# CONTAMINATED LAND RISK ASSESSMENT

## Phase 2 Environmental Site Investigation Report

**Site**
Former Garage
Bartram Close
Uxbridge
UB8 3AX

**Client**
Melim Management

**Report Reference**
PH2-2022-000018

**Prepared by**
STM Environmental Consultants Ltd

**Date**
14/04/2022

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| **Site Coordinates:** | 507678, 182105 |
| **Prepared for:** | Melim Management |
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This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

It should be noted that this report has been produced for environmental purposes only. It should not in any way be construed to be or used to replace a geotechnical survey, structural survey, asbestos survey, buried services survey, unexploded ordnance survey or invasive plant survey.

# 3 EXECUTIVE SUMMARY

| SECTION | SUMMARY |
|---|---|
| **Site Location and Description** | The site is located at Former Garage, Bartram Close, Uxbridge, UB8 3AX and is centred at national grid reference 507678, 182105. The site has an area of approximately 0.03 ha. |
| **Proposed Development** | The development proposal is for the '*Construction of 2 bungalows with dormers, parking spaces, changes to existing crossover and all associated external works*.' It is understood that there are proposals to include soft landscaping in the development.<br><br>It is understood that private gardens are included in the proposed development. |
| **Summary of Phase 1 Desk Study** | A Phase 1 Desk Study was carried out by STM in March 2022 which indicated that the site has been subject to past potentially contaminative land uses (PCLUs) including a Car Park, an Orchard and Domestic Garages while off site PCLUs have included an Orchard (adjacent N) and 3no. Infilled Ponds (40m SW, 90m SW, and 180m E). A conceptual risk site model was constructed and a qualitative risk assessment carried out. This identified potentially significant potential pollutant linkages with respect to human health and property receptors.<br><br>The Desk Study recommended that an intrusive site investigation be carried out with the objective of determining the presence and extent of any soil contamination at the site. |
| **Summary of Site Investigation** | Site investigation works were carried out on the 22nd of March 2022. A total of 4no. boreholes (BH01 – BH04) were excavated to a maximum depth of 2 mbgl using a dynamic windowless sampler rig.<br><br>A total of 6no. soil samples were collected from depths ranging between 0.3 – 0.9 mbgl and submitted to a UKAS/MCERTS accredited laboratory for analysis of Heavy Metals, TPH, BTEX, PAHs, SVOCs and Asbestos. |
| **Updated Contamination Assessment** | The strata encountered generally consisted of Made Ground comprising clayey Silt and gravelly Sand to a maximum depth of 0.5 mbgl. This was underlain by sandy and gravelly clayey Silt. Visual indications of contamination of the Made Ground were observed (i.e. fragments of bituminous material and concrete) generally across the site. No significant odours or PID readings were recorded during the investigation.<br><br>A Generic Quantitative Risk Assessment was carried out where the results of the soil sample analysis were compared to Generic Assessment Criteria (GAC) for a residential housing with home-grown produce land use scenario. |

| SECTION | SUMMARY |
|---|---|
| | Results of the soil sample analysis indicate that concentrations of Lead and Dibenzo(ah)anthracene, marginally exceeded their adopted GAC for a residential with home-grown produce scenario in 1no. of the 4no. borehole locations. Asbestos was not identified in any of the samples screened.<br><br>The Conceptual Risk Model for the site was reassessed incorporating the results of the site investigation. Potentially Significant Potential Pollutant Linkages were considered to exist with respect to human health receptors due to the elevated Lead and Dibenzo(ah)anthracene that were identified in the area of BH04. This was concerned with the risk of human health receptors (future occupiers) being exposed to the contamination identified while undertaking recreational activities in the proposed garden area surrounding BH04. |
| **Conclusions and Recommendations** | Given the findings of the site investigation, it is recommended that remedial measures are undertaken in the area of BH04 in order to break the Potential Pollutant Linkages identified and to render the site suitable for the proposed residential end use.<br><br>Remedial measures will likely comprise of the excavation of Made Ground and replacement with clean certified fill around this area depending on visual signs of contamination observed during the excavation.<br><br>A formal remediation strategy will need to be submitted to the Local Planning Authority for approval. Once completed, the remedial works will need to be validated and a remediation verification report submitted to the Local Planning Authority for approval prior to occupation of the development.<br><br>It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined in this document should be followed. |

# 4 INTRODUCTION

STM Environmental Consultants Limited were commissioned by Melim Management to undertake a preliminary risk assessment at Former Garage, Bartram Close, Uxbridge, UB8 3AX (the site).

## 4.1 Development Proposal

The report was produced to support the discharge of Condition 13(b) attached to Planning Permission 75240/APP/2021/4431 for the *"Construction of 2 bungalows with dormers, parking spaces, changes to existing crossover and all associated external works."* It is understood that there are proposals to include soft landscaping in the development.

The proposed development plans are available in Appendix 1.

## 4.2 Report Objectives

The main objectives of the study were to:

- Provide information for a generic quantitative risk assessment (GQRA) to be undertaken;
- Refine the Conceptual Site Risk Model using the findings of the GQRA;
- Inform the need for and scope of any remedial works that may be required.

A summary of the findings of the site investigation and GQRA are detailed within this report.

This report should be read in conjunction with the Desk Study Report (Ref: PH1-2022-000025) produced for the site by STM Environmental Consultants in March 2022 which is summarised below.

# 5 SUMMARY OF DESK STUDY FINDINGS

## 5.1 Site Location

The site is located at Former Garage, Bartram Close, Uxbridge, UB8 3AX and is centred at national grid reference 507678, 182105. The site has an area of approximately 0.03 ha.

The site lies within the jurisdiction of London Borough of Hillingdon Council in terms of the planning process. Maps showing the location of the site are shown in the figure below.

## 5.2 Current Site and Surrounding Land Uses

The site is currently used as a car parking area. The surrounding area is predominantly residential.

## 5.3 Site History

Examination of Ordnance Survey historic maps revealed that the site was an Orchard from c.1895-97 until c.1965-66, when the site was redeveloped as 9no. Small Domestic Garages. The Garages were demolished in c.2022 after which the site use changed to a Car Park. The surrounding area has been predominately residential since c.1935 to present day.

The Phase 1 Desktop Study indicated that the site and immediate surrounding area had been subject to past potentially contaminative uses including a Car Park, an Orchard, Domestic Garages, Orchard (adjacent N) and 3no. Infilled Ponds (40m SW, 90m SW, and 180m E).


Figure 1: Maps showing the location of the site

## 5.4 Previous Site Investigations

A search of relevant information on London Borough of Hillingdon Council's planning portal did not identify any records of previous contaminated land site investigations at or in the vicinity of the site.

## 5.5 Qualitative Risk Assessment

A qualitative risk assessment was undertaken in order to assess the magnitude of the potential risks identified in the Phase 1 Report.

### 5.5.1 Potential Sources

Any Potentially Contaminative Land Uses (PCLUs) within a 50m radius of the site as well as any PCLUs with high pollution migration potential within 250m of the site were considered to be of concern and were included within the assessment.

A summary is provided in the table below.

Table 1: Summary of potential contamination sources, period of operation and distance from site.

| Site Name | Industrial Profile | Approx. Year Use Established | Approx. Year Use Ended | Direction | Approx. Distance from Site (m) |
|---|---|---|---|---|---|
| **Car Park** | Road Vehicle - Garages and Filling Station | Unknown | Current (c. 2022) | On-Site | 0 |
| **Orchards** | - | c. 1895-87 | c. 1965-66 | On Site<br>N | 0<br>Adjacent |
| **Domestic Garages** | Road Vehicle: Garages and Filling Station | c. 1965-66 | Unknown | On Site | 0 |
| **Infilled Ponds** | Unknown Filled Ground (Pond, Marsh, River, Stream, Dock etc) | c. 1935<br>c. 1938<br>c. 1935 | Current (c. 2022) | SW<br>SW<br>E | 40<br>90<br>180 |

### 5.5.2 Potential Receptors

Potential human health receptors were considered to include future site users, construction workers and neighbours. Property receptors were considered to include onsite buildings and services.

Data from the BGS indicates that the site is underlain by superficial deposits consisting of Boyn Hill Gravel Member comprising Sand and Gravel which are classified as a Secondary A Aquifer. The bedrock consists of London Clay Formation comprising Clay, Silt and Sand and is classified as an Unproductive Aquifer. There are no groundwater Source Protection Zones on or within 250m of the site and no Surface Water or Potable Water Abstraction Licenses were identified on or within 250m of the site. However, the following Groundwater Abstraction Licenses were identified within 250m of the site:

Table 2: Groundwater Abstraction Licenses identified within 250m of the site.

| Point | Status | Details | Source | Distance/ Direction |
|---|---|---|---|---|
| **BOREHOLE AT WHITELYS PARADE** | Historical | Laundry Use | Thames Groundwater | 212m NE |
| **BLUE DRAGON (HILLINGDON) LTD** | Active | Laundry Use | Thames Groundwater | 221m NE |

No surface water bodies were identified on or within 250m of the site.

No designated ecological receptors were identified onsite or within 250m of the site.

### 5.5.3 Conceptual Site Risk Model

A preliminary conceptual site risk model (CSM) was constructed in order to assess potential pollutant linkages.

Potentially significant potential pollutant linkages (PPLs) were identified with respect to:

- Human health receptors (PPL1a, PPL1b; and PPL2a, PPL2b)
- Property (PPL6a and PPL6b)

The desk study recommended that an intrusive site investigation be carried out to determine the presence and extent of any soil contamination at the site.

# 6 SITE INVESTIGATION

The site investigation works were carried out on the 22nd of March 2022 and were undertaken in general accordance with the following guidance:

- Land contamination risk management (LCRM) guidance - DEFRA;
- BS 10175 - Code of practice for the Investigation of potentially contaminated sites British Standard Institution;
- BS5930:2015 Code of Practice for Ground Investigation
- BS 8485: 2015 - Code of practice for the Characterisation and remediation from Ground Gas in Affected Developments. British Standard Institution;
- BS8576:2013, Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs);
- C665, 2007 - Assessing Risks posed by Hazardous Ground Gases to Buildings CIRIA.

## 6.1 Strategy and Scope of the Site Investigation and Risk Assessment

A total of 4no. sampling locations (BH01 – BH04) were excavated to 2 mbgl for contamination assessment purposes. A semi-targeted sampling strategy was used to select the locations of the exploratory positions with boreholes being generally equally spaced out across the site with efforts being made to ensure that samples were collected from the most sensitive areas (i.e. gardens) of the proposed development.

As the investigation was primarily focused on assessing the quality of near surface soils, samples were collected at depths between 0.3 – 0.9 mbgl.

A map showing the locations of boreholes and the borehole logs are available in Appendix 2.

### 6.1.1 On-site Screening of Volatile Organic Compounds

Soil from each borehole was screened on site for volatile organic compounds (VOCs) using a hand held Minirae photo-ionisation detector (PID) which has a detection limit of 0.1 parts per billion (ppb). The PID was calibrated in the field prior to use using a gas of known concentration (isobutylene gas – 100ppm).

Soil vapour readings were taken using the headspace method, which involved placing the soil sample into a sealed plastic bag and then taking a reading by placing the PID filter into the bag.

### 6.1.2 Sample Collection and Transport

All samples were put into sample containers (jars and tubs) that were tightly sealed with minimal headspace. The sample containers were put into a cooler box immediately on collection and kept cool until analysis was undertaken at the laboratory.

### 6.1.3 Laboratory Analysis

A total of 6no. soil samples were submitted to a UKAS\MCERTs accredited laboratory for analysis of the following:

- Heavy Metals – Arsenic, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc;
- Petroleum Hydrocarbons (TPHCWG);
- Total Phenols - Total Phenols (Monohydric);
- Monoaromatics – Benzene, Toluene, Ethylbenzene, p & m-xylene, o-xylene, MTBE (Methyl Tertiary Butyl Ether);
- Speciated PAHs – Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;
- Total PAHs - Speciated Total EPA-16 PAHs;
- Asbestos Screening and Quantification;
- Inorganics - pH – Automated, Total Cyanide, Water Soluble Sulphate, Sulphide, Total Organic Carbon (TOC);
- SVOCs.

### 6.1.4 Groundwater, Ground Gas and Vapour Monitoring

No ground gas or vapour monitoring was carried out as part of the site investigation.

## 6.2 Site Investigation Findings

### 6.2.1 Ground Conditions

Made Ground comprising clayey Silt and gravelly Sand was encountered to a maximum depth of 0.5 mbgl. This was underlain by sandy and gravelly clayey Silt.

