
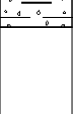
Britannia Victoria Ltd

Engineer

LKC

Job
Number
LKC 21 1679

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.60	ES PID=0.5ppm				(0.60)	MADE GROUND: Dark brown gravelly sandy SILT with occasional brick fragments, rootlets, rare pottery fragments and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.			
0.60-1.00	ES PID=0.3ppm			49.40	0.60	Very stiff consistency very high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.			
1.00	PP 211kPa		3,4/4,4,4,5						
1.00-2.00	D								
1.20-1.65	SPT N=17								
1.80	PP 206kPa								
2.00-2.45	SPT N=19		3,3/4,4,5,6						
2.80	PP 211kPa								
3.00-3.45	SPT N=22		3,4/5,5,5,7		(4.85)				
3.00-4.00	D								
3.80	PP 206kPa								
4.00-4.45	SPT N=27		4,5/5,7,7,8						
4.80	PP 221kPa								
				44.55	5.45	Complete at 5.45m			

Remarks

Borehole dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.

Scale
(approx)
1:40

Logged
By
JW

Figure No.
LKC 21 1679.WS102

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Observed measurements)
386159 E 395750 N

Ground Level (mOD)

50.00

Dates

19/08/2022

Client

Britannia Victoria Ltd

Engineer

LKC

Job
Number
LKC 21 1679

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50-1.00	ES PID=0.4ppm			49.88 49.80	(0.12) 0.12 0.20	MADE GROUND: Yellowish light brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded of mixed lithologies. Paving stone present at 0.00-0.05mbgl.			
1.20-1.65	SPT N=7		2,1/1,2,2,2		(1.10)	MADE GROUND: Light grey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone. Probable MOT.			
1.50-2.00	ES PID=0.4ppm			48.70	1.30	MADE GROUND: Loose density dark brown gravelly sandy SILT with occasional coal fragments, rootlets, clinker, brick fragments and rare ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies.			
1.80	PP 216kPa								
2.00-2.45	SPT N=19		2,3/4,5,5,5						
2.00-3.00	D								
2.80	PP 206kPa								
3.00-3.45	SPT N=20		3,4/4,5,5,6		(4.15)				
3.80	PP 206kPa								
4.00-4.45	SPT N=23		3,4/5,5,6,7						
4.80	PP 211kPa								
5.00-5.45	SPT N=27		3,5/6,6,7,8	44.55	5.45				
						Complete at 5.45m			

Remarks

No SPT recovery at 1.20mbgl.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.
Grid reference information obtained from: gridreferencefinder.com.
Borehole dry and stable.

Scale
(approx)

1:40

Logged
By

JW

Figure No.

LKC 21 1679.WS103

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Observed measurements)
386201 E 395674 N

Ground Level (mOD)

50.00

Dates

19/08/2022

Client

Britannia Victoria Ltd

Engineer

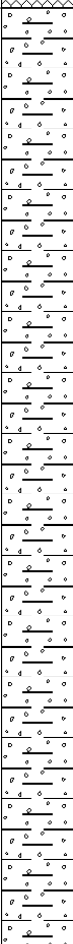
LK

Job
Number

LKC 21 1679

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.40	ES PID=0.4ppm				(0.45)	MADE GROUND: Dark brown gravelly sandy SILT with occasional brick fragments, rare coal fragments, clinker and plastic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of mixed lithologies. Gravel surface layer present to 0.05mbgl. Gravel is fine to coarse, subangular to subrounded of mixed lithologies. (Imported)		
0.50-1.00	ES PID=0.4ppm			49.55	0.45			
1.00	PP 157kPa					Very stiff consistency grey and brown mottled very high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.		
1.20-1.65	SPT N=15		3,3/3,4,4,4					
1.20-2.00	D							
1.80	PP 206kPa							
2.00-2.45	SPT N=17		2,3/3,4,5,5					
2.80	PP 181kPa							
3.00-3.45	SPT N=19		3,4/4,5,5,5		(5.00)			
3.00-4.00	D							
3.80	PP 167kPa							
4.00-4.45	SPT N=21		4,5/5,5,5,6					
4.80	PP 172kPa					Complete at 5.45m		
5.00-5.45	SPT N=23		6,5/5,6,6,6					
				44.55	5.45			

Remarks

Borehole dry and stable.
Grid reference information obtained from: gridreferencefinder.com.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.

Scale
(approx)

1:40

Logged
By

JW

Figure No.

LKC 21 1679.WS104

Excavation Method

Drive-in Windowless Sampler
driven to 5.45mbgl.

