



**SOLUTIONS LIMITED**

**PHASE II AND UPDATED RISK  
ASSESSMENT REPORT**

**AT**

**WORTHING ROAD, HORSHAM**

**FOR**

**STARBUILD LIMITED**

Report Reference: 4444-23 PI

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## LIST OF ACRONYMS

| Acronym | Meaning                                              |
|---------|------------------------------------------------------|
| BGS     | British Geological Survey                            |
| BH      | Borehole                                             |
| CDM     | Construction Design and Management                   |
| CL:AIRE | Contaminated Land: Applications In Real Environments |
| CLR     | Contaminated Land Report                             |
| COSHH   | Control Of Substances Hazardous to Health            |
| CSM     | Conceptual Site Model                                |
| DCP     | Dynamic Cone Penetrometer                            |
| DEFRA   | Department for Environment Foods and Rural Affairs   |
| DoE     | Department of Environment                            |
| DP      | Dynamic Probe                                        |
| DWS     | Drinking Water Standard                              |
| EA      | Environment Agency                                   |
| EQS     | Environmental Quality Standard                       |
| GAC     | Generic Acceptance Criteria                          |
| HA      | Hand Auger                                           |
| HP      | Hand Pit                                             |
| LPA     | Local Planning Authority                             |
| LQM     | Land Quality Management                              |
| mbgl    | Metres Below Ground Level                            |
| MP      | Mackintosh Probe                                     |
| NGR     | National Grid Reference                              |
| NPPF    | National Planning Policy Framework                   |
| OS      | Ordnance Survey                                      |
| SGV     | Soil Guideline Value                                 |
| SPOSH   | Significant Possibility of Significant Harm          |
| SPZ     | Source Protection Zone                               |
| SSSI    | Site of Special Scientific Interest                  |
| SSV     | Soil Screening Value                                 |
| TP      | Trial Pit                                            |
| TT      | Trial Trench                                         |
| WS      | Windowless Sample / Window Sample                    |
| WSV     | Water Screening Value                                |

# 1. INTRODUCTION

## 1.1 BACKGROUND AND INSTRUCTION

GeoEnviro Solutions Ltd (GES) were instructed by Starbuild Ltd (the Client) to conduct a Phase II geoenvironmental ground investigation at a site located at The Copse, Worthing Road, Horsham, RH13 9AT.

A site location plan is presented as drawing 4444-23 / 01 in **Appendix 1**.

This report is written in accordance with the guidance set out in Land Contamination Risk Management (LCRM), Guiding Principles for Land Contamination (GPLC) 1 – 3, the National Planning Policy Framework (NPPF), BS10175:2022+A2:2017 and YALPAG Technical Guidance for Developers, Landowners & Consultants (v11.2 – June 2020).

The ground investigation was undertaken to support an ongoing planning application. Due to the sensitivity of the proposed end use, whilst the site was considered “very low” risk to human health it was considered that additional investigation would be of benefit to support the original findings of the previous report.

## 1.2 PROPOSED DEVELOPMENT

We understand current plans for the development of the site include the demolition of the existing site structure and construction of a new 70 bed care home.

An outline development drawing for the site as drawn by Fluid London, referenced FL24-2145-055E and dated February 2024, can be reviewed within **Appendix 1**.

The risk assessment undertaken in this report is therefore based on the proposed development as outlined here. Any variation from this may require a re-assessment and the Conceptual Site Model updating accordingly.

## 1.3 OBJECTIVES

The objectives of this Phase II report are to:

- To gain an understanding of any concerns of the regulatory authorities (Local Authority Planning, Building Control and Environmental Health departments and the Environment Agency) regarding local land filling, flooding, mining, quarrying and other concerns.
- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater, and ecological receptors based on the findings of the preliminary CSM.
- Assess by quantitative means the potential nature and extent of contamination from those uses and the environmental risk and liabilities which may affect the site redevelopment.
- Refine the prevalent source-pathway-receptor linkages present on site by means of a Tier 2 contamination risk assessment which incorporates the formulation of an Updated Conceptual Site Model.
- To identify the ground conditions and provide details of their engineering properties in order to facilitate foundation design for the proposed development.

## 1.4 SCOPE

The ground investigation undertaken was specified by GES as a result of the local authority response to the original desktop study.

Prior to commencing the site works the proposed scope of investigation was as follows:

- Four window sampling boreholes to a nominal depth of up to 4.00 mbgl or refusal.
- Environmental sampling, and in situ geotechnical testing (SPTs).
- Collection and subsequent environmental laboratory testing of samples.
- Interpretation and risk assessment of the data in respect of potential contamination and subsequent updating of the preliminary CSM.
- Interpretation of the geotechnical data to provide details of their engineering properties in order to facilitate foundation design for the proposed development.

However, the proposed scope may be subject to change dependent upon site conditions, access, restrictions and obstructions.

## 1.5 PREVIOUS INVESTIGATIONS

GES have previously undertaken a Phase I: Desktop Study & Risk Assessment Report for the site (Report Reference: 4444-23 PI, issued initially in November 2023, with several updates due to additional information provided at later dates and the most recent version (V4) issued in September 2024), which this report should be read in conjunction with.

## 2. PHYSICAL SETTING

### 2.1 SITE INFORMATION

#### Location

The site is located at The Copse, Worthing Road, Horsham, at approximate National Grid Reference (NGR): 515962:128161 (centre of the site).

#### Topography

The site and surrounding area are both relatively flat.

#### Access

The site was accessible via Worthing Road at the eastern end of the site.

#### Site Description

An initial site reconnaissance was carried out as part of the Phase I on the 22<sup>nd</sup> November 2023, with no significant change observed upon the return visit for the intrusive investigation. All details from the site reconnaissance are included in the site description below.

The site is an irregular shaped piece of land with an approximate area of 2.62 Ha.

At the time of the investigation the site was occupied by a single residential property adjacent to Worthing Road with the balance of the site being occupied by undeveloped scrubland with trees and an inland river providing the primary boundary demarcation. Several large stockpiles of demolition debris and wood can be found across the site.

The predominant site coverage consists of grass over soil soft standing, with small sections of grass over tarmac and concrete hardstanding near the residential property to the east of the site.

An approximate distribution of the surface covering is given below in Table 2.1.

*Table 2.1: Site Surface Covering*

| Type of Surface Cover                      | Distribution (%) |
|--------------------------------------------|------------------|
| Soft Ground (grassed and landscaped areas) | 95               |
| Hardstanding                               | 4                |
| Roadways                                   | 0                |
| Buildings                                  | 1                |
| Water (ponds, streams)                     | 0                |

### 2.2 GEOLOGY

The British Geological Survey shows the site to be underlain by the geological succession outlined below in Table 2.2.

*Table 2.2: Published Geology*

| Geology     | Description /strata                         |
|-------------|---------------------------------------------|
| Artificial  | None Recorded                               |
| Superficial | None Recorded                               |
| Bedrock     | Weald Clay Formation / Horsham Stone Member |

There are no known artificial deposits recorded underlying the site.

There is no recorded superficial geology underlying the site.

The bedrock geology beneath the site is shown to be the Weald Clay Formation (Mudstone) in the north and centre of the site and Horsham Stone Member (Calcareous Sandstone) in the south, east and west of the site.

The Weald Clay Formation is generally described as *'Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones.'* (BGS Lexicon description).

The Horsham Stone Member is generally described as *'Sandstone, calcareous, generally fine-grained, micaceous, locally well laminated, pale grey to greenish/olive grey'* (BGS Lexicon Description).

## 2.3 HYDROGEOLOGY

The Environment Agency designate aquifers in accordance with the Water Framework Directive. These designations reflect not only the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetlands ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey.

### Groundwater Vulnerability

The site is recorded to be located within an area where the EA considers the groundwater to have a high vulnerability to mobile pollutants in the areas underlain by the Horsham Stone member, as summarised in Table 2.3 below. The areas of site underlain by the Weald Clay Formation are considered to be over an Unproductive Strata.

Table 2.3: Groundwater Vulnerability Definitions

| Definition           | Description                                                                                                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High Vulnerability   | Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.                          |
| Medium Vulnerability | Intermediate between high and low vulnerability.                                                                                                                                                      |
| Low Vulnerability    | Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability. |

### Superficial Deposits

There is no superficial aquifer designation for the site.

### Bedrock

The Environment Agency aquifer classification scheme indicates that the bedrock aquifer designation for the site is classed as Unproductive Strata where Weald Clay Formation is present which are generally described as *'rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'*.