The borehole logs shown in Appendix 3 and photographs from some of the soils extracted from the boreholes are presented in Appendix 4.

### 6.2.2 Groundwater

Groundwater was not encountered during the site investigation.

### 6.2.3 Visual and Olfactory Signs of Contamination

Visual indications of contamination of the Made Ground were observed (i.e. fragments of bituminous material and concrete) generally across the site. No significant odours or PID readings were recorded during the investigation. The PID readings can be seen in the borehole logs shown in Appendix 3.

## 6.3 Laboratory Sample Analysis Results

A total of 6no. soil samples were submitted for analysis. The full results of the laboratory sample analysis can be seen in Appendix 5.

# 7 GENERIC QUANTITATIVE RISK ASSESSMENT

A GQRA was conducted using the soil analytical results in order to further evaluate the significance of the potential pollutant linkages identified in the Preliminary Risk Assessment in the Desk Study.

## 7.1 Generic Assessment Criteria for Soils

The GAC used for the screening of the soils and their sources are outlined in the table in Appendix 6. The GAC used are a combination of the DEFRA's Category 4 Screening Levels and the CIEH\LQM GAC for residential with homegrown produce.

### 7.1.1 Soil Organic Matter Content

Sample results indicated that soils on the site have an average Total Organic Carbon (TOC) content of 1.15%, which based on a conversion factor of 1.72, indicates a Soil Organic Matter (SOM) of around 1.98%. For reasons of conservatism, a soil organic matter content of 1% rather than 2.5% was assumed.

## 7.2 Statistical Tests

Although the sample size was insufficient to be considered statistically valid, it was nonetheless considered useful to undertake statistical analysis on the sample results.

The statistical analysis was carried out in accordance with the methodology laid out in the document "Guidance on comparing soil contamination data with a critical concentration" published by the Chartered Institute of Environmental Health and CLAIRE.

### 7.2.1 Test Scenario

The "Planning" scenario was used to undertake the statistical tests. Under this scenario, the Alternative Hypothesis is that "the true mean is lower than the critical concentration" and the Null hypothesis is that "the true mean is equal to or greater than the critical concentration". The critical concentration was taken as the relevant GAC for each contaminant.

### 7.2.2 Non-Detects

For the purpose of the statistical tests, sample results where the contaminant concentrations were below the limit of detection were set to zero. Statistical tests were only carried out on datasets where at least one of the samples returned a contaminant concentration above the limit of detection.

### 7.2.3 Data Distribution

The Shapiro-Wilk normality test was used to assess whether datasets were normally or non-normally distributed.

## 7.3 Results of Statistical Analysis

### 7.3.1 Contaminants Exceeding Generic Assessment Criteria

A summary of contaminants that were found to be present in concentrations that marginally exceeded the GAC is shown Table 3 below.

Table 3: Contaminants Exceeding GAC

| Contaminant | GAC (mg/kg) | No. of Exceedances | Measured Concentrations (mg/kg) | | Exceedance Borehole Locations |
|---|---|---|---|---|---|
| | | | Mean | Maximum | |
| Dibenzo(ah)anthracene | 0.24 | 1 | 0.05 | 0.28 | BH04/1* |
| Lead | 200 | 1 | 97.67 | 240 | BH04/1* |

**Maximum value location*

### 7.3.2 Statistical Analysis

The results of statistical analysis are presented in Appendix 7. Statistical analysis indicated that the Lead dataset had a normal distribution while Dibenzo(ah)anthracene had a non-normal distribution. They both passed the Mean Value test but failed the Chebychev test. When the maximum values (i.e. exceedances) were excluded from the dataset, the remaining results passed both the Mean Value and Chebychev tests indicating that BH04 is likely to be a hotspot.

## 7.4 Asbestos

No Asbestos was not detected in any of the samples analysed.

# 8 RE-ASSESSMENT OF POTENTIAL POLLUTANT LINKAGES

The Potential Pollutant Linkages (PPLs) identified as being plausible in the Desk Study are concerned with the following risks:

- Risk of direct contact (ingestion and absorption) with and inhalation of contaminants to on-site human health receptors (PPL1a – Future Occupiers and PPL1c – Construction Workers);
- Risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within on-site dwellings. (PPL1b- – Future Occupiers and PPL1d - Construction Workers);
- Risk of direct contact with (ingestion and absorption) and inhalation of contaminants to off-site human health receptors as a result of on-site contaminants migrating off-site (PPL2a);
- Risk of injury/death to off-site human health receptors as a result of explosion due to migration of on-site ground gas and subsequent accumulation in confined spaces in off-site buildings. (PPL2b);
- Risk of deterioration of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer (PPL3);
- Risk of deterioration of surface water quality resulting from the migration and entry of on-site contaminants into the surface water receptor (PPL4);
- Risk of deterioration of ecological quality resulting from the migration and entry of on-site contaminants to the ecological receptor during development and after completion (PPL5);
- Risk of damage to buildings and services from on and off-site contaminants (PPL6a);
- Risk of damage to property as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within buildings (PPL6b).

The Desk Study concluded that PPL1a, PPL1b, PPL6a and PPL6b had the potential to be significant. All of the PPLs were re-assessed considering the soil analytical results obtained from site investigation. The table below presents the results of the re-assessment.

A detailed explanation of the risk assessment methodology is available in Appendix 8.

Table 4: Results of Qualitative Risk Assessment.

| CRITERIA | POTENTIAL POLLUTANT LINKAGES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PPL1a | PPL1b | PPL1c | PPL1d | PPL2a | PPL2b | PPL3 | PPL4 | PPL5 | PPL6a | PPL6b |
| SEVERITY | Major (4) | Major (4) | Major (4) | Major (4) | Major (4) | Major (4) | Moderate (3) | Moderate (3) | Moderate (3) | Moderate (3) | Moderate (3) |
| LIKELIHOOD | Possible (3) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) | Improbable (1) |
| RISK | Moderate (12) | Low (4) | Low (4) | Low (4) | Low (4) | Low (4) | Very Low (3) | Very Low (3) | Very Low (3) | Very Low (3) | Very Low (3) |
| POTENTIALLY SIGNIFCANT? | **YES** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

## 8.1 Potential Risks to On-Site Human Health

PPL1a and PPL1c are concerned with the risk of direct contact (ingestion and dermal absorption) with and inhalation of on and off-site contaminants by on site human health receptors. PPL1a is considered to have the potential to be significant given the Lead and Dibenzo(ah)anthracene contamination identified in location BH04. As the proposal is to introduce residential dwellings with gardens, it is possible that human health receptors (i.e. future occupiers of the dwellings) could be exposed to contamination while undertaking recreational activities in the gardens.

PPL1c is considered unlikely to be significant as it is considered that any potential risks to groundworkers can be adequately dealt with by ensuring that standard health and safety measures are implemented during the construction phase.

PPL1b and PPL1d are concerned with the risk of injury/death of on-site human health receptors as a result of explosion due to the potential accumulation of ground gases and vapours from on and off-site sources. PPL1b is considered unlikely to have the potential to be significant as no potential sources of explosive ground gases (i.e. landfills) were identified on or in the vicinity of the site.

## 8.2 Potential Risks to Off-Site Human Health

PPL2a is concerned with the risk of direct contact and inhalation of contaminants emanating from the site by off-site human health receptors. PPL2a is considered unlikely to have the potential to be significant as it is considered that the contaminants present at the site are not of sufficient magnitude or mobility as to significantly impact off-site human receptors.

PPL2b is concerned with the risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gases from on-site sources. PPL2b is considered unlikely to have the potential to be significant as no sources of potentially explosive ground gases (i.e. landfills) were identified on the site.

## 8.3 Potential Risks to Groundwater Receptors

PPL3 is concerned with the risk of deterioration of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer. PPL3 is considered unlikely to have the potential to be significant. Although the underlying aquifer is classified as Secondary A, it is considered that the contaminants identified at the site are unlikely to be of sufficient magnitude or mobility to significantly impact groundwater receptors. Additionally, the site does not lie within a Source Protection Zone.

## 8.4 Potential Risks to Surface Water Receptors

PPL4 is concerned with the risk of negative impacts on surface water quality resulting from the migration and entry of on-site contaminants into surface water receptors. PPL4 is considered unlikely to have the potential to be significant as no surface water bodies were identified within the vicinity of the site.

## 8.5 Potential Risks to Ecological Receptors

PPL5 is concerned with the risk of negative ecological impacts resulting from potential on-site contaminants. PPL5 is considered unlikely to have the potential to be significant given that no designated ecological receptors were identified onsite or within 250m of the site.

## 8.6 Potential Risks to Property Receptors

PPL6a is concerned with the risk of damage to on site buildings and services from on and off-site contaminants. If contaminated, the soil may contain aggressive chemicals (i.e. Sulphates, VOCs) that

can attack building materials and services. PPL6a is considered unlikely to have the potential to be significant as site investigation did not identify any elevated levels of aggressive contaminants.

PPL6b is concerned with the risk of damage to property as a result of explosion due to migration of on and off-site ground gases and vapours and their subsequent accumulation in confined spaces in on-site buildings. PPL6b is considered unlikely to have the potential to be significant as no potential sources of explosive ground gases (i.e. landfills) were identified on or in the vicinity of the site.

# 9 CONCLUSIONS

In response to the findings of the Desk Study carried out for the site by STM Environmental Consultants, an environmental site investigation was carried out on the 22nd of March 2022. The objective of the investigation was to determine the presence and extent of potential contamination at the site in order to further inform the risk assessment process.

A total of 4no. boreholes were advanced to a maximum depth of 2 mbgl for the purposes of environmental soil sampling. 6no. soil samples were taken from depths ranging from 0.3 – 0.6 mbgl. The samples were submitted to a UKAS/MCERTS accredited laboratory for analysis of Heavy Metals, TPH, BTEX, PAHs, SVOCs and Asbestos.

A Generic Quantitative Risk Assessment was carried out where the results of the soil sample analysis were compared to Generic Assessment Criteria (GAC) for the proposed residential with homegrown produce land use scenario.

Results of the soil sample analysis indicate that concentrations of Lead and Dibenzo(ah)anthracene, marginally exceeded their adopted GAC for a residential with home-grown produce scenario in 1no. of the 4no. borehole locations. Asbestos was not identified in any of the samples screened.

The Conceptual Risk Model for the site was reassessed incorporating the results of the site investigation. Potentially Significant Potential Pollutant Linkages were considered to exist with respect to human health receptors due to the elevated Lead and Dibenzo(ah)anthracene that were identified in the area of BH04. This was concerned with the risk of human health receptors (future occupiers) being exposed to the contamination identified while undertaking recreational activities in the proposed garden area surrounding BH04.

The revised conceptual site risk model is summarised in Table 5 below.

Table 5: Summary of revised conceptual site risk model

| Potential Receptor | Potential Pathway | Potential Hazard | PSPPL? | Risk |
|---|---|---|---|---|
| **On-Site Human Health** (Future Occupiers) | Ingestion/Absorption Inhalation | Adverse health Injury/Death | **Yes** | **Moderate** |
| | Build-up of Methane/ VOCs in confined spaces | Explosion/ Fire Injury/Death | **No** | **Low** |
| **Off-Site Human Health** | Ingestion/Absorption Inhalation | Adverse health Injury/Death | **No** | **Low** |
| | Build-up of Methane/ VOCs in confined spaces | Explosion/ Fire Injury/Death | **No** | **Low** |
| **Groundwater** | Percolation/Leaching | Adverse groundwater quality | **No** | **Very Low** |

| Potential Receptor | Potential Pathway | Potential Hazard | PSPPL? | Risk |
|---|---|---|---|---|
| **Surface Water** | Lateral Migration Groundwater baseflow | Adverse Surface water quality | **No** | **Very Low** |
| **Ecology** | Ingestion/Absorption | Adverse health Injury/Death | **No** | **Very Low** |
| **Property** | Physical Contact/Absorption | Damage to building and services | **No** | **Very Low** |
| | Build-up of Methane/ VOCs in confined spaces | Explosion/ Fire Damage to building | **No** | **Very Low** |

# 10 RECOMMENDATIONS

## 10.1 Remedial Action

Given the findings of the site investigation, it is recommended that remedial measures are undertaken in the area of BH04 in order to break the Potential Pollutant Linkages identified and to render the site suitable for the proposed residential end use.