Dimensions
Location (Observed measurements)
386199 E 395724 N

Ground Level (mOD)

52.00

Client

Britannia Victoria Ltd

Job
Number
LKC 21 1679

Dates

19/08/2022

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.40	ES PID=0.4ppm			51.95	0.05 (0.15)	MADE GROUND: Tarmacadam.			
0.50-1.00	ES PID=0.4ppm			51.80	0.20 (0.30)	MADE GROUND: Blackish grey gravelly SAND with frequent ash, occasional clinker, rare brick fragments and coal fragments. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded of predominantly ash.			
1.00	PP 157kPa			51.50	0.50	MADE GROUND: Grey and red gravelly SAND with frequent brick fragments, occasional ash, coal fragments and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of predominantly brick.			
1.20-1.65	SPT N=11		2,2/2,2,3,4			Stiff to very stiff consistency high to very high strength brown and grey mottled slightly gravelly CLAY with rare coal fragments. Gravel is fine to medium, subangular to subrounded of mixed lithologies.			
1.20-2.00	D					Stiff consistency and high strength until 1.00mbgl. Very stiff consistency and very high strength below 1.00mbgl.			
1.80	PP 206kPa								
2.00-2.45	SPT N=17		3,3/3,4,4,6						
2.80	PP 181kPa								
3.00-3.45	SPT N=15		2,2/3,3,4,5		(4.95)				
3.00-4.00	D								
3.80	PP 167kPa								
4.00-4.45	SPT N=15		3,3/3,4,4,4						
4.00-5.00	D								
4.80	PP kPa								
4.80	PP 172kPa								
5.00-5.45	SPT N=22		Water strike(1) at 5.00m. 3,3/4,5,6,7			Very sandy clay band at 5.00mbgl. Sand is fine to coarse.		Σ1	
				46.55	5.45	Complete at 5.45m			

Remarks

Groundwater strike at 5.00mbgl.
Elevation information obtained from: www.freemaptools.com/elevation-finder.htm.
Grid reference information obtained from: gridreferencefinder.com.
Borehole stable.

Scale
(approx)

1:40

Logged
By

JW

Figure No.

LKC 21 1679.WS105

Excavation Method

Machine excavated pit to 1.10mbgl.

Dimensions

1.00m x 1.50m x 1.10m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location
Dates

21/07/2023

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.40	ES PID=5ppm				(0.40)	MADE GROUND: Brown slightly silty SAND and GRAVEL predominantly comprising brick and concrete fragments with occasional metal (wire), coal and slate. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded.		
0.40-0.60	ES PID=2.3ppm				0.40 (0.40)	MADE GROUND: Firm consistency brown and light grey mottled sandy silty CLAY with occasional brick fragments, coal and concrete fragments. Sand is fine to coarse.		
0.80	SV 86.67kPa		90kPa, 80kPa, 90kPa/Av. 86.67		0.80 (0.30) 1.10	Stiff to very stiff consistency high strength brown and light grey mottled slightly gravelly sandy silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone and sandstone. Clay is friable.		
						Complete at 1.10m		


Remarks

Pit dry and stable.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP201

Excavation Method

Machine excavated pit to 1.60mbgl.

Dimensions

1.00m x 1.50m x 1.60m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location
Dates

21/07/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.90	ES PID=119ppm				(0.90)	MADE GROUND: Firm consistency brown with occasional light grey mottling slightly gravelly sandy silty CLAY with frequent brick fragments, ash, coal, slate, ceramic fragments, occasional whole bricks, concrete fragments and metal (tins). Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone and sandstone.		
0.90-1.60	ES PID=1ppm				0.90	Stiff consistency high strength brown and light grey mottled slightly gravelly sandy silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone and coal.		
1.30	SV 91.67kPa		90kPa, 95kPa, 90kPa/Av. 91.67		(0.70)			
					1.60	Complete at 1.60m		


Remarks

Pit dry and stable.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP202

Excavation Method

Machine excavated pit to 2.00mbgl.