The Environment Agency aquifer classification scheme indicates that the bedrock aquifer designation for the site is classed as Secondary A aquifer where the Horsham Stone Member is present, which are generally described as *'permeable layers capable of supporting water*

*supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

The groundwater vulnerability in the vicinity of the site is classified as High where it is underlain by Horsham Stone.

## 2.4 HYDROLOGY

The nearest surface watercourse to the site is *an unnamed water feature* located on site.

The site lies within the Arun Horsham water body catchment, which the EA recorded to have a 'Fail' chemical and 'Poor' ecological classification in 2019.

## 2.5 CONTAMINANT SOURCES

### On-Site Sources

The historical study and previous desktop did not identify any likely sources of on-site contamination

### Offsite Sources

No off-site sources of contamination have been identified in the previous investigations.

## 3. FIELDWORKS

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### 3.1 GROUND INVESTIGATION

All ground investigation works were carried out on the 20<sup>th</sup> of August 2025 under the supervision of a Geoenvironmental Engineer from GES.

The ground investigation has been carried out in accordance with BS5930: 2015+A1:2020 and the UK Specification for Ground Investigation Second Edition 2012.

All strata descriptions were undertaken in accordance with BS5930: 2015+A1:2020; EN ISO 14688-1&2:2018; and EN ISO 14689:2018.

The ground investigation undertaken was in line with the scope as described in Section 1.4.

The positions of the exploratory holes in relation to the existing site layout can be reviewed on drawing number GES 4444-23 / 02 within **Appendix 1**.

### 3.2 RESTRICTIONS

No restrictions were encountered during this ground investigation.

## 4. GEOLOGY AND GROUND CONDITIONS

The following ground conditions were encountered during the ground investigation.

### 4.1 GENERAL

A generalised summary of the ground conditions encountered, depths to base, and thickness recorded from the exploratory hole records is presented below in Table 4.1, below.

Table 4.1: Summary of Ground Conditions

| Geology / Strata               | Depth (mbgl) |      |            |            | Thickness (m) |            | Locations encountered     |
|--------------------------------|--------------|------|------------|------------|---------------|------------|---------------------------|
|                                | Top          |      | Base       |            | Min           | Max        |                           |
|                                | Min          | Max  | Min        | Max        |               |            |                           |
| Topsoil                        | 0.00         | -    | 0.30       | 0.30       | 0.30          | 0.30       | All Exploratory Boreholes |
| Weathered Weald Clay Formation | 0.30         | 0.30 | 2.80       | 2.95       |               |            | All Exploratory Boreholes |
| Weald Clay Formation           | 2.80         | 2.95 | Not Proved | Not Proved | Not Proved    | Not Proved | All Exploratory Boreholes |

Detailed strata descriptions are presented on the exploratory point logs presented in [Appendix 3](#) and photographs of the exploratory points in [Appendix 4](#).

### 4.2 TOPSOIL

Topsoil encountered on site generally comprised

### 4.3 BEDROCK (WEALD CLAY FORMATION)

Deposits considered to represent the weathered fraction of the Weald Clay Formation generally comprised firm sandy gravelly clay becoming stiff slightly gravelly clay with depth.

The un-weathered fraction of the Weald Clay Formation comprised extremely weak, highly fractured mudstone.

### 4.4 GROUNDWATER

Groundwater was not encountered during the ground investigation.

### 4.5 OBSTRUCTIONS

No obstructions were encountered during this ground investigation.

### 4.6 CONTAMINATION

No visual or olfactory evidence of contamination was encountered or observed during this ground investigation, in particular no obvious visual or olfactory evidence of mobile contamination was observed during the ground investigation.

## 5. INSITU TESTING

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### 5.1 STANDARD PENETRATION TESTS

Standard penetration testing was undertaken in some / all exploratory boreholes, and are summarised below:

- SPT 'N' values of between 11 and 24 were encountered within the weathered fraction of the Weald Clay Formation.
- SPT 'N' values of between 24 and 35 were encountered within the Weald Clay Formation.

SPT 'N' values generally increase with depth.

## 6. LABORATORY TESTING – SULPHATES

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The following programme of chemical laboratory testing has been undertaken on samples obtained during this investigation:

Two samples of the underlying naturally occurring deposits were submitted for assessment of water-soluble sulphate, total sulphate, pH value and total sulphur concentrations. With a further four also analysed for water-soluble sulphate and pH values only.

Water-soluble sulphate concentrations of <10mg/l to 39 mg/l were recorded, total (acid) sulphate concentrations ranged from <0.010% to 0.032%, total sulphur concentrations ranged from 0.010% to 0.021% with pH values ranging from of 7.7 to 8.1 units. Total Potential Sulphates ranged between <0.03% and 0.051%.

Reference to BRE Special Digest 1 and the test results indicates the results from the fall within Design Sulphate Class DS-1. Consequently, concrete may be designed to AC-1s concrete classification.

## 7. LABORATORY TESTING – CONTAMINATION

### 7.1 SOIL TESTING

All samples were sent to a UKAS accredited chemical testing laboratory, and MCERTS were used where available. The analytical strategy focussed on a general suite of potential contaminants and the analytical suites are summarised in Table 8.1, below.

*Table 8.1: Summary of Chemical Testing Suite*

| Testing                                                                                                                                                   | Comment                                                                                                                                                 | No. of soil samples analysed |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| General metals suite including Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, phenol, selenium, zinc, pH, and water soluble sulphate | General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance | 6                            |
| Speciated PAH and TPH CWG                                                                                                                                 | General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance | 6                            |
| Asbestos Screen                                                                                                                                           | General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance | 6                            |

All chemical testing results are presented in [Appendix 5](#).

## 8. GEOTECHNICAL RECOMMENDATIONS

### 8.1 FOUNDATIONS

The topsoil is not considered suitable for the construction of shallow foundations due to the risk of unacceptable total and differential settlement occurring under moderately light surface loading.

The proposed areas of developments are likely to be capable of being constructed on conventional shallow spread/trench fill foundations within the cohesive deposits of the Weald Clay Formation.

It is considered that strip foundations constructed within the underlying clays could be designed assuming an allowable increase in load given below in Table 9.1.

Table 9.1: Allowable Increase in Stress

| Foundation Type                                   | Strip Foundations (m) |     |     | Spread Foundations (m) |     |     |
|---------------------------------------------------|-----------------------|-----|-----|------------------------|-----|-----|
| Foundation Width                                  | 0.6                   | 0.9 | 1.2 | 0.6                    | 0.9 | 1.2 |
| Foundation Depth                                  | 1.0                   |     |     | 1.0                    |     |     |
| Allowable increase in stress (kN/m <sup>2</sup> ) | 110                   | 105 | 100 | 180                    | 165 | 155 |

The allowable increase in stress given above assumes a factor of safety of 3 against general shear failure, with cohesion of 50kN/m<sup>2</sup> at the foundation depths. Settlements at the above loading intensities should remain within tolerable limits for the type of structure proposed provided that the underlying soils are carefully inspected immediately after final trimming has taken place. It should be appreciated that greater bearing capacity could be achieved if foundations are placed at greater depth within the Weald Clay.

Should any soft, weak or made ground soils be encountered they should be locally removed and replaced with lean-mix concrete or compacted granular soil. It should be appreciated that should higher bearing capacities are required then these could be achieved by placing the foundation at greater depths within the clay or using an alternative foundation option such as micro piles.

In addition, if the excavations are required to stand open for any period of time, then a blinding layer of lean-mix concrete should be placed in the excavation bases. This expedient will reduce loosening of the sub-grade due to the ingress of surface water.

does require a survey of the existing trees to be undertaken. In addition, the recommendations given for voids below ground floor slabs and drainage services should be followed.

### 8.2 EXCAVATIONS

Groundwater was not encountered during the investigation. However, it should be appreciated that groundwater levels are subject to seasonal variation or changes on local drainage conditions.

Groundwater is unlikely to represent a particular problem to the construction of the development; however, may become a problem if encountered with excavations in the sand and gravels during inclement weather. Furthermore, it should be recognized that slight seepages and minor water entries may combine in any long trench excavations to create a significant volume of water which may cause local problems during the construction phase.

Any minor groundwater seepages or significant standing water within excavations made upon this site may be removed by using a simple form of de-watering. Such a system could include the excavation of sumps from which the water could be pumped. Advice on Groundwater Control is given in CIRIA Report No 515 – Groundwater Control Design and Practice.

The stability of the excavation faces cannot be guaranteed thus temporary support to the excavation faces may become necessary unless the foundations are constructed using trench-fill techniques. In this method the foundation trenches should be excavated, inspected and backfilled with concrete as a continuous operation. Under no circumstances should operatives be allowed to enter unsupported excavations.