Remedial measures will likely comprise of the excavation of Made Ground and replacement with clean certified fill around this area depending on visual signs of contamination observed during the excavation.

A formal remediation strategy will need to be submitted to the Local Planning Authority for approval. Once completed, the remedial works will need to be validated by a qualified Environmental Consultant and a remediation verification report submitted to the Local Planning Authority for approval prior to occupation of the development.

## 10.2 Watching Brief and Discovery Strategy

It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined below should be followed.

- Works should be halted if any suspicious ground conditions are identified by groundworkers;
- The Contractor should assess the need for any immediate health and safety or environmental management control measures. If control measures are considered to be required, they should be implemented;
- The Contractor should notify the Client’s Environmental Consultant and the Local Planning Authority;
- The Environmental Consultant should attend the site to record the extent of ‘contamination’ and if necessary, to collect samples;
- If remedial action is considered necessary then the proposed works should be agreed with the Local Planning Authority prior to implementation;
- Once remediation is complete, the Environmental Consultant should collate evidence of work carried out for inclusion in a Remediation Verification Report which should be submitted to the Local Planning Authority.

## 10.3 Health and Safety

Given that contaminants have been identified on the site, measures will be necessary to protect the health and safety of site workers during the site works. The following measures are suggested to provide a minimum level of protection.

- Provision of appropriate Personal Protective Equipment (PPE) including protective clothing, footwear, gloves and dust masks to all groundworkers on-site. These should not be removed from site, and advice should be given on when and how they are to be used.
- Great care should be taken to minimise the amount of dust and mud generated on-site.
- Good practices relating to personal hygiene (i.e. washing and changing procedures) should be adhered to on-site, i.e. food and drink should only be consumed within designated areas on the site and smoking should be prohibited in all working areas.
- Availability of site welfare;
- Daily safety briefings

All site works should be carried out in accordance with Health and Safety Executive regulations and guidelines and the Contractor's Construction Health and Safety Plan. Particular should be made to the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Development of Contaminated Land".

## 10.4 Waste Disposal

Groundworks at the site are likely to give rise to waste soils. These may require classification before removal from site to an appropriately licensed facility for treatment or final disposal. The Environment Agency's Hazardous Waste Technical Guidance document (WM3) outlines the methodology for classifying wastes.

The contractor will need to keep a full documentary record of the waste disposal works in line with Duty of Care requirements. The record will include waste transfer notes and details of the receiving site. Copies of all relevant documents should be provided to the Client's Environmental Consultant for inclusion in the remediation verification report.

## 10.5 Services

The Statutory Water Undertaker for the area should be contacted in relation to new services that are to be installed as part of the proposed development in order to determine their specification for the type of pipework/conduits that should be used on this site.

# 11 INFORMATION GAPS AND UNCERTAINTIES

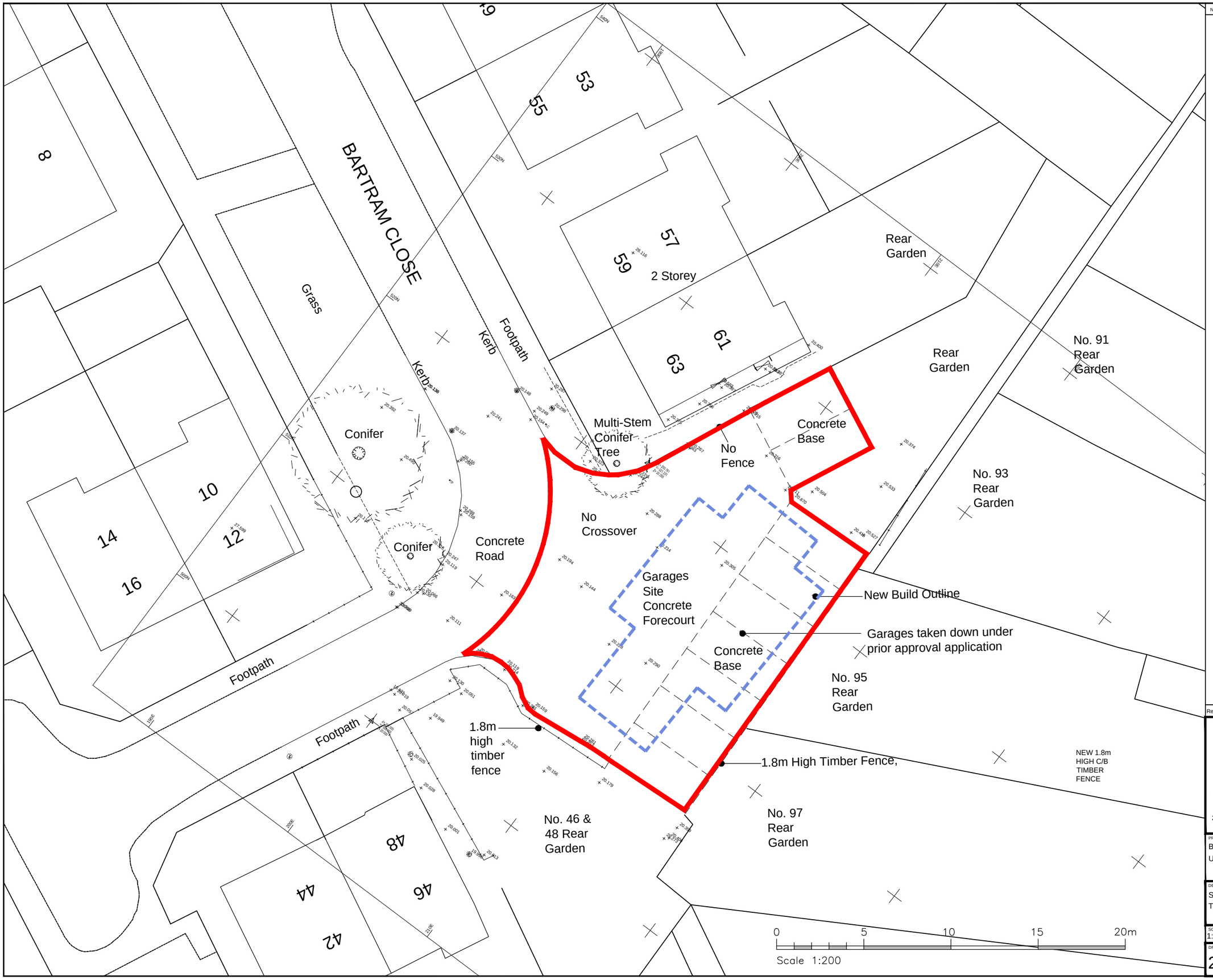
Assumptions have been made regarding the nature and scale of the activities that took place on the site and the types of potential contaminants that may have resulted. There are therefore a number of uncertainties associated with the investigation which include, but are not limited to, the following:

- This report is based on data obtained from the chosen sampling locations only. Although efforts have been made to ensure adequate coverage of the site when designing the investigation, it is nonetheless possible that (as with any site investigation) there may be locations which were not sampled where localised pockets of contamination exist.
- The site investigation and risk assessment were designed to investigate only the most likely contaminants associated with the former commercial/industrial uses. The presence of additional unknown contaminants cannot be discounted.

These uncertainties will need to be reviewed along with the Conceptual Site Risk Model should further information come to light in the future.

# 12 APPENDICES

## 12.1 Appendix 1 – Proposed Development Plans




NOTES

Site Area 0.03ha

| Rev | Revision notes | Initials | Date |
|---|---|---|---|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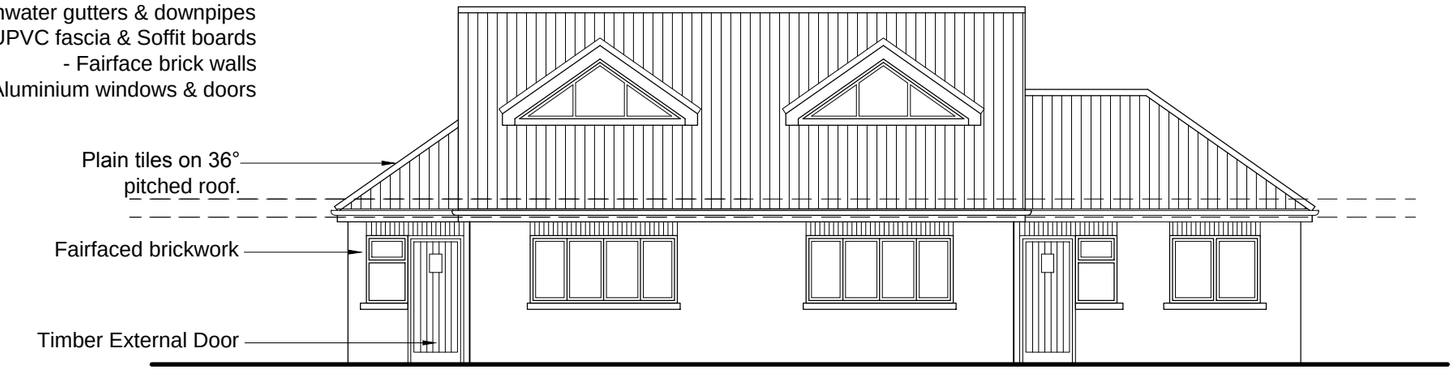
PROJECT
BARTRAM CLOSE, GARAGE SITE
UXBRIDGE, UB8 3AX

DESCRIPTION
SITE LOCATION PLAN SHOWING
TOPOGRAPHICAL & TREE SURVEY

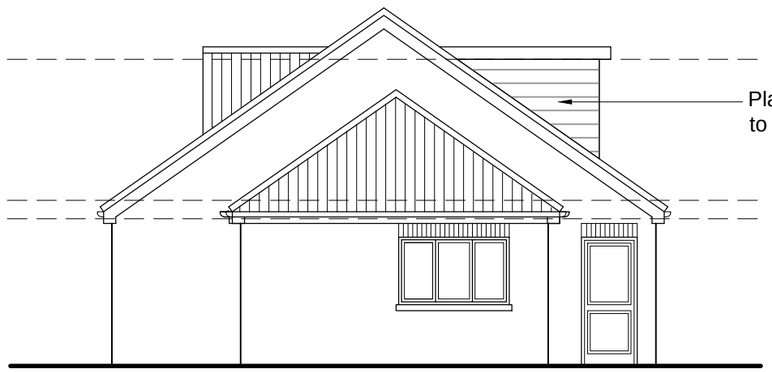
| SCALE | DRAWN BY | CHECKED BY | DATE |
|---|---|---|---|
| 1:200 @ A3 | ST | SV | DEC 2021 |

| DRAWING No. | REV. |
|---|---|
| 2021/D167/P/02 | - |

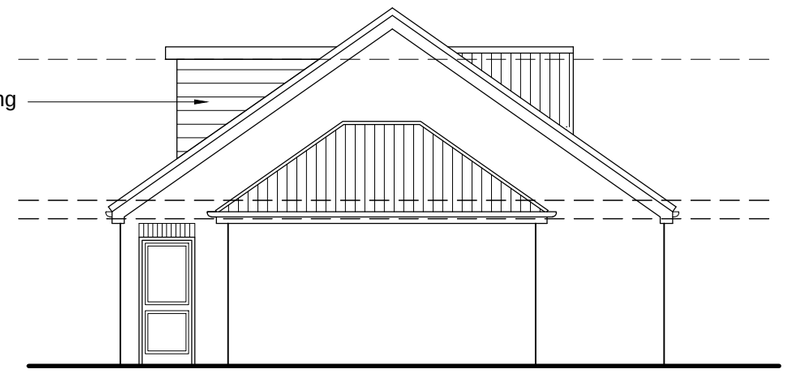
- UPVC rainwater gutters & downpipes
- UPVC fascia & Soffit boards
- Fairface brick walls
- Aluminium windows & doors