Dimensions

1.00m x 11.00m x 2.00m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location
Dates

21/07/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.40	ES PID=0.3ppm				(0.40)	MADE GROUND: Very light brown SAND and GRAVEL with occasional brick fragments, rootlets and rare roots. Sand is fine to coarse. Gravel is fine to coarse, sub-angular comprising limestone.		
0.40-0.70	ES PID=0.7ppm				0.40 (0.30)	MADE GROUND: Greyish brown gravelly slightly silty SAND with occasional rootlets, brick fragments, concrete slabs, sandstone slabs, coal and rare ash. Sand is fine to coarse. Gravel is fine to coarse, sub-angular comprising mudstone.		
0.70-1.30	ESB PID=2ppm				0.70	Eastern 1.00m of pit and western 1.00m of pit- slightly organic SILT is not present.		
					(0.60)	MADE GROUND: Slightly organic very sandy SILT with occasional brick fragments, glass fragments, ceramic fragments, timber and rootlets. Sand is fine to coarse.		
					1.30	Firm consistency medium strength light grey and orangish brown mottled slightly sandy silty CLAY. Sand is fine to medium. Ceramic drain at 1.40mbgl in western wall of pit.		
			Seepage(1) at 1.50m.		(0.70)			
1.70	SV 40kPa		40kPa, 40kPa, 40kPa/Av. 40.00		2.00	Complete at 2.00m		


Remarks

Perched water encountered at approximately 1.50mbgl in central area of pit. Initial moderate inflow of water, which stopped after approximately 1 minute. Pit unstable in upper 1.00m - collapse in north eastern wall of pit.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP203

Excavation Method

Machine excavated pit to 1.60mbgl.

Dimensions

2.00m x 3.00m x 1.60m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location
Dates

21/07/2023

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES PID=0.6ppm					MADE GROUND: Brown very sandy SILT with occasional roots, rootlets, concrete slabs (up to 1.50m x 1.00m), brick fragments, ceramic and glass fragments. Sand is fine to coarse.		
					(1.20)	Ceramic drain at 0.50mbgl in western side of pit.		
1.30	SV 58.33kPa		60kPa, 60kPa, 55kPa/Av. 58.33		1.20 (0.40)	Stiff consistency medium strength orangish brown and light grey slightly sandy silty CLAY. Sand is fine to medium. Ceramic drain in western wall of pit at 1.20mbgl surrounded by bricks.		
					1.60	Complete at 1.60m		


Remarks

Pit dry and stable.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP204

Excavation Method

Machine excavated pit to 1.70mbgl.

Dimensions

1.00m x 5.00m x 1.70m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**
LKC 21 1679

Location
Dates

21/07/2023

Engineer

LKC

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.90)	MADE GROUND: Brown slightly silty SAND and GRAVEL with frequent brick fragments, whole bricks, occasional concrete slabs, ceramic fragments, coal and rare ash. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising sandstone and mudstone.		
					0.90 (0.50)	MADE GROUND: Slightly organic very sandy SILT with occasional brick fragments, glass fragments, ceramic fragments, timber and rootlets. Sand is fine to coarse. Thickness of band of slightly organic very sandy SILT strata thins to the north.		
					1.40 (0.30)	Firm consistency light grey and orangish brown mottled slightly sandy silty CLAY. Sand is fine to medium.		
					1.70	Ceramic drains visible in northern end of pit at approximately 1.70mbgl.		
						Complete at 1.70m		


Remarks

Perched water present in base of trial pit from ceramic drains. Pit unstable in upper 1.00m.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP205

Excavation Method

Machine excavated pit to 1.90mbgl.

Dimensions

1.00m x 2.00m x 1.90m

Ground Level (mOD)
Client

Britannia Victoria Ltd

**Job
Number**

LKC 21 1679

Location
Dates

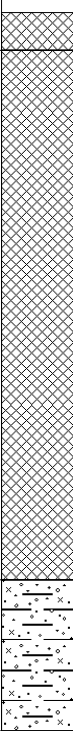
21/07/2023

Engineer

LKC

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-1.50	ESB PID=0.2ppm				<div> <div>(0.10)</div> <div>0.10</div> <div>(1.40)</div> <div>1.50</div> <div>(0.40)</div> <div>1.90</div> </div>	<p>MADE GROUND: Dark brown very sandy SILT with frequent rootlets. Sand is fine to medium.</p> <p>MADE GROUND: Brown slightly silty SAND with frequent whole bricks, brick fragments, occasional coal, ash and rootlets. Sand is fine to coarse.</p> <p>Very stiff consistency brown and grey mottled slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded comprising mudstone and coal. Clay is friable. Concrete floor at 1.50mbgl. Approximately 0.05m thickness.</p> <p>Complete at 1.90m</p>		


Remarks

Pit collapsing in upper 1.50m.
Pit dry.
Unable to take shear vane readings in clay strata as strata too friable.

Scale (approx)

1:20

Logged By

EM

Figure No.