Subject to space constraints, excavations could be battered back to a suitable angle of repose (typically 1:1 for a 1.00 m deep excavation). Alternatively, if there is a requirement to protect nearby structures or services, appropriate supports may be required. Advice on excavation support is given in CIRIA Report No 97 – Trenching Practice.

Where trench support/shoring is utilised an appropriately qualified and experienced engineer should design the support system. The shoring/support will require regular inspection in accordance with published guidelines to ensure that the support/shoring is adequate for the ground conditions present.

### **8.3 DISPOSAL OF ARISING**

If any soils are to be removed offsite, it may be prudent to undertake Waste Acceptance Criteria (WAC) analyses on the soils to be removed and undertake discussion with landfill operators at an early stage.

Any materials removed from site should be undertaken in accordance with current Duty of Care requirements and the Environment Agency Technical Guidance Document WM3, dated 2015.

All materials must be transported in compliance with the Duty of Care Regulations by authorising movements with Carrier's individually numbered Duty of Care conveyance notes, complete with the appropriate EWC Codes. All relevant dockets will need to be kept; to provide evidence of the removal as these may be required as part of a Validation Report.

Site preparatory works associated with this project are likely to involve the re-use of both natural and made ground soils on-site. Therefore, the Contractor should prepare a Materials Management Plan (MMP) in accordance with the CL:AIRE Code of Practice (v2, March 2011).

The MMP will document how all of the materials to be excavated during the proposed site preparatory and remediation earthworks are to be dealt with.

## 9. CONTAMINATION

### 9.1 SOIL TESTING

A total of six samples have been analysed by Chemtest Ltd in their UKAS and MCERTS accredited laboratory-testing facility in accordance with laboratory protocol.

The testing completed comprised of a focused suite of heavy metals, speciated Total Petroleum Hydrocarbons (TPH CWG Aromatic/aliphatic split) and speciated Polycyclic Aromatic Hydrocarbons (PAH) including the more carcinogenic benzo(a)pyrene (BaP) and naphthalene, asbestos, soil organic matter (SOM) content, MTBE & BTEX, cyanide, pH and sulphates.

The results of this laboratory testing have been compared to the Soil Guideline Values (SGVs) as well as the CIEH 'LQM' guideline values for inorganic and organic contaminants in soils. The proposed development of the site is intended to comprise a care home and therefore screening has been made against a land use of 'Residential without Home Grown Produce'.

A set of Screening Values are provided in [Appendix 6](#).

### 9.2 SELECTION OF SCREENING CRITERIA

The on-site receptors for the study site are considered to be:

- Construction workers (during redevelopment of the site only).
- Future maintenance workers (following redevelopment).
- Future end users and site visitors (following redevelopment); and
- Trespassers (during redevelopment).

Risks to construction workers during the redevelopment process will be mitigated by adhering to appropriate health and safety legislation, and the wearing of appropriate personal protective equipment (PPE). During redevelopment, the site will be securely fenced to prevent trespassers from accessing the site, and good site management practices will be implemented to mitigate exposure to off-site receptors.

The potential pathways for contaminants within the soil to human health receptors following redevelopment are considered to be:

- Direct ingestion of soil and soil derived dust.
- Dermal contact with soil outside and soil derived dust inside.
- Inhalation of soil derived dust inside and outside; and
- Inhalation of soil derived vapours inside and outside.

The potential pathways for contaminants within the soil to off-site human health receptors following redevelopment are considered to be:

- Direct ingestion of soil and soil derived dust.
- Dermal contact with soil outside and soil derived dust inside.
- Inhalation of soil derived dust inside and outside; and
- Inhalation of soil derived vapours inside and outside if contamination within soil is able to migrate across the site boundary within.

In the first instance, the results of this laboratory testing have been compared to generic assessment criteria (GAC) for the residential without homegrown produce land use scenario. These incorporate the following pathways:

- Direct ingestion of soil and soil derived dust.
- Dermal contact with soil outside and soil derived dust inside.
- Inhalation of soil derived dust inside and outside; and
- Inhalation of soil derived vapours inside and outside.

Contaminants have been screened against revised LQM/CIEH S4UL criteria<sup>1</sup> where available. These GAC have been designed for use under planning, using Health Criteria Values based on minimal risk, and updated exposure parameters. The S4UL are intended to replace the previous LQM/CIEH GAC. The S4UL are based on the assumption of a sandy loam soil the 2.5% soil organic matter (SOM) criteria have been used, where available and appropriate, in the first instance. All soil samples were analysed for %SOM, the range was from 0.68-2.58%, and so this conservative approach is considered appropriate for initial screening.

Where no S4UL are available, the EIC/ AGS/ CL:AIRE/ GAC<sup>2</sup> have been used. The toxicological criteria within these are also based on minimal risk. It is recognised that these criteria have not recently been updated, and in particular, do not incorporate the slightly higher inhalation rates that have been used within the S4UL. However, given that they incorporate additional pathways, they are considered suitable for an initial screen. The EIC/ AGS/ CL:AIRE/ GAC are also based on a sandy loam soil and the 1% SOM criteria have been used in the first instance.

There is neither an S4UL nor an EIC/ AGS/ CL:AIRE/ GAC available for lead. In the absence of a GAC based on minimal risk, the C4SL for lead has been used. It is recognised that this is based on a “low level of toxicological concern” rather than on a minimal risk level. However, it is considered appropriate for use under planning, especially for a site where there will effectively be no pathways for inorganic metals following redevelopment.

All the GAC are based on a sandy loam soil. This is considered appropriate for use for initial screening.

All of the GAC assume unsaturated soils. However, the use of the GAC is considered to be conservative, because they assume a certain air-filled porosity and water-filled porosity.

The GAC also assume that no free phase product is present and are not intended for use in this instance. No free product was observed within soils during the ground investigation.

### 9.3 SOIL TESTING RESULTS AND SCREENING

All metals, PAHs, and TPH CWG analytes are presented in the following tables with units in mg/kg unless otherwise stated. Other potential contaminants of concern are only shown where there is at least one result exceeding the limit of detection.

The results of the chemical laboratory testing are provided in **Appendix 5**.

Tables 10.1 – 10.3 overleaf summarize the soil testing results.

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<sup>1</sup> Nathanail et al. (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, 2015. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3495

<sup>2</sup> CL:AIRE (2010) The EIC/AGS/CL:AIRE Generic Assessment Criteria for Human Health Risk Assessment

## Metalloids

Table 10.1: Metalloids Soil Exceedances

| Determinant    | Min   | Max   | GAC    | Number of exceedances | Location of exceedances |
|----------------|-------|-------|--------|-----------------------|-------------------------|
| Arsenic        | 1.6   | 6.3   | 40*    | 0                     | -                       |
| Cadmium        | <0.10 | 1.1   | 85*    | 0                     | -                       |
| Chromium total | 5.6   | 21    | 910*   | 0                     | -                       |
| Chromium (VI)  | <0.50 | <0.50 | 6*     | 0                     | -                       |
| Copper         | 5.1   | 24    | 7100*  | 0                     | -                       |
| Lead           | 6.3   | 28    | 310*   | 0                     | -                       |
| Mercury        | <0.05 | <0.05 | 1.2*   | 0                     | -                       |
| Nickel         | 4.2   | 28    | 180*   | 0                     | -                       |
| Selenium       | <0.25 | 0.61  | 430*   | 0                     | -                       |
| Zinc           | 22    | 85    | 40000* | 0                     | -                       |
| Total Phenols  | <0.10 | <0.10 | 1300*  | 0                     | -                       |
| Total Cyanide  | <0.50 | 1.3   | 34*    | 0                     | -                       |

\*LQM/CIEH GAC for 'Residential without home grown produce' use scenario based on a sandy loam soil and 2.5% SOM.

a) Based on the inorganic mercury GAC as the conceptual site model does not suggest that other forms of mercury are likely to be present on site.

b) LQM issued an update to the nickel S4ULs in August 2015, and this has been taken into account.