NORTH WEST ELEVATION




SOUTH WEST ELEVATION



NORTH EAST ELEVATION


SOUTH EAST ELEVATION


Scale 1:100

NOTES

| Rev | Revision notes | Initials | Date |
|---|---|---|---|

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PROJECT
BARTRAM CLOSE
GARAGE SITE
UXBRIDGE, UB8 3AX

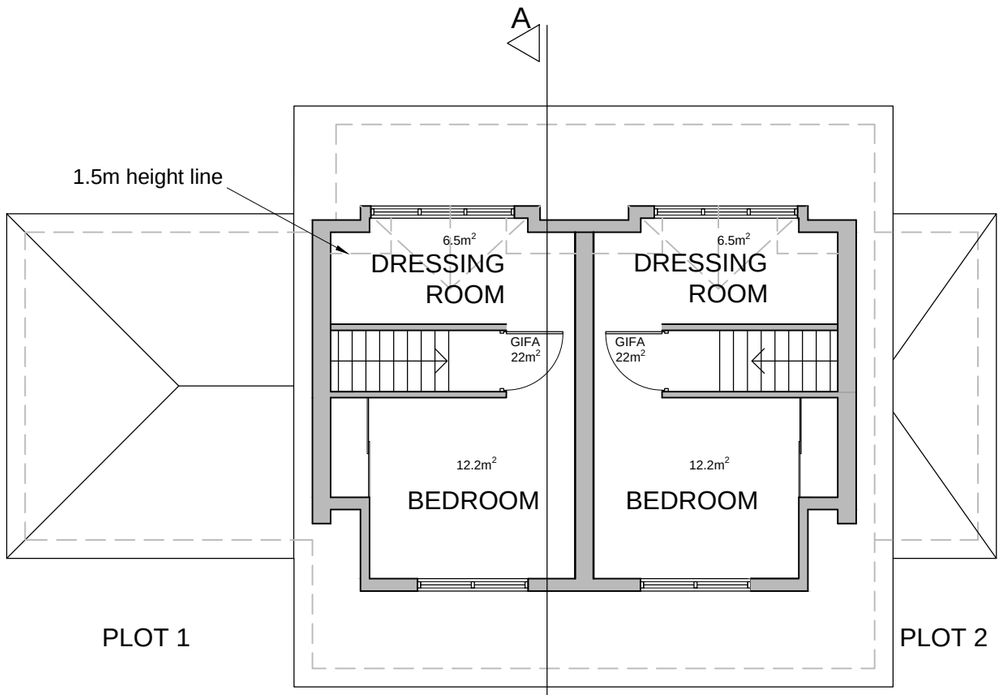
DESCRIPTION
PROPOSED ELEVATIONS

| SCALE | DRAWN BY | CHECKED BY | DATE |
|---|---|---|---|
| 1:100 @ A3 | ST | SV | DEC 2021 |

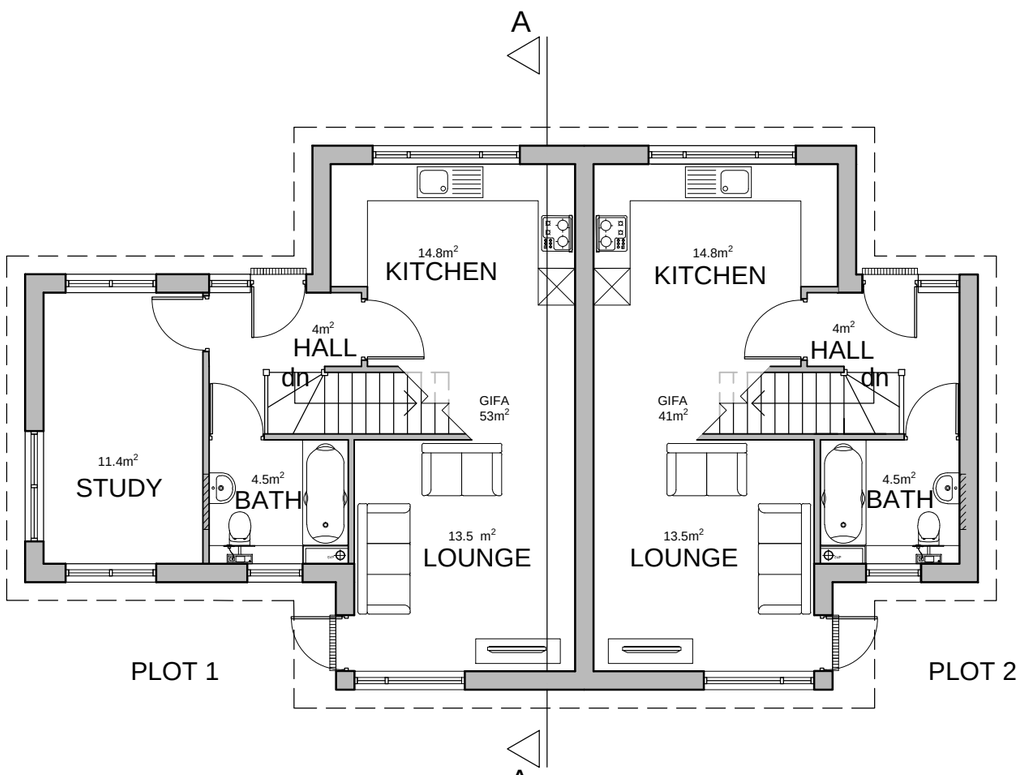
DRAWING No. 2021/D167/P/05

REV.

NOTES




# LOFT FLOOR PLAN




# GROUND FLOOR PLAN

| Rev | Revision notes | Initials | Date |
|---|---|---|---|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PROJECT
BARTRAM CLOSE
GARAGE SITE
UXBRIDGE, UB8 3AX

DESCRIPTION
GROUND & LOFT FLOOR PLANS

| SCALE | DRAWN BY | CHECKED BY | DATE |
|---|---|---|---|
| 1:100 @ A3 | ST | SV | DEC 2021 |

DRAWING No.
2021/D167/P/04

REV.
-

BARTRAM CLOSE

61
63

46
48

No. 61 Rear Garden

No. 63 Rear Garden

No. 91 Rear Garden

No. 93 Rear Garden

No. 95 Rear Garden

No. 97 Rear Garden

No. 46 & 48 Rear Garden

FENCE FROM HOUSE 63 BUILDING LINE TO DROP TO 1M HEIGHT TO FRONTAGE

NEW FOOTPATH CORNER

EXISTING TREE TO BE PRUNED

CENTRE POINT OF ROAD RADIUS

RADIUS 11m APPROX

RADIUS 11m APPROX

NEW FOOTPATH

EXISTING DROP KERB

NEW FOOTPATH LINK TO EXISTING

EXISTING DROP KERB

NEW 1.5m HIGH METAL BOW TOP FENCING

parking

parking

1

FRONT GARDEN AREA 35m²

FRONT GARDEN AREA 52m²

AMENITY GARDEN AREA 48m²

AMENITY GARDEN AREA 42m²

NEW 1.8m HIGH C/B TIMBER FENCE

NEW 1.8m HIGH C/B TIMBER FENCE

SITE BOUNDARY SHOWN IN BLUE DASHED LINE

EXISTING 1.8m HIGH C/B TIMBER FENCE TO BE TAKEN DOWN

NEW 1.8m HIGH C/B TIMBER FENCE - REFER TO ELEVATION A

ELEVATION A

Bin Store

Cycle Store

0 5 10 15 20m

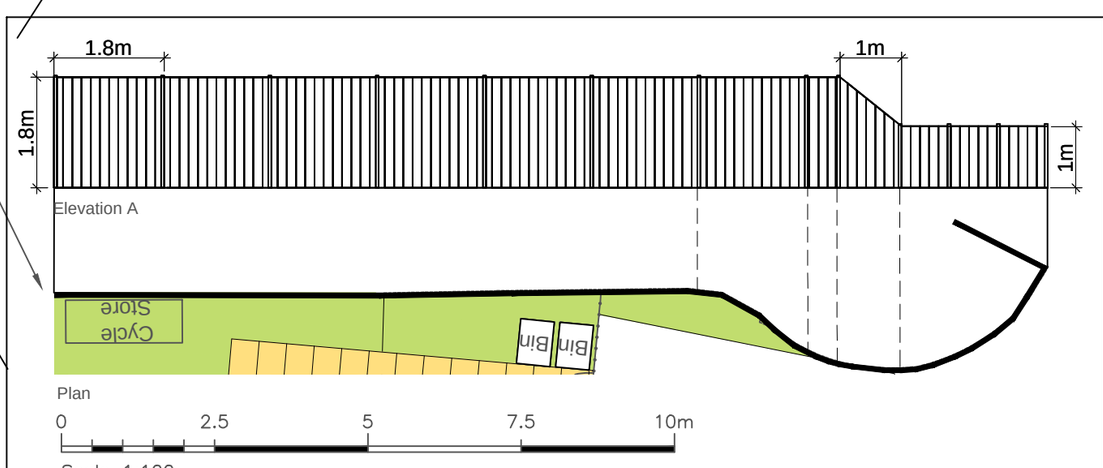
Scale 1:200

NOTES

## Schedule of Accommodation

1 No 2 Bed 4P bungalow @ 71m²
1 No 1 Bed 4P bungalow @ 58m²

Parking - 1 space for each bungalow




| Rev | Revision notes | Initials | Date |
|---|---|---|---|
| . | . | . | . |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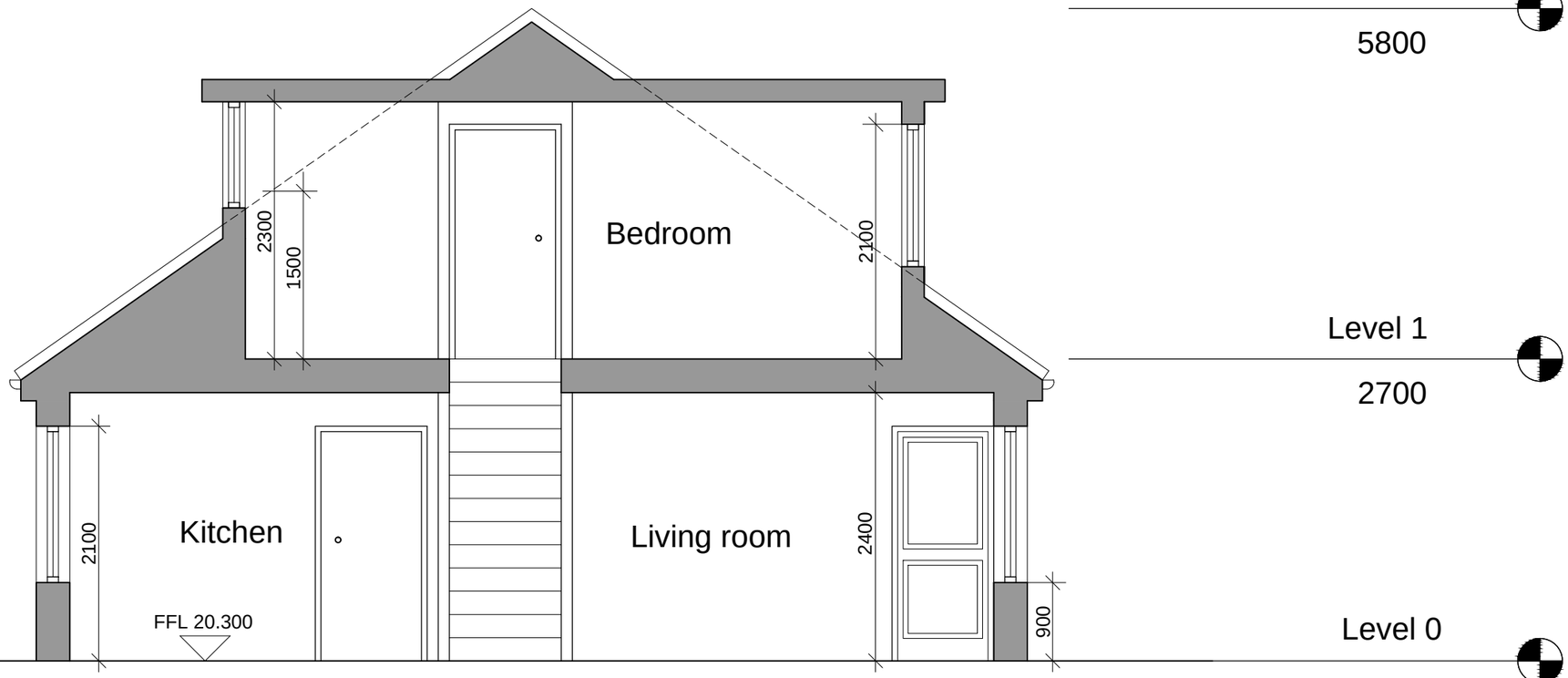
PROJECT
BARTRAM CLOSE
GARAGE SITE
UXBRIDGE, UB8 3AX

DESCRIPTION
PROPOSED SITE PLAN

| SCALE | DRAWN BY | CHECKED BY | DATE |
|---|---|---|---|
| 1:200 @ A3 | MY | SV | DEC 2021 |

DRAWING No.
2021/D167/P/03

REV.