LKC 21 1679.TP206

Appendix C – Certificates of Analysis - Chemical



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

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

DETS Report No: 23-09645

Site Reference: Victoria Park Probation Centre

Project / Job Ref: LKC 21 1679

Order No: LKC211679-EK

Sample Receipt Date: 25/07/2023

Sample Scheduled Date: 25/07/2023

Report Issue Number: 1

Reporting Date: 01/08/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 23-09645	Date Sampled	21/07/23	21/07/23	21/07/23	21/07/23	21/07/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Victoria Park Probation Centre	TP / BH No	TP201	TP201	TP202	TP203	TP203
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC211679-EK	Depth (m)	0.00 - 0.40	0.40 - 0.60	0.00 - 0.90	0.00 - 0.40	0.40 - 0.70
Reporting Date: 01/08/2023	DETS Sample No	665884	665885	665886	665887	665888

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
Asbestos Quantification ^(S)	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS			8.5		
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			815		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS			0.82		
Organic Matter (SOM)	%	< 0.1	MCERTS			1.7		
Arsenic (As)	mg/kg	< 2	MCERTS			9		
W/S Boron	mg/kg	< 1	NONE			< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS			1.2		
Chromium (Cr)	mg/kg	< 2	MCERTS			19		
Chromium (hexavalent)	mg/kg	< 2	NONE			< 2		
Copper (Cu)	mg/kg	< 4	MCERTS			29		
Lead (Pb)	mg/kg	< 3	MCERTS			47		
Mercury (Hg)	mg/kg	< 1	MCERTS			< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS			21		
Selenium (Se)	mg/kg	< 2	MCERTS			< 2		
Vanadium (V)	mg/kg	< 1	MCERTS			25		
Zinc (Zn)	mg/kg	< 3	MCERTS			155		
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



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: 23-09645	Date Sampled	21/07/23	21/07/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Victoria Park Probation Centre	TP / BH No	TP203	TP204			
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied	None Supplied			
Order No: LKC211679-EK	Depth (m)	0.70 - 1.30	0.00 - 1.00			
Reporting Date: 01/08/2023	DETS Sample No	665889	665891			

Determinand	Unit	RL	Accreditation	(n)			
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Detected	Not Detected		
Sample Matrix ^(S)	Material Type	N/a	NONE	Free Fibres			
Asbestos Type ^(S)	PLM Result	N/a	ISO17025	Chrysotile			
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	0.029			
pH	pH Units	N/a	MCERTS	8.9			
Total Cyanide	mg/kg	< 1	NONE				
Free Cyanide	mg/kg	< 1	NONE				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	211			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.21			
Organic Matter (SOM)	%	< 0.1	MCERTS	4.8			
Arsenic (As)	mg/kg	< 2	MCERTS	19			
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3			
Chromium (Cr)	mg/kg	< 2	MCERTS	19			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	58			
Lead (Pb)	mg/kg	< 3	MCERTS	191			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	21			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	29			
Zinc (Zn)	mg/kg	< 3	MCERTS	126			
Total Phenols (monohydric)	mg/kg	< 2	NONE				

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



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



Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-09645	Date Sampled	21/07/23	21/07/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Victoria Park Probation Centre	TP / BH No	TP202	TP203			
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied	None Supplied			
Order No: LKC211679-EK	Depth (m)	0.00 - 0.90	0.70 - 1.30			
Reporting Date: 01/08/2023	DETS Sample No	665886	665889			

Determinand	Unit	RL	Accreditation	(n)		
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.22	0.39	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.14	0.87	
Pyrene	mg/kg	< 0.1	MCERTS	0.14	0.86	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.29	
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.39	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.32	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.24	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3.6	

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



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



Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 23-09645	Date Sampled	21/07/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Victoria Park Probabtion Centre	TP / BH No	TP202				
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied				
Order No: LKC211679-EK	Depth (m)	0.00 - 0.90				
Reporting Date: 01/08/2023	DETS Sample No	665886				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	30			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	43			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	4			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	53			
Aliphatic >C34 - C44	mg/kg	< 10	NONE	< 10			
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	130			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	130			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10			
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10			
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	130			
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	130			



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



Soil Analysis Certificate - BTEX / MTBE

DETS Report No: 23-09645	Date Sampled	21/07/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Victoria Park Probation Centre	TP / BH No	TP202				
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied				
Order No: LKC211679-EK	Depth (m)	0.00 - 0.90				
Reporting Date: 01/08/2023	DETS Sample No	665886				

Determinand	Unit	RL	Accreditation				
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2			
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	8			
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	19			
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	37			
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5			



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



Soil Analysis Certificate - Volatile Organic Compounds (VOC)