## Organics

Table 10.2: PAH Soil Exceedances

| Determinant          | Min   | Max   | GAC   | Number of exceedances | Location of exceedances |
|----------------------|-------|-------|-------|-----------------------|-------------------------|
| Naphthalene          | <0.10 | <0.10 | 5.6   | 0                     | -                       |
| Acenaphthylene       | <0.10 | <0.10 | 4600  | 0                     | -                       |
| Acenaphthene         | <0.10 | <0.10 | 4700  | 0                     | -                       |
| Fluorene             | <0.10 | <0.10 | 3800  | 0                     | -                       |
| Phenanthrene         | <0.10 | <0.10 | 1500  | 0                     | -                       |
| Anthracene           | <0.10 | <0.10 | 35000 | 0                     | -                       |
| Fluoranthene         | <0.10 | 0.48  | 1600  | 0                     | -                       |
| Pyrene               | <0.10 | 0.34  | 3800  | 0                     | -                       |
| Benzo(a)anthracene   | <0.10 | <0.10 | 14    | 0                     | -                       |
| Chrysene             | <0.10 | <0.10 | 31    | 0                     | -                       |
| Benzo(b)fluoranthene | <0.10 | <0.10 | 4     | 0                     | -                       |
| Benzo(k)fluoranthene | <0.10 | <0.10 | 110   | 0                     | -                       |
| Benzo(a)pyrene       | <0.10 | <0.10 | 3.2   | 0                     | -                       |

| Determinant            | Min   | Max   | GAC  | Number of exceedances | Location of exceedances |
|------------------------|-------|-------|------|-----------------------|-------------------------|
| Indeno(1,2,3-cd)pyrene | <0.10 | <0.10 | 46   | 0                     | -                       |
| Dibenz(a,h)anthracene  | <0.10 | <0.10 | 0.32 | 0                     | -                       |
| Benzo(ghi)perylene     | <2.0  | <2.0  | 360  | 0                     | -                       |

\*LQM/CIEH GAC for 'Residential without Home Grown Produce' use scenario based on a sandy loam soil and 2.5% SOM.

Table 10.3: TPH CWG Aliphatic/Aromatic Soil Exceedances

| Determinant          | Min   | Max   | GAC   | Number of exceedances | Location of exceedances |
|----------------------|-------|-------|-------|-----------------------|-------------------------|
| Aromatic >C5 - C7    | <0.05 | <0.05 | 690   | 0                     | -                       |
| Aromatic >C7 - C8    | <0.05 | <0.05 | 1800  | 0                     | -                       |
| Aromatic >C8 - C10   | <0.05 | <0.05 | 110   | 0                     | -                       |
| Aromatic >C10 - C12  | <1.0  | <1.0  | 590   | 0                     | -                       |
| Aromatic >C12 - C16  | <1.0  | <1.0  | 2300  | 0                     | -                       |
| Aromatic >C16 - C21  | <2.0  | 2.6   | 1900  | 0                     | -                       |
| Aromatic >C21 - C35  | <2.0  | 4.6   | 1900  | 0                     | -                       |
| Aromatic >C35 - C44  | <1.0  | <1.0  | 1900  | 0                     | -                       |
| Aliphatic >C5 - C6   | <0.05 | <0.05 | 78    | 0                     | -                       |
| Aliphatic >C6 - C8   | <0.05 | <0.05 | 230   | 0                     | -                       |
| Aliphatic >C8 - C10  | <0.05 | <0.05 | 65    | 0                     | -                       |
| Aliphatic >C10 - C12 | <2.0  | <2.0  | 330   | 0                     | -                       |
| Aliphatic >C12 - C16 | <1.0  | <1.0  | 2400  | 0                     | -                       |
| Aliphatic >C16 - C35 | <2.0  | 8.7   | 92000 | 0                     | -                       |
| Aliphatic >C35-C44   | <10   | <10   | 92000 | 0                     | -                       |

\* LQM/CIEH GAC scenario based on a sandy loam soil and 2.50% SOM. It is noted that the LQM/CIEH S4UL guidance recommends an additive approach for the TPH fraction, so that a hazard index approach is used. Based on a preliminary conservative comparison of maximum concentrations to S4ULs, no forward modelling is necessary to prove that this would still result in no exceedances at the site.

### Others

The asbestos screening did not identify the presence of Asbestos in any of the samples analysed.

## 10. UPDATED CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

The Conceptual Site Model has been re-formulated based upon the results from the ground investigation in accordance with BS10175:2015. It aims to provide information regarding the sources of contamination and the pathways in which contamination can migrate to a vulnerable receptor, all of which need to be present for there to be a risk. This is in relation to the proposed end use being classified as 'residential with homegrown produce'. The following linkages have been identified and are presented in Table 11.1, below.

Table 11.1: Updated Conceptual Site Model.

| Contaminant Source                                                                                                                  | Pathways                                                                   | Receptor                                                   | Pollutant Linkage   | Probability of Risk | Classification of Consequence | Level of Risk | Justification                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------|---------------------|---------------------|-------------------------------|---------------|-----------------------------------------------------------------------------------|
| On-site:<br>Made Ground soils on site possibly containing elevated metals, other organics such as TPH, PAH, phenols, VOC and SVOCs. | Ingestion, dermal contact, inhalation of dusts/vapours                     | Future end users and site visitors                         | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
|                                                                                                                                     |                                                                            | Construction Workers                                       | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
|                                                                                                                                     | Leaching through soils and migration via groundwater or soil pore moisture | Controlled Waters                                          | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
|                                                                                                                                     | Permeation of water pipes                                                  | Construction materials, future end users and site visitors | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |

| Contaminant Source                                                                                                               | Pathways                                                                  | Receptor                                  | Pollutant Linkage   | Probability of Risk | Classification of Consequence | Level of Risk | Justification                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|---------------------|---------------------|-------------------------------|---------------|-----------------------------------------------------------------------------------|
|                                                                                                                                  | Uptake                                                                    | Plant and Wildlife                        | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
| On-site:<br>Asbestos at/near ground surface in Made Ground soils.                                                                | Inhalation of fibres in airborne dust                                     | Future end users and site visitors        | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
|                                                                                                                                  |                                                                           | Construction Workers                      | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
| On-site:<br>Ground Gases (CH <sub>4</sub> , CO <sub>2</sub> ) from on-site Made Ground.                                          | Gas migration and build up within buildings (explosion/asphyxiation risk) | Future end users and building structures. | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |
| Offsite:<br>Ground Gases (CH <sub>4</sub> , CO <sub>2</sub> , H <sub>2</sub> S) from off-site historical landfilling activities. | Gas migration and build up within buildings (explosion/asphyxiation risk) | Future end users and building structures. | Considered inactive | -                   | -                             | Very Low<br>● | The results of the investigation undertaken do not change the initial assessment. |

## 11. RECOMMENDATIONS

---

The results of the general testing undertaken across the site indicates that contamination is not likely across the site.

### 11.1 CONSULTEES

It is highly recommended that this report be forwarded to the relevant Local Authority Environmental Health and Planning Departments to seek their comments and subsequent approval, otherwise further works may be required.

### 11.2 WATCHING BRIEF AND DISCOVERY STRATEGY

A watching brief should be maintained by the Main Contractor at all times during the groundworks stage. Should any unforeseen contamination, such as oils or soils/groundwater with an unusual colour or odour, be encountered during groundworks then the following procedure should be implemented:

- Work to cease in that area to prevent exposure to ground workers and potential contaminants being spread around.
- Notify GES, to attend site and sample material.
- Notify the Environmental Health Department / Contaminated Land Officer(s) of the Local Planning Authority.

If the nature and extent of the contamination is unmanageable under the procedure set out above, then a suitable management, mitigation or remediation procedure will be agreed with the CLO. However, this is considered unlikely at this particular site.

### 11.3 PREVIOUSLY UNIDENTIFIED CONTAMINANTS

Any suspected contaminated soil/fill found during construction works shall be placed in temporary stockpiles on hardstanding or high density Visqueen and be suitably covered to minimize the potential for dust/odour nuisance and prevent surface water runoff. Samples of arising material will be taken to determine whether this material is suitable for re-use on site.

Once the laboratory analysis of the material is available an assessment should be undertaken to determine whether it can be retained on-site as part of the Material Management Plan or whether it should be disposed off-site.

Depending on the nature of any such impact it may be necessary to undertake validation testing of the excavation faces in order to demonstrate that no such materials are left in-situ.

### 11.4 GROUND GAS PROTECTION MEASURES

Based on the findings of the Phase I Desktop and this Investigation, the site can be characterised by Table 8.6 of CIRIA C665 for building type A, Characteristic Situation CS1 and as 'Very Low' risk.

As such no site-specific gas protection measures are required.

## 11.5 ASBESTOS

Although screening has revealed no asbestos to be present within the samples analysed from exploratory holes undertaken, it cannot be guaranteed that asbestos is not present within the soils across the remainder of the site.