SECTION A-A

0 1 2 3 4 5m

Scale 1:50

NOTES

| Rev | Revision notes | Initials | Date |
|---|---|---|---|

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PROJECT
BARTRUM CLOSE, GARAGE SITE
UXBRIDGE, UB8 3AX

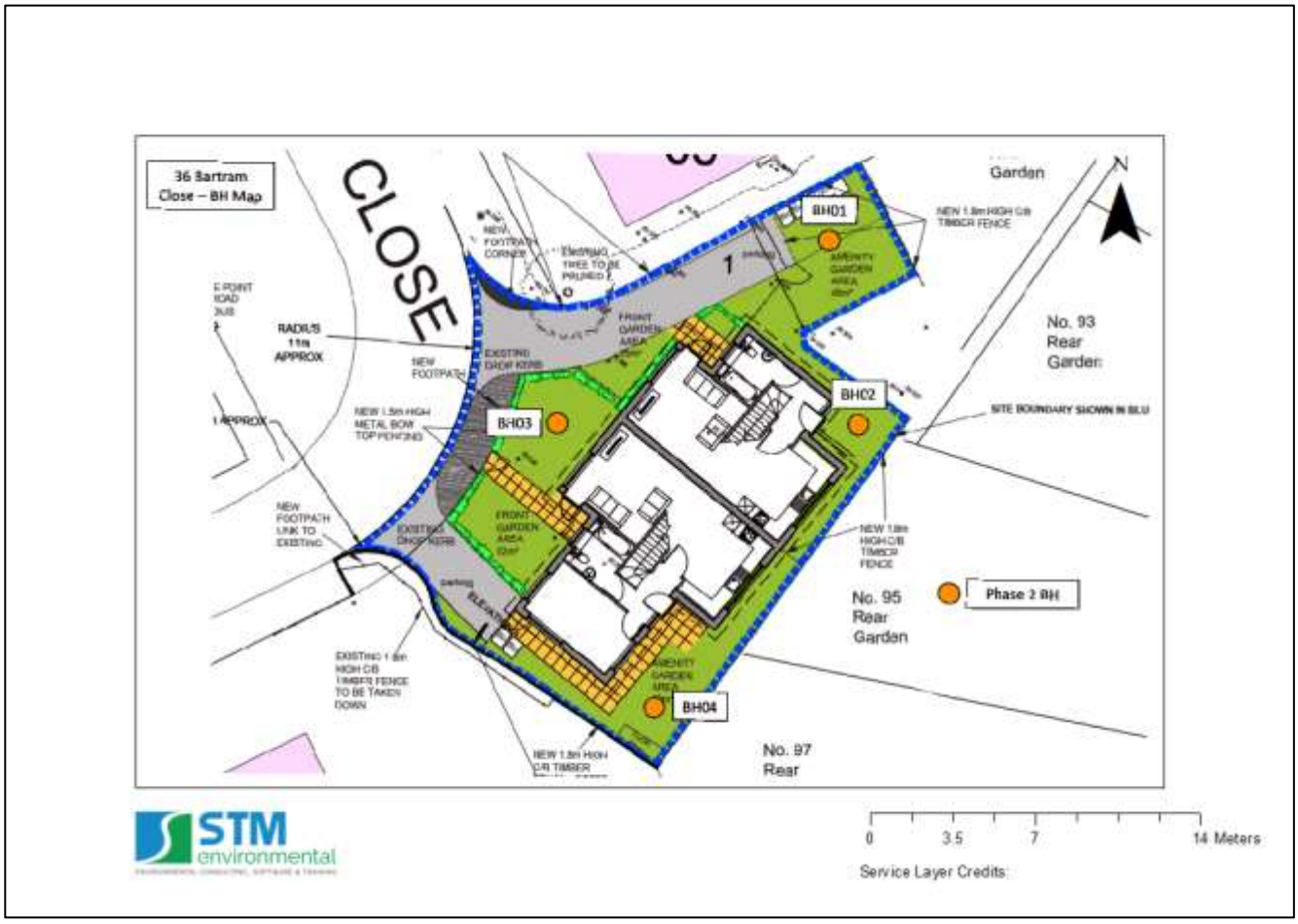
DESCRIPTION
TYPICAL SECTION

| SCALE | DRAWN BY | CHECKED BY | DATE |
|---|---|---|---|
| 1:50 @A3 | ST | SV | DEC 2021 |

DRAWING No.
2021/D167/P/06

REV.

## 12.2 Appendix 2 - Borehole Location Plan



## 12.3 Appendix 3 - Borehole Logs

# Borehole Log

Borehole No. **BH01**

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | Project No. PH2-2022-000018 | Co-ords: | 507674.00 - 182135.00 | Hole Type WLS |
| Location: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | | Level: | 46.00 | Scale 1:50 |
| Client: | Melim Management | | Dates: | 22/03/2022 - 22/03/2022 | Logged By MF/GN |

| Well | Water Strikes | Samples and In Situ Testing | | | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|---|
| | | Depth (m) | Type | Results | | | | |
| | | | | | 0.20 | 45.80 | | Made Ground - Concrete Hardstand |
| | | 0.30 | ES | PID=0 | 0.30 | 45.70 | | Made Ground - Dark grey gravelly silty SAND. Occasional concrete fragments |
| | | 0.90 | ES | PID=0 | | | | Mottled light greyish brown, light grey and dark orange gravelly slightly cobbly slightly sandy clayey SILT |
| | | | | | 2.00 | 44.00 | | End of borehole at 2.00 m |

Remarks

Borehole advanced to a maximum depth of 2mbgl. No water encountered. Elevation levels and borehole location grid references are approximated based on satellite imagery (not measured).

# Borehole Log

Borehole No. **BH02**

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | Project No. PH2-2022-000018 | Co-ords: | 507674.00 - 182135.00 | Hole Type WLS |
| Location: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | | Level: | 46.00 | Scale 1:50 |
| Client: | Melim Management | | Dates: | 22/03/2022 - 22/03/2022 | Logged By MF/GN |

| Well | Water Strikes | Samples and In Situ Testing | | | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|---|
| | | Depth (m) | Type | Results | | | | |
| | | | | PID=0 | 0.20 | 45.80 | | Made Ground - Concrete Hardstand |
| | | 0.40 | ES | | 0.30 | 45.70 | | Made Ground - Black and dark grey slightly gravelly SAND. Abundant bituminous material and rare small concrete fragments |
| | | | | PID=0 | 0.40 | 45.60 | | Made Ground - Mottled dark greyish brown, dark orange and dark grey clayey SILT. Occasional small bituminous fragments |
| | | 1.00 | ES | | | | | Mottled dark greyish brown, dark orange and dark grey cobbly very gravelly clayey SILT |
| | | | | PID=0 | | | | |
| | | | | | 2.00 | 44.00 | | End of borehole at 2.00 m |

Remarks

Borehole advanced to a maximum depth of 2mbgl. No water encountered. Elevation levels and borehole location grid references are approximated based on satellite imagery (not measured).

# Borehole Log

Borehole No. **BH03**

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | Project No. PH2-2022-000018 | Co-ords: | 507674.00 - 182135.00 | Hole Type WLS |
| Location: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | | Level: | 46.00 | Scale 1:50 |
| Client: | Melim Management | | Dates: | 22/03/2022 - 22/03/2022 | Logged By MF/GN |

| Well | Water Strikes | Samples and In Situ Testing | | | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|---|
| | | Depth (m) | Type | Results | | | | |
| | | | | | 0.10 | 45.90 | | Made Ground - Tarmac hardstand |
| | | | | | 0.30 | 45.70 | | Made Ground - Concrete Hardstand |
| | | 0.40 | ES | PID=0 | 0.50 | 45.50 | | Made Ground - Mottled dark greyish brown, dark orange and dark grey clayey SILT. Occasional small bituminous fragments |
| | | 0.90 | ES | | | | | Mottled light greyish brown light grey and dark orange gravelly slightly cobbly slightly sandy clayey SILT. Abundant flint gravel |
| | | | | | 2.00 | 44.00 | | End of borehole at 2.00 m |

Remarks

Borehole advanced to a maximum depth of 2mbgl. No water encountered. Elevation levels and borehole location grid references are approximated based on satellite imagery (not measured).

# Borehole Log

Borehole No. **BH04**

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | Project No. PH2-2022-000018 | Co-ords: | 507674.00 - 182135.00 | Hole Type WLS |
| Location: | Former Garages, Bartram Close, Uxbridge, UB8 3AX | | Level: | 46.00 | Scale 1:50 |
| Client: | Melim Management | | Dates: | 22/03/2022 - 22/03/2022 | Logged By MF/GN |

| Well | Water Strikes | Samples and In Situ Testing | | | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|---|
| | | Depth (m) | Type | Results | | | | |
| | | 0.30 | ES | PID=0 | 0.10 | 45.90 | | Made Ground - Concrete Hardstand |
| | | | | | 0.20 | 45.80 | | Made Ground - Dark grey and black slightly gravelly silty SAND |
| | | | | | 0.40 | 45.60 | | Made Ground - Mottled dark greyish brown, dark orange and dark grey clayey SILT. Occasional small bituminous fragments |
| | | 0.80 | ES | | 1.00 | 45.00 | | Mottled light greyish brown light grey and dark orange slightly gravelly slightly cobbly slightly clayey SILT |
| | | | | | | | | Mottled light brown and dark orange gravelly clayey SILT |
| | | | | | 2.00 | 44.00 | | End of borehole at 2.00 m |

Remarks

Borehole advanced to a maximum depth of 2mbgl. No water encountered. Elevation levels and borehole location grid references are approximated based on satellite imagery (not measured).

## 12.4 Appendix 4 - Photographs

General overview of the site and drilling rig


Soils encountered in BH01 and BH02


Soils encountered in BH03 and BH04

## 12.5 Appendix 5 – Laboratory Certification

**Lab Info**
STM ENVIRONMENTAL LTD
Unit 6 Crane Mews
32 Gould Road
Twickenham
London
TW2 6RS

**e:** labinfo@stmenvironmental.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

**t:** 01923 225404
**f:** 01923 237404
**e:** reception@i2analytical.com

# Analytical Report Number : 22-47302

Replaces Analytical Report Number: 22-47302, issue no. 2
Client references/information amended.

| | | | |
|---|---|---|---|
| **Project / Site name:** | Former Garages, Bartram Close, Uxbridge, UB8 3AX | **Samples received on:** | 23/03/2022 |
| **Your job number:** | BARTRAM CLOSE UXBRIDGE | **Samples instructed on/ Analysis started on:** | 23/03/2022 |
| **Your order number:** | BARTRAM CLOSE | **Analysis completed by:** | 19/04/2022 |
| **Report Issue Number:** | 3 | **Report issued on:** | 19/04/2022 |
| **Samples Analysed:** | 6 soil samples | | |