DETS Report No: 23-09645	Date Sampled	21/07/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Victoria Park Probation Centre	TP / BH No	TP202				
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied				
Order No: LKC211679-EK	Depth (m)	0.00 - 0.90				
Reporting Date: 01/08/2023	DETS Sample No	665886				

Determinand	Unit	RL	Accreditation				
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5			
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5			
Chloromethane	ug/kg	< 10	MCERTS	< 10			
Chloroethane	ug/kg	< 5	MCERTS	< 5			
Bromomethane	ug/kg	< 10	MCERTS	< 10			
Trichlorofluoromethane	ug/kg	< 5	MCERTS	16			
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5			
MTBE	ug/kg	< 5	MCERTS	< 5			
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5			
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5			
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5			
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5			
Chloroform	ug/kg	< 5	MCERTS	< 5			
Bromochloromethane	ug/kg	< 5	MCERTS	< 5			
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5			
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10			
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5			
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5			
Benzene	ug/kg	< 2	MCERTS	< 2			
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5			
Trichloroethene	ug/kg	< 5	MCERTS	< 5			
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5			
Dibromomethane	ug/kg	< 5	MCERTS	< 5			
TAME	ug/kg	< 5	MCERTS	< 5			
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5			
Toluene	ug/kg	< 5	MCERTS	< 5			
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5			
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10			
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5			
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5			
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5			
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5			
Chlorobenzene	ug/kg	< 5	MCERTS	< 5			
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5			
Ethyl Benzene	ug/kg	< 2	MCERTS	8			
m,p-Xylene	ug/kg	< 2	MCERTS	19			
o-Xylene	ug/kg	< 2	MCERTS	37			
Styrene	ug/kg	< 5	MCERTS	< 5			
Bromoform	ug/kg	< 10	MCERTS	< 10			
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5			
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5			
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5			
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5			
Bromobenzene	ug/kg	< 5	MCERTS	< 5			
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5			
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5			
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5			
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5			
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5			
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5			
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5			
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5			
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5			
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5			
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5			
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10			
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5			



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



Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)

DETS Report No: 23-09645	Date Sampled	21/07/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Victoria Park Probabtion Centre	TP / BH No	TP202				
Project / Job Ref: LKC 21 1679	Additional Refs	None Supplied				
Order No: LKC211679-EK	Depth (m)	0.00 - 0.90				
Reporting Date: 01/08/2023	DETS Sample No	665886				

Determinand	Unit	RL	Accreditation				
Phenol	mg/kg	< 0.1	NONE	< 0.1			
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1			
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1			
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1			
0-Cresol	mg/kg	< 0.1	NONE	< 0.1			
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1			
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1			
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1			
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1			
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1			
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1			
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1			
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15			
Isophorone	mg/kg	< 0.1	NONE	< 0.1			
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1			
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15			
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1			
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15			
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1			
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1			
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	0.2			
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1			
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1			
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1			
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1			
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15			
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1			
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1			
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1			
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1			
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1			
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1			
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1			
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1			
Azobenzene	mg/kg	< 0.1	NONE	< 0.1			
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1			
Carbazole	mg/kg	< 0.1	ISO17025	0.2			
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	ISO17025	< 0.15			
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1			
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1			



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



Soil Analysis Certificate - Deleterious Materials						
DETS Report No: 23-09645	Date Sampled	21/07/23	21/07/23			
LK Consult Limited	Time Sampled	None Supplied	None Supplied			
Site Reference: Victoria Park Probation Centre	TP / BH No	TP203	TP206			
Project / Job Ref: LKC 21 1679	Additional Refs	Forensic Bag	Forensic Bag			
Order No: LKC211679-EK	Depth (m)	0.70 - 1.30	0.100 - 1.50			
Reporting Date: 01/08/2023	DETS Sample No	665890	665892			

Determinand	Unit	RL	Accreditation				
Fines <10mm	%	< 0.1	NONE	94.5	84.9		
Carbonaceous Material	%	< 0.1	NONE	0.1	0.4		
Gravel >10mm	%	< 0.1	NONE	3.9	5.7		
Concrete	%	< 0.1	NONE	< 0.1	< 0.1		
Brick	%	< 0.1	NONE	1	8		
Wood	%	< 0.1	NONE	0.4	0.2		
Vegetable Matter	%	< 0.1	NONE	< 0.1	0.5		
Textile	%	< 0.1	NONE	< 0.1	< 0.1		
Metal	%	< 0.1	NONE	< 0.1	0.1		
Glass	%	< 0.1	NONE	< 0.1	0.2		
Ceramics	%	< 0.1	NONE	< 0.1	< 0.1		
Paper & Card	%	< 0.1	NONE	< 0.1	< 0.1		
Fibrous Material	%	< 0.1	NONE	< 0.1	< 0.1		
Plastic	%	< 0.1	NONE	< 0.1	< 0.1		
Sharps	%	< 0.1	NONE	< 0.1	< 0.1		
Sample Mass	kg	< 0.1	NONE	19.7	9.6		
<10mm Soil Fraction TOC	%	< 0.1	MCERTS	2.8	3		