Consequently, GES would recommend that a watching brief be adopted with regards to the site for the potential of finding any Asbestos Containing Materials (ACMs). If any ACMs are identified these need to be dealt with accordingly in relation to the Hazardous Waste Regulations 2005.

## 11.6 SERVICES

If new services will be installed as part of the redevelopment of the site, we would recommend the local water supply company be contacted to determine their specification for the type of pipework which should be used on this site.

All services and in particular potable water supply pipework should comprise of material that is resistant to attack and degradation to chemical attack.

Further information can be found within the published guidance for the '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research (UKWIR), this supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note – '*Laying Pipes in Contaminated Land*' which has been withdrawn.

## 11.7 SURFACE WATER

It should be noted that the Environment Agency does not recommend that soakaways be placed within Made Ground, potentially contaminative land or in ground previously identified as contaminated.

## 12. RELIANCE AND LIMITATIONS

---

This report has been prepared using published information and information provided by the Client and their professional advisers which has been made available to GES at the time of writing only. GES accepts no liability for any changes resulting from new information which has become available since this time.

This report is provided for the sole use of the client and their professional advisors and is confidential to them unless agreed otherwise in writing. This report may only be used and relied on once the work has been paid for in full. GES owes no duty of care and has no liability to any third party who is not authorised by GES to use this report. Any unauthorised third parties using information contained in this report do so at their own risk.

We are content that as a result of the ground investigation works and subsequent soil testing undertaken, as outlined within this report, we have characterised the ground conditions and consequently the potential for contamination to exist on site. These works and ensuing assessment have been detailed in this report.

This assessment has been carried out to determine the potential risks posed to future end users, along with other key receptors, resulting from potential contamination at the site, based on the proposed development. Should any revisions in the development proposals result in a change any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.

Whilst this report may reference observations made regarding the presence of features/ issues such as invasive species, ACM, site drainage and evidence of structural abnormalities, this report does not constitute specialist surveys on these matters. Should further specialist surveys be carried out in this regard, the findings of these should be reported to GES so that we may determine if this has any impact on the findings of this report.

The assessment and interpretation of the factual data obtained as part of this ground investigation has been undertaken in accordance with standard consulting practise and with current national and international guidance.

This report presents the observations made during the ground investigation and the factual data obtained. The conclusions and recommendations in this report are limited to those which can be made based on the findings of the survey and information provided by third parties. GES assumes all third party data to be true and correct. No responsibility can be accepted by GES for inaccuracies in the information provided by any other party.

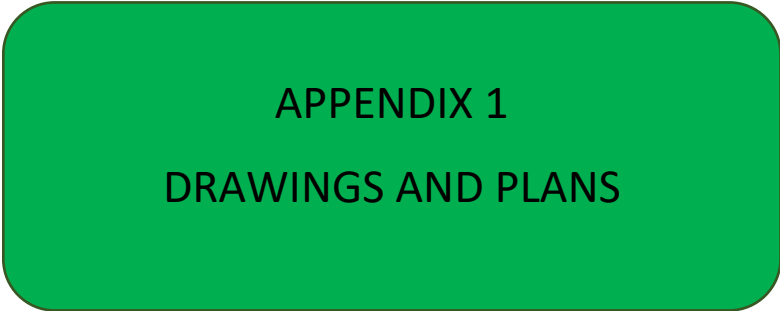
This report is written in the context of an agreed scope of works and should not be used in a different context. Furthermore, new information, improved practises, and changes in legislation may require the reinterpretation of the report in whole or in part after its original issue. GES reserve the right to alter their conclusions and recommendations in the light of further information that may become available.

Ground conditions can be variable and change rapidly, especially in areas of Made Ground, however it is assumed that the ground conditions encountered and observed are typical and representative of the site as a whole. Most specifically with regard to this limited investigation, the ground conditions have been determined from a limited number of exploratory holes formed across the site, therefore only a small percentage of the total area of the site has been investigated. Interpolation between exploratory holes has enabled a general picture of the subsurface conditions to be produced. Conclusions drawn from the ground investigation should be read in this context. GES cannot accept responsibility for any situations resulting from locally unforeseen ground conditions occurring between exploratory holes.

September 2025

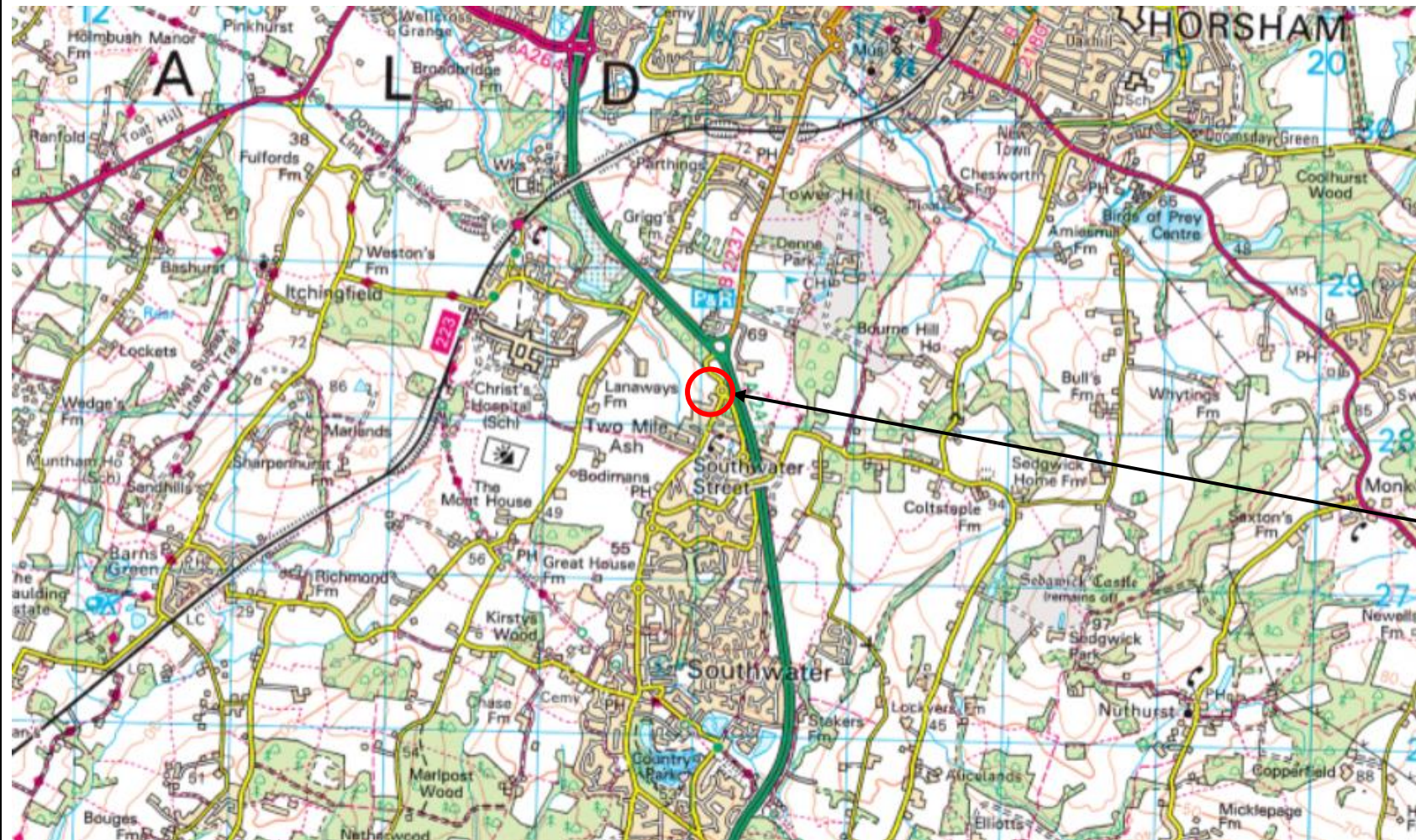
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In addition, subsurface conditions including contaminant concentrations and groundwater levels may vary spatially with time. This factor should be given due consideration in the event that the information contained within this report is used after any significant period of time has elapsed.