**Signed:**

Adam Fenwick
Technical Reviewer
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213955 | 2213956 | 2213957 | 2213958 | 2213959 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH01/1 | BH01/2 | BH02/1 | BH03/1 | BH03/2 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | 0.30 | 0.90 | 0.40 | 0.40 | 0.90 |
| **Date Sampled** | | | | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | 0.01 | NONE | 13 | 12 | 14 | 15 | 15 |
| Total mass of sample received | kg | 0.001 | NONE | 1 | 0.4 | 1 | 1 | 0.4 |
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected | Not-detected |
| Asbestos Analyst ID | N/A | N/A | N/A | SPU | SPU | SPU | SPU | SPU |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 5 | 7.6 | 6 | 6.8 | 7.5 |
| Total Cyanide | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Total Sulphate as SO4 | mg/kg | 50 | MCERTS | - | 230 | 910 | - | 360 |
| Water Soluble Sulphate as SO4 16hr extraction (2:1) | mg/kg | 2.5 | MCERTS | 650 | - | - | 71 | - |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | 0.32 | - | - | 0.036 | - |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | mg/l | 1.25 | MCERTS | 324 | - | - | 35.6 | - |
| Sulphide | mg/kg | 1 | MCERTS | 15 | < 1.0 | < 1.0 | 2.7 | < 1.0 |
| Total Organic Carbon (TOC) - Automated | % | 0.1 | MCERTS | 1.6 | 0.2 | 0.9 | 1.1 | 0.4 |
| **Total Phenols** | | | | | | | | |
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | < 0.80 | < 0.80 | < 0.80 | < 0.80 |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213955 | 2213956 | 2213957 | 2213958 | 2213959 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH01/1 | BH01/2 | BH02/1 | BH03/1 | BH03/2 |
| Sample Number | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m) | | | | 0.30 | 0.90 | 0.40 | 0.40 | 0.90 |
| Date Sampled | | | | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 12 | 21 | 10 | 14 | 24 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 1.1 | 0.6 | 0.5 | 0.7 | 0.8 |
| Boron (total) | mg/kg | 1 | MCERTS | - | 7.9 | 6.8 | - | 6.7 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 22 | 34 | 25 | 24 | 34 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 52 | 28 | 18 | 24 | 24 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 110 | 27 | 93 | 91 | 25 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 24 | - | - | 18 | - |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 50 | 57 | 55 | 63 | 51 |
| **Monoaromatics & Oxygenates** | | | | | | | | |
| Benzene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH C10 - C40 $_{EH\_CU\_1D\_TOTAL}$ | mg/kg | 10 | MCERTS | - | < 10 | < 10 | - | < 10 |
| TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$ | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$ | mg/kg | 2 | MCERTS | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$ | mg/kg | 8 | MCERTS | < 8.0 | < 8.0 | < 8.0 | < 8.0 | < 8.0 |
| TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$ | mg/kg | 8 | MCERTS | < 8.0 | < 8.0 | < 8.0 | < 8.0 | < 8.0 |
| TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$ | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$ | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$ | mg/kg | 2 | MCERTS | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$ | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$ | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | < 10 | < 10 |
| TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$ | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | < 10 | < 10 |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213955 | 2213956 | 2213957 | 2213958 | 2213959 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH01/1 | BH01/2 | BH02/1 | BH03/1 | BH03/2 |
| Sample Number | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m) | | | | 0.30 | 0.90 | 0.40 | 0.40 | 0.90 |
| Date Sampled | | | | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **SVOCs** | | | | | | | | |
| Aniline | mg/kg | 0.1 | NONE | - | < 0.1 | < 0.1 | - | < 0.1 |
| Phenol | mg/kg | 0.2 | ISO 17025 | - | < 0.2 | < 0.2 | - | < 0.2 |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - | < 0.2 | < 0.2 | - | < 0.2 |
| Isophorone | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Naphthalene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - | < 0.1 | < 0.1 | - | < 0.1 |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - | < 0.1 | < 0.1 | - | < 0.1 |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - | < 0.1 | < 0.1 | - | < 0.1 |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - | < 0.1 | < 0.1 | - | < 0.1 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - | < 0.3 | < 0.3 | - | < 0.3 |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| Fluorene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Azobenzene | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Carbazole | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - | < 0.2 | < 0.2 | - | < 0.2 |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - | < 0.3 | < 0.3 | - | < 0.3 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - | < 0.3 | < 0.3 | - | < 0.3 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Chrysene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - | < 0.05 | < 0.05 | - | < 0.05 |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213955 | 2213956 | 2213957 | 2213958 | 2213959 |
|---|---|---|---|---|---|---|---|---|
| Sample Reference | | | | BH01/1 | BH01/2 | BH02/1 | BH03/1 | BH03/2 |
| Sample Number | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m) | | | | 0.30 | 0.90 | 0.40 | 0.40 | 0.90 |
| Date Sampled | | | | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 | 22/03/2022 |
| Time Taken | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter (Soil Analysis) | Units | Limit of detection | Accreditation Status | | | | | |

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| **Lab Sample Number** | | | | 2213960 |
|---|---|---|---|---|
| **Sample Reference** | | | | BH04/1 |
| **Sample Number** | | | | None Supplied |
| **Depth (m)** | | | | 0.30 |
| **Date Sampled** | | | | 22/03/2022 |
| **Time Taken** | | | | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | |
| Stone Content | % | 0.1 | NONE | < 0.1 |
| Moisture Content | % | 0.01 | NONE | 13 |
| Total mass of sample received | kg | 0.001 | NONE | 1 |

| | | | | |
|---|---|---|---|---|
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected |
| Asbestos Analyst ID | N/A | N/A | N/A | SPU |

**General Inorganics**

| | | | | |
|---|---|---|---|---|
| pH - Automated | pH Units | N/A | MCERTS | 5.2 |
| Total Cyanide | mg/kg | 1 | MCERTS | < 1.0 |
| Total Sulphate as SO4 | mg/kg | 50 | MCERTS | - |
| Water Soluble Sulphate as SO4 16hr extraction (2:1) | mg/kg | 2.5 | MCERTS | 1800 |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | 0.89 |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | mg/l | 1.25 | MCERTS | 885 |
| Sulphide | mg/kg | 1 | MCERTS | 2.3 |
| Total Organic Carbon (TOC) - Automated | % | 0.1 | MCERTS | 2.7 |

**Total Phenols**

| | | | | |
|---|---|---|---|---|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 |

**Speciated PAHs**

| | | | | |
|---|---|---|---|---|
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | 4.1 |
| Anthracene | mg/kg | 0.05 | MCERTS | 0.41 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | 6.6 |
| Pyrene | mg/kg | 0.05 | MCERTS | 5.5 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | 2 |
| Chrysene | mg/kg | 0.05 | MCERTS | 2.9 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | 2.6 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | 1.2 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | 2.1 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 1 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | 0.28 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | 0.96 |

**Total PAH**

| | | | | |
|---|---|---|---|---|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 29.6 |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213960 |
|---|---|---|---|---|
| Sample Reference | | | | BH04/1 |
| Sample Number | | | | None Supplied |
| Depth (m) | | | | 0.30 |
| Date Sampled | | | | 22/03/2022 |
| Time Taken | | | | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | |
| **Heavy Metals / Metalloids** | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 21 |
| Boron (water soluble) | mg/kg | 0.2 | MCERTS | 1.7 |
| Boron (total) | mg/kg | 1 | MCERTS | - |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 22 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 38 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 240 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 25 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 98 |
| **Monoaromatics & Oxygenates** | | | | |
| Benzene | µg/kg | 1 | MCERTS | < 1.0 |
| Toluene | µg/kg | 1 | MCERTS | < 1.0 |
| Ethylbenzene | µg/kg | 1 | MCERTS | < 1.0 |
| p & m-xylene | µg/kg | 1 | MCERTS | < 1.0 |
| o-xylene | µg/kg | 1 | MCERTS | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 |
| **Petroleum Hydrocarbons** | | | | |
| TPH C10 - C40 $_{EH\_CU\_1D\_TOTAL}$ | mg/kg | 10 | MCERTS | - |
| TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$ | mg/kg | 1 | MCERTS | < 1.0 |
| TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$ | mg/kg | 2 | MCERTS | < 2.0 |
| TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$ | mg/kg | 8 | MCERTS | < 8.0 |
| TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$ | mg/kg | 8 | MCERTS | < 8.0 |
| TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$ | mg/kg | 10 | MCERTS | < 10 |
| TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$ | mg/kg | 0.001 | MCERTS | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$ | mg/kg | 1 | MCERTS | < 1.0 |
| TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$ | mg/kg | 2 | MCERTS | < 2.0 |
| TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$ | mg/kg | 10 | MCERTS | < 10 |
| TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$ | mg/kg | 10 | MCERTS | 19 |
| TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$ | mg/kg | 10 | MCERTS | 27 |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| Lab Sample Number | | | | 2213960 |
|---|---|---|---|---|
| Sample Reference | | | | BH04/1 |
| Sample Number | | | | None Supplied |
| Depth (m) | | | | 0.30 |
| Date Sampled | | | | 22/03/2022 |
| Time Taken | | | | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | |
| **SVOCs** | | | | |
| Aniline | mg/kg | 0.1 | NONE | - |
| Phenol | mg/kg | 0.2 | ISO 17025 | - |
| 2-Chlorophenol | mg/kg | 0.1 | MCERTS | - |
| Bis(2-chloroethyl)ether | mg/kg | 0.2 | MCERTS | - |
| 1,3-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - |
| 1,2-Dichlorobenzene | mg/kg | 0.1 | MCERTS | - |
| 1,4-Dichlorobenzene | mg/kg | 0.2 | MCERTS | - |
| Bis(2-chloroisopropyl)ether | mg/kg | 0.1 | MCERTS | - |
| 2-Methylphenol | mg/kg | 0.3 | MCERTS | - |
| Hexachloroethane | mg/kg | 0.05 | MCERTS | - |
| Nitrobenzene | mg/kg | 0.3 | MCERTS | - |
| 4-Methylphenol | mg/kg | 0.2 | NONE | - |
| Isophorone | mg/kg | 0.2 | MCERTS | - |
| 2-Nitrophenol | mg/kg | 0.3 | MCERTS | - |
| 2,4-Dimethylphenol | mg/kg | 0.3 | MCERTS | - |
| Bis(2-chloroethoxy)methane | mg/kg | 0.3 | MCERTS | - |
| 1,2,4-Trichlorobenzene | mg/kg | 0.3 | MCERTS | - |
| Naphthalene | mg/kg | 0.05 | MCERTS | - |
| 2,4-Dichlorophenol | mg/kg | 0.3 | MCERTS | - |
| 4-Chloroaniline | mg/kg | 0.1 | NONE | - |
| Hexachlorobutadiene | mg/kg | 0.1 | MCERTS | - |
| 4-Chloro-3-methylphenol | mg/kg | 0.1 | NONE | - |
| 2,4,6-Trichlorophenol | mg/kg | 0.1 | MCERTS | - |
| 2,4,5-Trichlorophenol | mg/kg | 0.2 | MCERTS | - |
| 2-Methylnaphthalene | mg/kg | 0.1 | NONE | - |
| 2-Chloronaphthalene | mg/kg | 0.1 | MCERTS | - |
| Dimethylphthalate | mg/kg | 0.1 | MCERTS | - |
| 2,6-Dinitrotoluene | mg/kg | 0.1 | MCERTS | - |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | - |
| Acenaphthene | mg/kg | 0.05 | MCERTS | - |
| 2,4-Dinitrotoluene | mg/kg | 0.2 | MCERTS | - |
| Dibenzofuran | mg/kg | 0.2 | MCERTS | - |
| 4-Chlorophenyl phenyl ether | mg/kg | 0.3 | ISO 17025 | - |
| Diethyl phthalate | mg/kg | 0.2 | MCERTS | - |
| 4-Nitroaniline | mg/kg | 0.2 | MCERTS | - |
| Fluorene | mg/kg | 0.05 | MCERTS | - |
| Azobenzene | mg/kg | 0.3 | MCERTS | - |
| Bromophenyl phenyl ether | mg/kg | 0.2 | MCERTS | - |
| Hexachlorobenzene | mg/kg | 0.3 | MCERTS | - |
| Phenanthrene | mg/kg | 0.05 | MCERTS | - |
| Anthracene | mg/kg | 0.05 | MCERTS | - |
| Carbazole | mg/kg | 0.3 | MCERTS | - |
| Dibutyl phthalate | mg/kg | 0.2 | MCERTS | - |
| Anthraquinone | mg/kg | 0.3 | MCERTS | - |
| Fluoranthene | mg/kg | 0.05 | MCERTS | - |
| Pyrene | mg/kg | 0.05 | MCERTS | - |
| Butyl benzyl phthalate | mg/kg | 0.3 | ISO 17025 | - |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | - |
| Chrysene | mg/kg | 0.05 | MCERTS | - |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | - |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | - |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | - |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | - |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | - |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | - |

**Analytical Report Number: 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**
**Your Order No: BARTRAM CLOSE**

| | | | | |
|---|---|---|---|---|
| **Lab Sample Number** | | | | 2213960 |
| **Sample Reference** | | | | BH04/1 |
| **Sample Number** | | | | None Supplied |
| **Depth (m)** | | | | 0.30 |
| **Date Sampled** | | | | 22/03/2022 |
| **Time Taken** | | | | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | |
| | | | | |

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number : 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 2213955 | BH01/1 | None Supplied | 0.3 | Brown clay and sand with gravel and coal. |
| 2213956 | BH01/2 | None Supplied | 0.9 | Light brown clay and sand with gravel. |
| 2213957 | BH02/1 | None Supplied | 0.4 | 4.4.3.17 |
| 2213958 | BH03/1 | None Supplied | 0.4 | Light brown clay and sand with gravel. |
| 2213959 | BH03/2 | None Supplied | 0.9 | 4.4.3.17 |
| 2213960 | BH04/1 | None Supplied | 0.3 | Brown clay and sand with gravel and clinker. |