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



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-09645	
LK Consult Limited	
Site Reference: Victoria Park Probation Centre	
Project / Job Ref: LKC 21 1679	
Order No: LKC211679-EK	
Reporting Date: 01/08/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
665886	TP202	None Supplied	0.00 - 0.90	14	Brown sandy clay with brick and concrete
665889	TP203	None Supplied	0.70 - 1.30	18.2	Brown clay with stones
665890	TP203	Forensic Bag	0.70 - 1.30	18.2	Brown clay
665892	TP206	Forensic Bag	0.100 - 1.50	15.7	Black loamy sand with stones and brick

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

Insufficient Sample ^{1/s}

Unsuitable Sample ^{u/s}



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



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-09645

LK Consult Limited

Site Reference: Victoria Park Probation Centre

Project / Job Ref: LKC 21 1679

Order No: LKC211679-EK

Reporting Date: 01/08/2023

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

D Dried
AR As Received



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



List of HWOL Acronyms and Operators
DETS Report No: 23-09645
LK Consult Limited
Site Reference: Victoria Park Probation Centre
Project / Job Ref: LKC 21 1679
Order No: LKC211679-EK
Reporting Date: 01/08/2023

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

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

Appendix D – Generic Assessment Criteria

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

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.

All GAC are based on sandy loam soils with a pH 7.			LQM Generic Assessment Criteria (mg/kg) Dry weight soil					
Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}
		6%	2.4	2.4	32	290	14,000	2,900
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190
		6%	22	38	7.0	830	100	190
	Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30
		2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30
		6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100
		2.5%	2.0	150	0.30	4,000	620	1,100
		6%	4.5	210	0.70	4,300	620	1,100
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110
		2.5%	0.52	29	8.0E-02	400	60	120
		6%	1.2	31	0.19	400	60	120
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300
		2.5%	0.29	0.29	10	22	11,000	1,900
		6%	0.62	0.62	23	47	11,000	2,700
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48
		2.5%	0.7	0.78	0.61	66	25	50
		6%	1.6	1.8	1.4	120	25	51
	Phenol	1%	280	750	66	760 ^{dir} (31,000)	760 ^{dir} (11,000)	760 ^{dir} (8,600)
		2.5%	550	1,300	140	1,500 ^{dir} (35,000)	1,500 ^{dir} (11,000)	1,500 ^{dir} (9,700)
		6%	1,100	2,300	280	3,200 ^{dir} (37,000)	3,200 ^{dir} (11,000)	3,200 ^{dir} (11,000)

NOTES

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

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

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

Table 4.2a: EIC/AGS/CL:AIRE GAC for organics with 1% SOM

Contaminant	GAC for 1% SOM (mg.kg ⁻¹)				Soil Saturation Concentration (mg.kg ⁻¹)
	Residential with consumption of homegrown produce	Residential without consumption of homegrown produce	Allotments	Commercial	
1,1,2 Trichloroethane	0.6	0.88	0.28	94	4030
1,1-Dichloroethane	2.4	2.5	9.2	280	1830
1,1-Dichloroethene	0.23	0.23	2.8	26	2230
1,2,4-Trimethylbenzene	0.35	0.41	0.38	42	557
1,2-Dichloropropane	0.024	0.024	0.62	3.3	1190
2,4-Dimethylphenol	19	210	3.1	16000	1380
2,4-Dinitrotoluene	1.5	170	0.22	3700	141
2,6-Dinitrotoluene	0.78	78	0.12	1900	287
2-Chloronaphthalene	3.7	3.8	40	390	114
Biphenyl	66	220	14	18000	34.4
Bis (2-ethylhexyl) phthalate	280	2700	47	85000	8.68
Bromobenzene	0.87	0.91	3.2	97	853
Bromodichloromethane	0.016	0.019	0.016	2.1	1790
Bromoform	2.8	5.2	0.95	760	2690
Butyl benzyl phthalate	1400	42000	220	940000	26.3
Chloroethane	8.3	8.4	110	960	2610
Chloromethane	0.0083	0.0085	0.066	1.0	1910
Cis 1,2 Dichloroethene	0.11	0.12	0.26	14	3940
Dichloromethane	0.58	2.1	0.10	270	7270
Diethyl Phthalate	120	1800	19	150000	13.7
Di-n-butyl phthalate	13	450	2.0	15000	4.65
Di-n-octyl phthalate	2300	3400	940	89000	32.6
Hexachloroethane	0.20	0.22	0.27	22	8.17
Isopropylbenzene	11	12	32	1400	390
Methyl tert-butyl ether	49	73	23	7900	20400
Propylbenzene	34	40	34	4100	402
Styrene	8.1	35	1.6	3300	626
Total Cresols (2-, 3- and 4-methylphenol)	80	3700	12	160000	15000
Trans 1,2 Dichloroethene	0.19	0.19	0.93	22	3420
Tributyl tin oxide	0.25	1.4	0.042	130	41.3