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## APPENDIX 1

### DRAWINGS AND PLANS



General  
Site  
Location



GeoEnviro Solutions Ltd  
Unit 7 Springvale Works  
Brighouse  
West Yorkshire  
HD6 2RA

Tel: 01484 986010  
Email: [info@geoenvirosolutions.com](mailto:info@geoenvirosolutions.com)  
Web: [www.geoenvirosolutions.com](http://www.geoenvirosolutions.com)



**PROJECT NAME** Worthing Road, Horsham

**PROJECT NUMBER** 4444-23

**TITLE**  
Site Location Plan

**DRAWING NO.**

4444-23/01

**SCALE**

N.T.S

**DATE**

November 2023

**DRAWN BY**

ADD



THE COPSE  
WORTHING ROAD  
SOUTHWATER

STARBUILD

|             |                      |
|-------------|----------------------|
| Dwg No      | FL23-2028-055        |
| Title       | Proposed Site Layout |
| Revision    | E                    |
| Scale at A1 | 1:500                |
| Status      | PLANNING             |
| Date        | Feb 2023             |



Window Sample Borehole Location

|                                                                                     |                                                                                                                                                                                                                                                                                          |                       |                        |                    |                               |              |                       |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|--------------------|-------------------------------|--------------|-----------------------|
|  | GeoEnviro Solutions Ltd<br>4A Haggwood Stone Quarry,<br>Woodhead Road, Honley,<br>HD9 6PW<br>Tel: 01484 986010<br>Email: <a href="mailto:info@geoenvirosolutions.com">info@geoenvirosolutions.com</a><br>Web: <a href="http://www.geoenvirosolutions.com">www.geoenvirosolutions.com</a> | <b>PROJECT NAME</b>   | Worthing Road, Horsham | <b>DRAWING NO.</b> |                               | <b>SCALE</b> |                       |
|                                                                                     |                                                                                                                                                                                                                                                                                          | <b>PROJECT NUMBER</b> | 4444-23                |                    | 4444-23/02                    |              | N.T.S                 |
|                                                                                     |                                                                                                                                                                                                                                                                                          | <b>TITLE</b>          | Borehole Location Plan |                    | <b>DATE</b><br>September 2025 |              | <b>DRAWN BY</b><br>JF |

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APPENDIX 2  
SITE PHOTOGRAPHS

**Site: Worthing Road, Horsham**

**Client: Starbuild Ltd**

**Job Reference: 4444-23**



**A.**



**B.**



**C.**



**D.**



A. Photo showing the front of the existing building on site

B. Photo showing the general condition of the soft landscape areas around the property facing north

C. Photo showing the rear of the existing property

D. Photo showing the general condition of the soft landscaped areas of the property facing east.

APPENDIX 3  
EXPLORATORY HOLE LOGS



# Dynamic (Windowless) Sampler

## WS01

Sheet 1 of 1

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

| Inst/<br>Backfill | Water<br>Levels | Samples and Tests |                    |                      | Level<br>(m) | Depth<br>(m)<br><small>(thickness)</small> | Strata |                                                                                                                             |      |
|-------------------|-----------------|-------------------|--------------------|----------------------|--------------|--------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------|------|
|                   |                 | Depth (m)         | Type/<br>Ref       | Results              |              |                                            | Legend | Description                                                                                                                 |      |
|                   |                 | 0.50              | ES 1               |                      |              | (0.30)<br>0.30                             |        | TOPSOIL: Grass over slightly gravelly clayey light brown SAND. Gravels of fine to medium subangular red brick and mudstone. |      |
|                   |                 | 1.00              | SPT<br>D 2         | N=11 (2,1/2,3,2,4)   |              | (0.70)<br>1.00                             |        | Firm light brown sandy CLAY<br>[Weathered Weald Clay Formation]                                                             | 0.5  |
|                   |                 | 1.00              |                    |                      |              | 1.00                                       |        | Stiff friable light brown slightly gravelly CLAY. Gravels of fine subangular mudstone.<br>[Weathered Weald Clay Formation]  | 1.0  |
|                   |                 | 2.00              | SPT<br>D 3         | N=24 (2,3/4,6,7,7)   |              | (1.80)<br>2.00                             |        |                                                                                                                             | 1.5  |
|                   |                 | 2.00              |                    |                      |              | 2.00                                       |        |                                                                                                                             | 2.0  |
|                   |                 | 3.00              | SPT<br>ES 4<br>D 5 | N=35 (2,2/6,8,11,10) |              | 2.80<br>(0.65)<br>3.00                     |        | Extremely weak, light brown highly fractured MUDSTONE<br>[Weald Clay Formation]                                             | 2.5  |
|                   |                 | 3.00              |                    |                      |              | 3.45                                       |        | End of Borehole at 3.45m                                                                                                    | 3.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 3.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 4.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 4.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 5.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 5.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 6.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 6.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 7.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 7.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 8.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 8.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 9.0  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 9.5  |
|                   |                 |                   |                    |                      |              |                                            |        |                                                                                                                             | 10.0 |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS01**  
SUPPLEMENTARY INFO

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

### SPT - Details

| Top Depth (m) (Type) | Casing Depth (m) | Water Depth (m) | Hammer Serial No. | Energy Ratio (%) | Results              |
|----------------------|------------------|-----------------|-------------------|------------------|----------------------|
| 1.00 (S)             |                  |                 |                   |                  | N=11 (2,1/2,3,2,4)   |
| 2.00 (S)             |                  |                 |                   |                  | N=24 (2,3/4,6,7,7)   |
| 3.00 (S)             |                  |                 |                   |                  | N=35 (2,2/6,8,11,10) |

### Sample Details

| Sample ID | Type | Water Level (m) | Remarks |
|-----------|------|-----------------|---------|
|           | ES   |                 |         |
|           | D    |                 |         |
|           | D    |                 |         |
|           | ES   |                 |         |
|           | D    |                 |         |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS02**  
Sheet 1 of 1

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

| Inst/<br>Backfill | Water<br>Levels | Samples and Tests |              |                     | Level<br>(m) | Depth<br>(m) | Strata |                                                                                                                             |      |
|-------------------|-----------------|-------------------|--------------|---------------------|--------------|--------------|--------|-----------------------------------------------------------------------------------------------------------------------------|------|
|                   |                 | Depth (m)         | Type/<br>Ref | Results             |              |              | Legend | Description                                                                                                                 |      |
|                   |                 |                   |              |                     |              | (0.30)       |        | TOPSOIL: Grass over slightly gravelly clayey light brown SAND. Gravels of fine to medium subangular red brick and mudstone. |      |
|                   |                 |                   |              |                     |              | 0.30         |        | Firm light brown sandy CLAY<br>[Weathered Weald Clay Formation]                                                             | 0.5  |
|                   |                 |                   |              |                     |              | (0.70)       |        |                                                                                                                             |      |
|                   |                 | 1.00              | SPT          | N=14 (2,3/3,4,3,4)  |              | 1.00         |        | Stiff friable light brown slightly gravelly CLAY. Gravels of fine subangular mudstone.<br>[Weathered Weald Clay Formation]  | 1.0  |
|                   |                 | 1.00              | ES 1         |                     |              |              |        |                                                                                                                             | 1.5  |
|                   |                 | 1.00              | D 2          |                     |              |              |        |                                                                                                                             |      |
|                   |                 | 2.00              | SPT          | N=16 (1,3/2,3,4,7)  |              | (1.95)       |        |                                                                                                                             | 2.0  |
|                   |                 | 2.00              | ES 3         |                     |              |              |        |                                                                                                                             | 2.5  |
|                   |                 | 2.00              | D 4          |                     |              |              |        |                                                                                                                             |      |
|                   |                 | 3.00              | SPT          | N=30 (3,5/7,7,6,10) |              | 2.95         |        | Extremely weak, light brown highly fractured MUDSTONE<br>[Weald Clay Formation]                                             | 3.0  |
|                   |                 | 3.00              | D 5          |                     |              | (0.50)       |        |                                                                                                                             | 3.5  |
|                   |                 |                   |              |                     |              | 3.45         |        | End of Borehole at 3.45m                                                                                                    | 3.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 4.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 4.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 5.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 5.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 6.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 6.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 7.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 7.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 8.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 8.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 9.0  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 9.5  |
|                   |                 |                   |              |                     |              |              |        |                                                                                                                             | 10.0 |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS02**  
SUPPLEMENTARY INFO

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

### SPT - Details

| Top Depth (m) (Type) | Casing Depth (m) | Water Depth (m) | Hammer Serial No. | Energy Ratio (%) | Results             |
|----------------------|------------------|-----------------|-------------------|------------------|---------------------|
| 1.00 (S)             |                  |                 |                   |                  | N=14 (2,3/3,4,3,4)  |
| 2.00 (S)             |                  |                 |                   |                  | N=16 (1,3/2,3,4,7)  |
| 3.00 (S)             |                  |                 |                   |                  | N=30 (3,5/7,7,6,10) |

### Sample Details

| Sample ID | Type | Water Level (m) | Remarks |
|-----------|------|-----------------|---------|
|           | ES   |                 |         |
|           | D    |                 |         |
|           | ES   |                 |         |
|           | D    |                 |         |
|           | D    |                 |         |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