**Analytical Report Number : 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**

**Water matrix abbreviations:**
**Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method. | L038-PL | D | MCERTS |
| Asbestos identification in soil | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques. | In house method based on HSG 248 | A001-PL | D | ISO 17025 |
| Boron, water soluble, in soil | Determination of water soluble boron in soil by hot water extract followed by ICP-OES. | In-house method based on Second Site Properties version 3 | L038-PL | D | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. (30 oC) | In house method. | L019-UK/PL | W | NONE |
| Monohydric phenols in soil | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry. | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL | W | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In house method. | L099-PL | D | MCERTS |
| Sulphide in soil | Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode. | In-house method | L010-PL | D | MCERTS |
| Total sulphate (as SO4 in soil) | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES. | In house method. | L038-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Semi-volatile organic compounds in soil | Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Total cyanide in soil | Determination of total cyanide by distillation followed by colorimetry. | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL | W | MCERTS |
| Total organic carbon (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In house method. | L009-PL | D | MCERTS |
| BTEX and MTBE in soil (Monoaromatics) | Determination of BTEX in soil by headspace GC-MS. | In-house method based on USEPA8260 | L073B-PL | W | MCERTS |
| TPHCWG (Soil) | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. | In-house method with silica gel split/clean up. | L088/76-PL | W | MCERTS |
| TPH Banding in Soil by FID | Determination of hexane extractable hydrocarbons in soil by GC-FID. | In-house method, TPH with carbon banding and silica gel split/cleanup. | L076-PL | D | MCERTS |

**Analytical Report Number : 22-47302**
**Project / Site name: Former Garages, Bartram Close, Uxbridge, UB8 3AX**

**Water matrix abbreviations:**
**Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| D.O. for Gravimetric Quant if Screen/ID positive | Dependent option for Gravimetric Quant if Screen/ID positive scheduled. | In house asbestos methods A001 & A006. | A006-PL | D | NONE |
| Sulphate, water soluble, in soil | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method. | L038-PL | D | MCERTS |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**

**Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.**

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

| Acronym | Descriptions |
|---|---|
| HS | Headspace Analysis |
| MS | Mass spectrometry |
| FID | Flame Ionisation Detector |
| GC | Gas Chromatography |
| EH | Extractable Hydrocarbons (i.e. everything extracted by the solvent(s)) |
| CU | Clean-up - e.g. by Florisil®, silica gel |
| 1D | GC - Single coil/column gas chromatography |
| 2D | GC-GC - Double coil/column gas chromatography |
| Total | Aliphatics & Aromatics |
| AL | Aliphatics |
| AR | Aromatics |
| #1 | EH_2D_Total but with humics mathematically subtracted |
| #2 | EH_2D_Total but with fatty acids mathematically subtracted |
| _ | Operator - understore to separate acronyms (exception for +) |
| + | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total |

## 12.6 Appendix 6 – Adopted Generic Assessment Criteria

### 12.6.1 Soils Criteria

| Contaminant | Concentration (mg/kg) | GAC Literature Source |
|---|---|---|
| **Arsenic** | 37 | Category 4 Screening Levels - Residential (with Home-grown Produce) |
| **Cadmium** | 11 | LQM SULs - RWHP |
| **Chromium** | 910 | LQM SULs - RWHP |
| **Chromium - Hexavalent** | 6 | LQM SULs - RWHP |
| **Copper** | 2400 | LQM SULs - RWHP |
| **Lead** | 200 | LQM SULs - RWHP |
| **Mercury** | 40 | LQM SULs - RWHP |
| **Nickel** | 180 | LQM SULs - RWHP |
| **Selenium** | 250 | LQM SULs - RWHP |
| **Zinc** | 3700 | LQM SULs - RWHP |
| **Toluene** | 130 | LQM SULs - RWHP (1% SOM) |
| **Benzene** | 0.42 | Category 4 Screening Levels - Residential (with home-grown produce) |
| **Ethylbenzene** | 47 | LQM SULs - RWHP (1% SOM) |
| **m,p xylenes** | 56 | LQM SULs - RWHP (1% SOM) |
| **Acenaphthylene** | 170 | LQM SULs - RWHP (1% SOM) |
| **Acenaphthene** | 210 | LQM SULs - RWHP (1% SOM) |
| **Fluorene** | 170 | LQM SULs - RWHP (1% SOM) |
| **Phenanthrene** | 95 | LQM SULs - RWHP (1% SOM) |
| **Anthracene** | 2400 | LQM SULs - RWHP (1% SOM) |
| **Fluoranthene** | 280 | LQM SULs - RWHP (1% SOM) |
| **Pyrene** | 620 | LQM SULs - RWHP (1% SOM) |
| **Benzo(a)anthracene** | 7.2 | LQM SULs - RWHP (1% SOM) |
| **Chrysene** | 15 | LQM SULs - RWHP (1% SOM) |
| **Benzo (b) fluoranthene** | 2.6 | LQM SULs - RWHP (1% SOM) |
| **Benzo(k)fluoranthene** | 77 | LQM SULs - RWHP (1% SOM) |
| **Benzo(a)pyrene** | 2.2 | LQM SULs - RWHP (1% SOM) |
| **Dibenz-a-h-anthracene** | 0.24 | LQM SULs - RWHP (1% SOM) |
| **Indeno(1,2,3-cd) pyrene** | 27 | LQM SULs - RWHP (1% SOM) |
| **Benzo (g,h,i) perylene** | 320 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C5-6** | 42 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C6-8** | 100 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C8-10** | 27 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C10-12** | 130 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C12-16** | 1100 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C16-C35** | 65000 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C21-35** | 1100 | LQM SULs - RWHP (1% SOM) |
| **Aliphatics >C35-44** | 65000 | LQM SULs - RWHP (1% SOM) |

| Contaminant | Concentration (mg/kg) | GAC Literature Source |
|---|---|---|
| **Aromatics >C5-7** | 0.087 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C8-10** | 34 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C10-12** | 74 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C12-16** | 140 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C16-21** | 260 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C21-35** | 1100 | LQM SULs - RWHP (1% SOM) |
| **Aromatics >C35-44** | 1100 | LQM SULs - RWHP (1% SOM) |
| **Naphthalene** | 2.3 | LQM SULs - RWHP (1% SOM) |
| **Phenol** | 120 | LQM SULs - RWHP (1% SOM) |

LQM S4ULs – RWHP: LQM Suitable for Use Levels - Residential (With Home-grown Produce - 1% Soil Organic Matter)
LQM S4ULs - RWHP (1% SSOM): LQM Suitable for Use Levels - Residential (With Home-grown Produce - 1% Organic Matter)

## 12.7 Appendix 7 – Exceedances and Statistical Analysis Summary

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| Parameter | GAC | GAC Source | No. Samples | Mean | Maximum | Outliers Excluded | Max. Value Location | Mean Exceedence | Std Deviation | Non-Detects | W_Shapiro-Wilk | W_Critical | Distribution | T Statistic | Upper 95th percentile (US95) | Mean Value Test Result | Max Value Test Result | One Sample T Test - T0 | One Sample T Test - Tn | One Sample T Test Result | One Sample T Test - Evidence Level (%) | Kcrit-Chebychev | UCL95-Chebychev | K0-Chebychev | Chebychev Test Result | Chebychev - Evidence Level (%) | Samples Exceeding GAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 37 | Category 4 Screening Levels - Residential (with homegrown produce) | 6 | 17 | 24 | 0 | BH03/2 | No | 5.73 | 0 | 0.8997 | 0.788 | Normal | 2.015 | 21.7113 | PASSED | Max. Value NOT Outlier | -8.554 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 27.1940741 | -8.55398923 | Reject H0 (k0 < kcrit) | 99 | None |
| Cadmium | 11 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7337 | 0.829 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -8.55398923 | Reject H0 (k0 < kcrit) | 99 | None |
| Chromium | 910 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 26.83 | 34 | 0 | BH01/2 | No | 5.67 | 0 | 0.7766 | 0.788 | Non-Normal | 2.015 | 31.4989 | PASSED | Max. Value NOT Outlier | -381.43 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 36.9285093 | -381.430366 | Reject H0 (k0 < kcrit) | 99 | None |
| Copper | 2400 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 30.67 | 52 | 0 | BH01/1 | No | 12.37 | 0 | 0.8934 | 0.788 | Normal | 2.015 | 40.8441 | PASSED | Max. Value NOT Outlier | -469.096 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 52.6883836 | -469.095727 | Reject H0 (k0 < kcrit) | 99 | None |
| Mercury | 40 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.8934 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -469.095727 | Reject H0 (k0 < kcrit) | 99 | None |
| Nickel | 180 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 3 | 22.33 | 25 | 0 | BH04/1 | No | 3.79 | 0 | 0.8544 | 0.767 | Normal | 2.92 | 28.7159 | PASSED | Max. Value is Outlier | -72.132 | -2.353 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 31.8634773 | -72.1318238 | Reject H0 (k0 < kcrit) | 99 | None |
| Lead | 200 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 97.67 | 240 | 0 | BH04/1 | No | 78.42 | 0 | 0.8507 | 0.788 | Normal | 2.015 | 162.1795 | PASSED | Max. Value is Outlier | -3.196 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99 | 4.36 | 237.257801 | -3.19628703 | DO NOT Reject H0 (k0 > kcrit) | 91 | BH04/1 |
| Selenium | 250 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.6582 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99 | 4.36 | 0 | -3.19628703 | Reject H0 (k0 < kcrit) | 91 | None |
| Zinc | 3700 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 62.33 | 98 | 0 | BH04/1 | No | 18.08 | 0 | 0.7241 | 0.788 | Non-Normal | 2.015 | 77.2104 | PASSED | Max. Value is Outlier | -492.698 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 94.5239285 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzene | 0.42 | Category 4 Screening Levels - Residential (with homegrown produce) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| Ethylbenzene | 47 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| m & p - Xylene | 56 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| Toluene | 130 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| Naphthalene | 2.3 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.697528 | Reject H0 (k0 < kcrit) | 99 | None |
| Phenanthrene | 95 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.68 | 4.1 | 0 | BH04/1 | No | 1.67 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 2.0603 | PASSED | Max. Value is Outlier | -138.024 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 3.66266667 | -138.02439 | Reject H0 (k0 < kcrit) | 99 | None |
| Anthracene | 2400 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.07 | 0.41 | 0 | BH04/1 | No | 0.17 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.206 | PASSED | Max. Value is Outlier | -35120.95 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.36626667 | -35120.9512 | Reject H0 (k0 < kcrit) | 99 | None |
| Fluoranthene | 280 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 1.1 | 6.6 | 0 | BH04/1 | No | 2.69 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 3.3165 | PASSED | Max. Value is Outlier | -253.545 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 5.896 | -253.545455 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (a) anthracene | 7.2 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.33 | 2 | 0 | BH04/1 | No | 0.82 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.005 | PASSED | Max. Value is Outlier | -20.6 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.78666667 | -20.6 | Reject H0 (k0 < kcrit) | 99 | None |
| Chrysene | 15 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.48 | 2.9 | 0 | BH04/1 | No | 1.18 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.4573 | PASSED | Max. Value is Outlier | -30.034 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 2.59066667 | -30.0344828 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (k) fluoranthene | 77 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.2 | 1.2 | 0 | BH04/1 | No | 0.49 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.603 | PASSED | Max. Value is Outlier | -384 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.072 | -384 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (a) pyrene | 2.2 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.35 | 2.1 | 0 | BH04/1 | No | 0.86 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.0553 | PASSED | Max. Value is Outlier | -5.286 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.876 | -5.28571429 | Reject H0 (k0 < kcrit) | 96 | None |
| Indeno (1,2,3 - cd) pyrene | 27 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.17 | 1 | 0 | BH04/1 | No | 0.41 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.5025 | PASSED | Max. Value is Outlier | -161 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.89333333 | -161 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (ghi) perylene | 320 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.16 | 0.96 | 0 | BH04/1 | No | 0.39 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.4824 | PASSED | Max. Value is Outlier | -1999 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.8576 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Acenaphthylene | 170 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Acenaphthene | 210 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Fluorene | 170 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Pyrene | 620 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.92 | 5.5 | 0 | BH04/1 | No | 2.25 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 2.7638 | PASSED | Max. Value is Outlier | -675.364 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 4.91333333 | -675.363636 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (b) fluoranthene | 2.6 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.43 | 2.6 | 0 | BH04/1 | No | 1.06 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.3065 | PASSED | Max. Value is Outlier | -5 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 2.32266667 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Dibenzo (ah) anthracene | 0.24 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.05 | 0.28 | 0 | BH04/1 | No | 0.11 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.1407 | PASSED | Max. Value is Outlier | -4.143 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.25013333 | -4.14285714 | DO NOT Reject H0 (k0 > kcrit) | 94 | BH04/1 |
| Aliphatic C5-C6 | 42 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aliphatic >C6-C8 | 100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aliphatic >C8-C10 | 27 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aliphatic >C10-C12 | 130 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aliphatic >C12-C16 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aliphatic >C21-C35 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aromatic >C8-C10 | 34 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aromatic >C10-C12 | 74 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aromatic >C12-C16 | 140 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aromatic >C16-C21 | 260 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -4.14285714 | Reject H0 (k0 < kcrit) | 94 | None |
| Aromatic >C21-C35 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 3.17 | 19 | 0 | BH04/1 | No | 7.76 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 9.5475 | PASSED | Max. Value is Outlier | -346.368 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 16.9733333 | -346.368421 | Reject H0 (k0 < kcrit) | 99 | None |
| Phenol | 120 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 3 | 0 | 0 | 0 | N/A | No | 0 | 3 | 0.4961 | 0.788 | N/A | 2.92 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -346.368421 | Reject H0 (k0 < kcrit) | 99 | None |