Notes

It is strongly recommended that the accompanying EIC/AGS/CL:AIRE GAC report is read and understood if using these GAC

GAC in highlighted boxes exceed soil saturation concentration. Soil concentrations above soil saturation may indicate that NAPL is present. Risks from NAPL may need to be considered separately.

Table 4.3a: EIC/AGS/CL:AIRE GAC for organics with 2.5% SOM

Contaminant	GAC for 2.5% SOM (mg.kg ⁻¹)				Soil Saturation Concentration (mg.kg ⁻¹)
	Residential with consumption of homegrown produce	Residential without consumption of homegrown produce	Allotments	Commercial	
1,1,2 Trichloroethane	1.2	1.8	0.61	190	8210
1,1-Dichloroethane	3.9	4.1	17	450	2960
1,1-Dichloroethene	0.40	0.41	5.6	46	3940
1,2,4-Trimethylbenzene	0.85	0.99	0.93	99	1360
1,2-Dichloropropane	0.042	0.042	1.2	5.9	2110
2,4-Dimethylphenol	43	410	7.2	24000	3140
2,4-Dinitrotoluene	3.2	170	0.49	3700	299
2,6-Dinitrotoluene	1.7	84	0.27	1900	622
2-Chloronaphthalene	9.2	9.3	98	960	280
Biphenyl	160	500	35	33000	84.3
Bis (2-ethylhexyl) phthalate	610	2800	120	86000	21.6
Bromobenzene	2.0	2.1	7.6	220	1970
Bromodichloromethane	0.030	0.034	0.032	3.7	3220
Bromoform	5.9	11	2.1	1500	5480
Butyl benzyl phthalate	3300	44000	550	940000	64.7
Chloroethane	11	11	200	1300	3540
Chloromethane	0.0098	0.0099	0.13	1.2	2240
<i>Cis</i> 1,2 Dichloroethene	0.19	0.20	0.50	24	6610
Dichloromethane	0.98	2.8	0.19	360	9680
Diethyl Phthalate	260	3500	41	220000	29.1
Di- <i>n</i> -butyl phthalate	31	450	5.0	15000	11.4
Di- <i>n</i> -octyl phthalate	2800	3400	2100	89000	81.5
Hexachloroethane	0.48	0.54	0.67	53	20.1
Isopropylbenzene	27	28	79	3300	950
Methyl <i>tert</i> -butyl ether	84	120	44	13000	33100
Propylbenzene	82	97	83	9700	981
Styrene	19	78	3.7	6500	1440
Total Cresols (2-, 3- and 4-methylphenol)	180	5400	27	180000	32500
<i>Trans</i> 1,2 Dichloroethene	0.34	0.35	1.9	40	6170
Tributyl tin oxide	0.59	3.1	0.10	180	101

Notes

It is strongly recommended that the accompanying EIC/AGS/CL:AIRE GAC report is read and understood if using these GAC.

GAC in highlighted boxes exceed soil saturation concentration. Soil concentrations above soil saturation may indicate that NAPL is present. Risks from NAPL may need to be considered separately.