## WS03

Sheet 1 of 1

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

| Inst/<br>Backfill | Water<br>Levels | Samples and Tests |                    |                    | Level<br>(m) | Depth<br>(m)<br><small>(thickness)</small> | Strata |                                                                                                                             |      |
|-------------------|-----------------|-------------------|--------------------|--------------------|--------------|--------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------|------|
|                   |                 | Depth (m)         | Type/<br>Ref       | Results            |              |                                            | Legend | Description                                                                                                                 |      |
|                   |                 |                   |                    |                    |              | (0.30)                                     |        | TOPSOIL: Grass over slightly gravelly clayey light brown SAND. Gravels of fine to medium subangular red brick and mudstone. |      |
|                   |                 |                   |                    |                    |              | 0.30                                       |        | Firm light brown sandy CLAY<br>[Weathered Weald Clay Formation]                                                             | 0.5  |
|                   |                 | 0.80              | ES 1               |                    |              | (0.70)                                     |        | Band of extremely weak mudstone (0.70 - 0.75m)                                                                              |      |
|                   |                 | 1.00              | SPT<br>D 2         | N=11 (5,4/3,3,2,3) |              | 1.00                                       |        | Stiff friable light brown slightly gravelly CLAY. Gravels of fine subangular mudstone.<br>[Weathered Weald Clay Formation]  | 1.0  |
|                   |                 | 1.00              |                    |                    |              |                                            |        |                                                                                                                             | 1.5  |
|                   |                 | 2.00              | SPT<br>D 3         | N=17 (2,2/3,5,4,5) |              | (1.90)                                     |        |                                                                                                                             | 2.0  |
|                   |                 | 2.00              |                    |                    |              |                                            |        |                                                                                                                             | 2.5  |
|                   |                 | 3.00              | SPT<br>ES 4<br>D 5 | N=24 (3,5/4,6,5,9) |              | 2.90                                       |        | Extremely weak, light brown highly fractured MUDSTONE<br>[Weald Clay Formation]                                             | 3.0  |
|                   |                 | 3.00              |                    |                    |              | (0.55)                                     |        |                                                                                                                             |      |
|                   |                 | 3.00              |                    |                    |              | 3.45                                       |        |                                                                                                                             |      |
|                   |                 |                   |                    |                    |              |                                            |        | End of Borehole at 3.45m                                                                                                    | 3.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 4.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 4.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 5.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 5.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 6.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 6.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 7.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 7.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 8.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 8.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 9.0  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 9.5  |
|                   |                 |                   |                    |                    |              |                                            |        |                                                                                                                             | 10.0 |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS03**  
SUPPLEMENTARY INFO

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

### SPT - Details

| Top Depth (m) (Type) | Casing Depth (m) | Water Depth (m) | Hammer Serial No. | Energy Ratio (%) | Results            |
|----------------------|------------------|-----------------|-------------------|------------------|--------------------|
| 1.00 (S)             |                  |                 |                   |                  | N=11 (5,4/3,3,2,3) |
| 2.00 (S)             |                  |                 |                   |                  | N=17 (2,2/3,5,4,5) |
| 3.00 (S)             |                  |                 |                   |                  | N=24 (3,5/4,6,5,9) |

### Sample Details

| Sample ID | Type | Water Level (m) | Remarks |
|-----------|------|-----------------|---------|
|           | ES   |                 |         |
|           | D    |                 |         |
|           | D    |                 |         |
|           | ES   |                 |         |
|           | D    |                 |         |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS04**  
Sheet 1 of 1

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

| Inst/<br>Backfill | Water<br>Levels | Samples and Tests |              |                      | Level<br>(m) | Depth<br>(m)   | Strata |                                                                                                                                  |      |
|-------------------|-----------------|-------------------|--------------|----------------------|--------------|----------------|--------|----------------------------------------------------------------------------------------------------------------------------------|------|
|                   |                 | Depth (m)         | Type/<br>Ref | Results              |              |                | Legend | Description                                                                                                                      |      |
|                   |                 | 0.60              | ES 1         |                      |              | (0.30)<br>0.30 |        | TOPSOIL: Grass over slightly gravelly clayey light brown SAND. Gravels of fine to medium subangular red brick and mudstone.      |      |
|                   |                 | 1.00              | SPT<br>DS 2  | N=11 (1,2/3,2,3,3)   |              | (0.70)<br>1.00 |        | Firm to stiff light brown sandy gravelly CLAY. Gravels of fine to coarse subangular MUDSTONE<br>[Weathered Weald Clay Formation] | 0.5  |
|                   |                 | 1.80              | ES 3         |                      |              | (1.85)         |        | Stiff friable light brown slightly gravelly CLAY. Gravels of fine subangular mudstone.<br>[Weathered Weald Clay Formation]       | 1.0  |
|                   |                 | 2.00              | SPT<br>D 4   | N=14 (2,3/3,4,3,4)   |              |                |        |                                                                                                                                  | 1.5  |
|                   |                 | 2.00              |              |                      |              |                |        |                                                                                                                                  | 2.0  |
|                   |                 | 2.00              |              |                      |              |                |        |                                                                                                                                  | 2.5  |
|                   |                 | 3.00              | SPT<br>D 5   | N=33 (3,8/10,11,5,7) |              | 2.85           |        | Extremely weak, light brown highly fractured MUDSTONE<br>[Weald Clay Formation]                                                  | 3.0  |
|                   |                 | 3.00              |              |                      |              | (0.60)         |        |                                                                                                                                  |      |
|                   |                 |                   |              |                      |              | 3.45           |        |                                                                                                                                  |      |
|                   |                 |                   |              |                      |              |                |        | End of Borehole at 3.45m                                                                                                         | 3.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 4.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 4.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 5.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 5.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 6.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 6.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 7.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 7.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 8.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 8.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 9.0  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 9.5  |
|                   |                 |                   |              |                      |              |                |        |                                                                                                                                  | 10.0 |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|



# Dynamic (Windowless) Sampler

**WS04**  
SUPPLEMENTARY INFO

|                                        |                        |                          |                  |               |
|----------------------------------------|------------------------|--------------------------|------------------|---------------|
| Hole Type<br>WLS                       | Easting                | Northing                 | Ground Level (m) | Scale<br>1:50 |
| Project Name<br>Worthing Road, Horsham | Project No.<br>4444-23 | Start Date<br>2025-08-20 | End Date         |               |

|                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| Client<br>Starbuild Ltd | Consultant<br>GeoEnviro Solutions | Contractor<br>GeoEnviro Solutions |
|-------------------------|-----------------------------------|-----------------------------------|

### SPT - Details

| Top Depth (m) (Type) | Casing Depth (m) | Water Depth (m) | Hammer Serial No. | Energy Ratio (%) | Results              |
|----------------------|------------------|-----------------|-------------------|------------------|----------------------|
| 1.00 (S)             |                  |                 |                   |                  | N=11 (1,2/3,2,3,3)   |
| 2.00 (S)             |                  |                 |                   |                  | N=14 (2,3/3,4,3,4)   |
| 3.00 (S)             |                  |                 |                   |                  | N=33 (3,8/10,11,5,7) |

### Sample Details

| Sample ID | Type | Water Level (m) | Remarks |
|-----------|------|-----------------|---------|
|           | ES   |                 |         |
|           | DS   |                 |         |
|           | ES   |                 |         |
|           | D    |                 |         |
|           | D    |                 |         |

|                                                                                                                                                                                                                                                      |                                                                       |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|
| Remarks<br>1. A hand pit was excavated to 1.0 mbgl to check for services. 2. No visual or olfactory evidence of hydrocarbon contamination was noted. 3. Groundwater was not encountered. 4. The borehole was backfilled with bentonite and arisings. | Method, Plant, Stability, Dimensions<br>0.00 - 3.45m WLS Archway Dart | Logger<br>JF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------|

APPENDIX 4  
EXPLORATORY HOLE  
PHOTOGRAPHS

Site: Worthing Road, Horsham  
Client: Starbuild Ltd  
Job Reference: 4444-23



E.



F.



E. Photo showing the inspection pit arising from borehole WS01

F. Photo showing the sample recovered from borehole WS01

G.



H.



G. Photo showing the inspection pit arising from borehole WS02

H. Photo showing the sample recovered from borehole WS02

Site: Worthing Road, Horsham  
Client: Starbuild Ltd  
Job Reference: 4444-23



I.



J.



K.



L.