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| Parameter | GAC | GAC Source | No. Samples | Mean | Maximum | Outliers Excluded | Max. Value Location | Mean Exceedence | Std Deviation | Non-Detects | W_Shapiro-Wilk | W_Critical | Distribution | T Statistic | Upper 95th percentile (US95) | Mean Value Test Result | Max Value Test Result | One Sample T Test - T0 | One Sample T Test - Tn | One Sample T Test Result | One Sample T Test - Evidence Level (%) | Kcrit-Chebychev | UCL95-Chebychev | K0-Chebychev | Chebychev Test Result | Chebychev - Evidence Level (%) | Samples Exceeding GAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 37 | Category 4 Screening Levels - Residential (with homegrown produce) | 6 | 17 | 24 | 0 | BH03/2 | No | 5.73 | 0 | 0.8997 | 0.788 | Normal | 2.015 | 21.7113 | PASSED | Max. Value NOT Outlier | -8.554 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 27.1940741 | -8.5539892 | Reject H0 (k0 < kcrit) | 99 | None |
| Cadmium | 11 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7337 | 0.829 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -8.5539892 | Reject H0 (k0 < kcrit) | 99 | None |
| Chromium | 910 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 26.83 | 34 | 0 | BH01/2 | No | 5.67 | 0 | 0.7766 | 0.788 | Non-Normal | 2.015 | 31.4989 | PASSED | Max. Value NOT Outlier | -381.43 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 36.9285093 | -381.43037 | Reject H0 (k0 < kcrit) | 99 | None |
| Copper | 2400 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 30.67 | 52 | 0 | BH01/1 | No | 12.37 | 0 | 0.8934 | 0.788 | Normal | 2.015 | 40.8441 | PASSED | Max. Value NOT Outlier | -469.096 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 52.6883836 | -469.09573 | Reject H0 (k0 < kcrit) | 99 | None |
| Mercury | 40 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.8934 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -469.09573 | Reject H0 (k0 < kcrit) | 99 | None |
| Nickel | 180 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 3 | 22.33 | 25 | 0 | BH04/1 | No | 3.79 | 0 | 0.8544 | 0.767 | Normal | 2.92 | 28.7159 | PASSED | Max. Value is Outlier | -72.132 | -2.353 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 31.8634773 | -72.131824 | Reject H0 (k0 < kcrit) | 99 | None |
| Lead | 200 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 5 | 69.2 | 110 | 1 (BH04/1-240) | BH01/1 | No | 40.13 | 0 | 0.8145 | 0.762 | Normal | 2.132 | 107.4597 | PASSED | Max. Value NOT Outlier | -7.289 | -2.015 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 147.442262 | -7.2887463 | Reject H0 (k0 < kcrit) | 98 | None |
| Selenium | 250 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.6582 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -7.2887463 | Reject H0 (k0 < kcrit) | 98 | None |
| Zinc | 3700 | LQM Suitable for Use Levels - Residential (With Plant Uptake) | 6 | 62.33 | 98 | 0 | BH04/1 | No | 18.08 | 0 | 0.7241 | 0.788 | Non-Normal | 2.015 | 77.2104 | PASSED | Max. Value is Outlier | -492.698 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 94.5239285 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzene | 0.42 | Category 4 Screening Levels - Residential (with homegrown produce) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| Ethylbenzene | 47 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| m & p - Xylene | 56 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| Toluene | 130 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| Naphthalene | 2.3 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.7241 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -492.69753 | Reject H0 (k0 < kcrit) | 99 | None |
| Phenanthrene | 95 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.68 | 4.1 | 0 | BH04/1 | No | 1.67 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 2.0603 | PASSED | Max. Value is Outlier | -138.024 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 3.66266667 | -138.02439 | Reject H0 (k0 < kcrit) | 99 | None |
| Anthracene | 2400 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.07 | 0.41 | 0 | BH04/1 | No | 0.17 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.206 | PASSED | Max. Value is Outlier | -35120.95 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.36626667 | -35120.951 | Reject H0 (k0 < kcrit) | 99 | None |
| Fluoranthene | 280 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 1.1 | 6.6 | 0 | BH04/1 | No | 2.69 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 3.3165 | PASSED | Max. Value is Outlier | -253.545 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 5.896 | -253.54545 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (a) anthracene | 7.2 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.33 | 2 | 0 | BH04/1 | No | 0.82 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.005 | PASSED | Max. Value is Outlier | -20.6 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.78666667 | -20.6 | Reject H0 (k0 < kcrit) | 99 | None |
| Chrysene | 15 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.48 | 2.9 | 0 | BH04/1 | No | 1.18 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.4573 | PASSED | Max. Value is Outlier | -30.034 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 2.59066667 | -30.034483 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (k) fluoranthene | 77 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.2 | 1.2 | 0 | BH04/1 | No | 0.49 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.603 | PASSED | Max. Value is Outlier | -384 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.072 | -384 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (a) pyrene | 2.2 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.35 | 2.1 | 0 | BH04/1 | No | 0.86 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.0553 | PASSED | Max. Value is Outlier | -5.286 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 1.876 | -5.2857143 | Reject H0 (k0 < kcrit) | 96 | None |
| Indeno (1,2,3 - cd) pyrene | 27 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.17 | 1 | 0 | BH04/1 | No | 0.41 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.5025 | PASSED | Max. Value is Outlier | -161 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.89333333 | -161 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (ghi) perylene | 320 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.16 | 0.96 | 0 | BH04/1 | No | 0.39 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 0.4824 | PASSED | Max. Value is Outlier | -1999 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 0.8576 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Acenaphthylene | 170 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Acenaphthene | 210 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Fluorene | 170 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -1999 | Reject H0 (k0 < kcrit) | 99 | None |
| Pyrene | 620 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.92 | 5.5 | 0 | BH04/1 | No | 2.25 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 2.7638 | PASSED | Max. Value is Outlier | -675.364 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 4.91333333 | -675.36364 | Reject H0 (k0 < kcrit) | 99 | None |
| Benzo (b) fluoranthene | 2.6 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0.43 | 2.6 | 0 | BH04/1 | No | 1.06 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 1.3065 | PASSED | Max. Value is Outlier | -5 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 2.32266667 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Dibenzo (ah) anthracene | 0.24 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 5 | 0 | 0 | 1 (BH04/1-0.28) | N/A | No | 0 | 5 | 0.4961 | 0.788 | N/A | 2.132 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic C5-C6 | 42 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic >C6-C8 | 100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic >C8-C10 | 27 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic >C10-C12 | 130 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic >C12-C16 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aliphatic >C21-C35 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aromatic >C8-C10 | 34 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aromatic >C10-C12 | 74 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aromatic >C12-C16 | 140 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aromatic >C16-C21 | 260 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 0 | 0 | 0 | N/A | No | 0 | 6 | 0.4961 | 0.788 | N/A | 2.015 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -5 | Reject H0 (k0 < kcrit) | 96 | None |
| Aromatic >C21-C35 | 1100 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 6 | 3.17 | 19 | 0 | BH04/1 | No | 7.76 | 5 | 0.4961 | 0.788 | Non-Normal | 2.015 | 9.5475 | PASSED | Max. Value is Outlier | -346.368 | -1.943 | Reject H0 t0 < t(n -1, 0.95) | 99.5 | 4.36 | 16.9733333 | -346.36842 | Reject H0 (k0 < kcrit) | 99 | None |
| Phenol | 120 | LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter) | 3 | 0 | 0 | 0 | N/A | No | 0 | 3 | 0.4961 | 0.788 | N/A | 2.92 | 0 | N/A | N/A | N/A | N/A | N/A | 99.5 | 4.36 | 0 | -346.36842 | Reject H0 (k0 < kcrit) | 99 | None |

## 12.8 Appendix 8 - Assessment Methodology

- Severity considers the potential impact of the linkage on the receptors if the linkage was active. Categories range from slight/superficial to fatal.
- Likelihood considers the chances of the linkage occurring and is classified into categories from improbable to frequent.

By assigning scores with each of the above categories, the risk assessment can be undertaken using the formula:

**RISK = LIKELIHOOD × SEVERITY**

The matrix given in Table 8 provides a means of calculating the overall risk; while Table 7 provides the qualitative assessment based on the risk score.

Table 6: Contamination Risk Matrix

| | | Potential Severity | | | | |
|---|---|---|---|---|---|---|
| | | Fatal 5 | Major 4 | Moderate 3 | Minor 2 | Slight 1 |
| **Probable Likelihood** | Frequent 5 | Very High | High | Moderate | Low - Moderate | Low |
| | Probable 4 | High | High | Moderate | Low - Moderate | Low |
| | Possible 3 | Moderate | Moderate | Low - Moderate | Low - Moderate | Very Low |
| | Remote 2 | Low - Moderate | Low - Moderate | Low - Moderate | Low | Very Low |
| | Improbable 1 | Low | Low | Very Low | Very Low | Very Low |

Table 7: Assessment description for risk scores

| Risk Score | Risk Assessment |
|---|---|
| 1-3 | Very Low |
| 4-5 | Low |
| 6-10 | Low to Moderate |
| 11-15 | Moderate |
| 16-20 | High |
| 21-25 | Very High |

Table 8: Risk Classification System

| Risk Term | Description |
|---|---|
| **Very Low** | The presence of an identified hazard does not give rise to the potential to cause significant harm to groundwater, surface water, ecological and/or property receptors. In the event of such harm being realized, it is not likely to be Severe. |
| **Low** | The presence of an identified hazard does not give rise to the potential to cause significant harm to human health receptors. In the event of such harm being realized, it is not likely to be Severe. |
| **Low to Moderate** | It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realized, would at worst normally be mild. |
| **Moderate** | It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. |
| **High** | Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action. Investigation is required and remedial works may be necessary in the short term and are likely over the longer term. |
| **Very High** | There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is an evidence that severe harm to a designated receptor is currently happening. Urgent investigation and remediation are likely to be required. |

## 13 ABBREVIATIONS

| Abbreviation | Description |
|---|---|
| BTEX | Benzene, Tolulene, Ethylene and Xylene |
| c. | Circa |
| CLRA | Contaminated Land Risk Assessment |
| CSM | Conceptual Site Risk Model |
| EA | Environment Agency |
| GAC | Generic Assessment Criteria |
| IPC | Integrated Pollution Control |
| LAPC | Local Authority Pollution Control |
| LQM S4ULs | Land Quality Management Suitable for Use Levels |
| NPPF | National Planning Policy Framework |
| OS | Ordnance Survey |
| PAHs | Polycyclic aromatic hydrocarbons |
| Part IIA | Part IIA of the Environmental Protection. Act 1990 |
| PID | Photoionization Detector |
| PCB | Polychlorinated Biphenyl |
| PCLU | Potentially Contaminative Land Use |
| PPL | Potential Pollutant Linkage |
| PRA | Preliminary Risk Assessment |
| PSPPL | Potentially Significant Potential Pollutant Linkage |
| RWHP | Residential with Home-grown Produce |
| SI | Site Investigation |
| SOM | Soil Organic Matter |
| SPOSH | Significant Possibility of Significant Harm |
| TOC | Total Organic Carbon |
| TPH | Total Petroleum Hydrocarbons |
| TPHCWG | Total Petroleum Hydrocarbon Criteria Working Group |
| UXO | Unexploded Ordnance |

# 14 REFERENCES


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