Table 4.4a: EIC/AGS/CL:AIRE GAC for organics with 6% SOM

Contaminant	GAC for 6% SOM (mg.kg ⁻¹)				Soil Saturation Concentration (mg.kg ⁻¹)
	Residential with consumption of homegrown produce	Residential without consumption of homegrown produce	Allotments	Commercial	
1,1,2 Trichloroethane	2.7	3.9	1.4	400	18000
1,1-Dichloroethane	7.4	7.7	35	850	5600
1,1-Dichloroethene	0.82	0.82	12	92	7940
1,2,4-Trimethylbenzene	2.0	2.3	2.2	220	3250
1,2-Dichloropropane	0.084	0.085	2.6	12	4240
2,4-Dimethylphenol	97	730	17	30000	7240
2,4-Dinitrotoluene	7.2	170	1.1	3800	669
2,6-Dinitrotoluene	3.9	87	0.61	1900	1400
2-Chloronaphthalene	22	22	230	2200	669
Biphenyl	360	980	83	48000	201
Bis (2-ethylhexyl) phthalate	1100	2800	280	86000	51.7
Bromobenzene	4.7	4.9	18	520	4580
Bromodichloromethane	0.061	0.070	0.068	7.6	6570
Bromoform	13	23	4.6	3100	12000
Butyl benzyl phthalate	7200	44000	1300	950000	154
Chloroethane	18	18	380	2100	5710
Chloromethane	0.013	0.013	0.23	1.6	2990
Cis 1,2 Dichloroethene	0.37	0.39	1.0	47	12900
Dichloromethane	1.7	4.5	0.34	560	15300
Diethyl Phthalate	570	6300	94	290000	65
Di-n-butyl phthalate	67	450	12	15000	27.3
Di-n-octyl phthalate	3100	3400	3900	89000	196
Hexachloroethane	1.1	1.3	1.6	120	48.1
Isopropylbenzene	64	67	190	7700	2250
Methyl <i>tert</i> -butyl ether	160	220	90	24000	62700
Propylbenzene	190	230	200	21000	2330
Styrene	43	170	8.7	11000	3350
Total Cresols (2-, 3- and 4-methylphenol)	400	6900	63	180000	73300
<i>Trans</i> 1,2 Dichloroethene	0.70	0.71	4.0	81	12600
Tributyl tin oxide	1.3	5.7	0.24	200	241

Notes

It is strongly recommended that the accompanying EIC/AGS/CL:AIRE GAC report is read and understood if using these GAC.

GAC in highlighted boxes exceed soil saturation concentration. Soil concentrations above soil saturation may indicate that NAPL is present. Risks from NAPL may need to be considered separately.

Appendix E – JIWG Assessment



Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Chrysotile alone	0
Sub-total		10
Hazard ranking		Low

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



Stage 2			
Emission Factors		Score	
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Low quantities - >0.01 to <0.05 %wt/wt	2	
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Very low	1	
Activity type and effect on deterioration of ACMs	Minimal disturbance, no deterioration expected	1	
Best description of primary host material matrix	Fine Silt and/or Clay	1	
Sub-total		5	
Exposure ranking			Low



Joint Industry **Working Group**

Asbestos in Soil and Construction & Demolition Materials

Stage 3		Score	
Pathway and Receptor Sensitivity			
Receptor category	Residential	No score required	
Age of Receptor	Infant (under 5)	4	
Duration of exposure/site occupancy	>> 10 hours per day (e.g. 24 hour residential exposure)	4	
Receptor ranking		8	High
Combined hazard, exposure and receptor ranking			Medium
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	Material buried at shallow depth, potential to be disturbed by excavation	C	
Pathway ranking		4C	Low
Overall ranking			Low



Joint Industry **Working Group**

Asbestos in Soil and Construction & Demolition Materials

Project Reference	LKC 21 1679 TP203
Site Name	Victoria Park Probation Centre
Client	Victoria Britannia Ltd
Run by	EM
Date	09-Aug-23
Reviewed by	EK
Characterisation of scenario being evaluated	Fibres present in the ground, residential with plant uptake, assuming 600mm cover system placed in gardens.
Interpretation of scenario ranking by DST	Assumes 600mm environmental cover system in place with break layer.

Appendix F – Environmental Cover System

Either (physical break layer)		Or (geotextile membrane)	
600mm rear gardens, kitchen garden & raised planters. 450mm front gardens, shared landscaping & residents garden (minimum)	Chemically validated TOPSOIL ¹	600mm rear gardens, kitchen garden & raised planters. 450mm front gardens & shared landscaping& residents garden (minimum)	Chemically validated TOPSOIL ¹
	Chemically validated SUBSOIL		Chemically validated SUBSOIL
	100mm (minimum) PHYSICAL BREAK LAYER ² or PAVING SLABS		GEOTEXTILE MEMBRANE (at base of subsoil)
Existing MADE GROUND			

Typical Environmental Cover System Construction.

Notes:

Hardstood Areas – No Remediation Required.

¹NHBC recommend 100mm minimum topsoil depth.

²Gravel break layer, minimal fines.

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