I. Photo showing the inspection pit arising from borehole WS03

J. Photo showing the recovered sample from borehole WS03

K. Photo showing the inspection pit arising from borehole WS04

L. Photo showing the recovered sample from borehole WS04

APPENDIX 5  
CHEMICAL TESTING RESULTS



# Final Report

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**Report No.:** 25-27730-1

**Initial Date of Issue:** 10-Sep-2025

**Re-Issue Details:**

**Client** *Geoenviro Solutions Ltd*

**Client Address:** *Unit 4a Haggwood Stone Quarry  
Woodhead Road  
Honley  
HD9 6PW*

**Contact(s):** *Jacob Fenton  
Results*

**Project** *4444-23 Worthing Road, Horsham*

**Quotation No.:** **Date Received:** 22-Aug-2025

**Order No.:** 4444-23 **Date Instructed:** 22-Aug-2025

**No. of Samples:** 6

**Turnaround (Wkdays):** 10 **Results Due:** 05-Sep-2025

**Date Approved:** 10-Sep-2025

**Approved By:**

**Details:** David Smith, Technical Director

**For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report**

---

## Results - Soil

**Project: 4444-23 Worthing Road, Horsham**

|                                          |                  |                             |            |              |             |                      |                      |                      |                      |
|------------------------------------------|------------------|-----------------------------|------------|--------------|-------------|----------------------|----------------------|----------------------|----------------------|
| <b>Client: Geoenviron Solutions Ltd</b>  |                  | <b>Chemtest Job No.:</b>    |            | 25-27730     | 25-27730    | 25-27730             | 25-27730             | 25-27730             | 25-27730             |
| <b>Quotation No.:</b>                    |                  | <b>Chemtest Sample ID.:</b> |            | 2018608      | 2018609     | 2018610              | 2018611              | 2018612              | 2018613              |
|                                          |                  | <b>Client Reference:</b>    |            | WS01         | WS01        | WS02                 | WS03                 | WS04                 | WS04                 |
|                                          |                  | <b>Sample Type:</b>         |            | SOIL         | SOIL        | SOIL                 | SOIL                 | SOIL                 | SOIL                 |
|                                          |                  | <b>Top Depth (m):</b>       |            | 0.50         | 3.00        | 1.00                 | 0.80                 | 0.80                 | 1.80                 |
|                                          |                  | <b>Bottom Depth (m):</b>    |            | 0.50         | 3.00        | 1.00                 | 0.80                 | 0.60                 | 1.80                 |
|                                          |                  | <b>Date Sampled:</b>        |            | 20-Aug-2025  | 20-Aug-2025 | 20-Aug-2025          | 20-Aug-2025          | 20-Aug-2025          | 20-Aug-2025          |
|                                          |                  | <b>Asbestos Lab:</b>        |            | DURHAM       | DURHAM      | DURHAM               | DURHAM               | DURHAM               | DURHAM               |
| <b>Determinand</b>                       | <b>HWOL Code</b> | <b>Accred.</b>              | <b>SOP</b> | <b>Units</b> | <b>LOD</b>  |                      |                      |                      |                      |
| ACM Type                                 |                  | N                           | 2192       |              | N/A         | -                    | -                    | -                    | -                    |
| Asbestos Identification                  |                  | U                           | 2192       |              | N/A         | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected |
| Moisture                                 |                  | N                           | 2030       | %            | 0.020       | 6.8                  | 15                   | 13                   | 7.3                  |
| Soil Colour                              |                  | N                           | 2030       |              | N/A         | Brown                | Brown                | Brown                | Brown                |
| Other Material                           |                  | N                           | 2030       |              | N/A         | Stones and Roots     | Stones               | None                 | Stones               |
| Soil Texture                             |                  | N                           | 2030       |              | N/A         | Loam                 | Clay                 | Clay                 | Clay                 |
| pH at 20C                                |                  | M                           | 2010       |              | 4.0         | 7.7                  | 8.1                  | 8.1                  | 7.9                  |
| Sulphate (2:1 Water Soluble) as SO4      |                  | M                           | 2120       | g/l          | 0.010       | < 0.010              |                      | < 0.010              |                      |
| Sulphate (2:1 Water Soluble) as SO4 mg/l |                  | M                           | 2120       | mg/l         | 10.000      | < 10                 | < 10                 | 37                   | < 10                 |
| Total Sulphur                            |                  | U                           | 2175       | %            | 0.010       | 0.021                |                      | 0.010                |                      |
| Cyanide (Total)                          |                  | M                           | 2300       | mg/kg        | 0.50        | < 0.50               | < 0.50               | < 0.50               | 1.3                  |
| Sulphate (Acid Soluble)                  |                  | U                           | 2430       | %            | 0.010       | 0.032                |                      | < 0.010              |                      |
| Arsenic                                  |                  | M                           | 2455       | mg/kg        | 0.5         | 3.0                  | 4.4                  | 1.6                  | 6.3                  |
| Cadmium                                  |                  | M                           | 2455       | mg/kg        | 0.10        | < 0.10               | < 0.10               | < 0.10               | 1.1                  |
| Chromium                                 |                  | M                           | 2455       | mg/kg        | 0.5         | 5.6                  | 13                   | 15                   | 7.6                  |
| Copper                                   |                  | M                           | 2455       | mg/kg        | 0.50        | 5.1                  | 14                   | 16                   | 7.8                  |
| Mercury                                  |                  | M                           | 2455       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Nickel                                   |                  | M                           | 2455       | mg/kg        | 0.50        | 4.2                  | 24                   | 28                   | 11                   |
| Lead                                     |                  | M                           | 2455       | mg/kg        | 0.50        | 11                   | 11                   | 14                   | 6.3                  |
| Selenium                                 |                  | M                           | 2455       | mg/kg        | 0.25        | < 0.25               | 0.28                 | 0.27                 | 0.51                 |
| Zinc                                     |                  | M                           | 2455       | mg/kg        | 0.50        | 23                   | 32                   | 51                   | 22                   |
| Chromium (Hexavalent)                    |                  | N                           | 2490       | mg/kg        | 0.50        | < 0.50               | < 0.50               | < 0.50               | < 0.50               |
| Aliphatic VPH >C5-C6                     | HS 2D AL         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Aliphatic VPH >C6-C7                     | HS 2D AL         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Aliphatic VPH >C7-C8                     | HS 2D AL         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Aliphatic VPH >C8-C10                    | HS 2D AL         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Total Aliphatic VPH >C5-C10              | HS 2D AL         | U                           | 2780       | mg/kg        | 0.25        | < 0.25               | < 0.25               | < 0.25               | < 0.25               |
| Aliphatic EPH >C10-C12 MC                | EH 2D AL #1      | M                           | 2690       | mg/kg        | 2.00        | < 2.0                | < 2.0                | < 2.0                | < 2.0                |
| Aliphatic EPH >C12-C16 MC                | EH 2D AL #1      | M                           | 2690       | mg/kg        | 1.00        | < 1.0                | < 1.0                | < 1.0                | < 1.0                |
| Aliphatic EPH >C16-C21 MC                | EH 2D AL #1      | M                           | 2690       | mg/kg        | 2.00        | < 2.0                | < 2.0                | < 2.0                | < 2.0                |
| Aliphatic EPH >C21-C35 MC                | EH 2D AL #1      | M                           | 2690       | mg/kg        | 3.00        | 8.7                  | < 3.0                | < 3.0                | 5.5                  |
| Aliphatic EPH >C35-C40 MC                | EH 2D AL #1      | N                           | 2690       | mg/kg        | 10.00       | < 10                 | < 10                 | < 10                 | < 10                 |
| Total Aliphatic EPH >C10-C35 MC          | EH 2D AL #1      | M                           | 2690       | mg/kg        | 5.00        | 9.8                  | < 5.0                | < 5.0                | 6.4                  |
| Total Aliphatic EPH >C10-C40 MC          | EH 2D AL #1      | N                           | 2690       | mg/kg        | 10.00       | < 10                 | < 10                 | < 10                 | < 10                 |
| Aromatic VPH >C5-C7                      | HS 2D AR         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Aromatic VPH >C7-C8                      | HS 2D AR         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Aromatic VPH >C8-C10                     | HS 2D AR         | U                           | 2780       | mg/kg        | 0.05        | < 0.05               | < 0.05               | < 0.05               | < 0.05               |
| Total Aromatic VPH >C5-C10               | HS 2D AR         | U                           | 2780       | mg/kg        | 0.25        | < 0.25               | < 0.25               | < 0.25               | < 0.25               |

## Results - Soil

**Project: 4444-23 Worthing Road, Horsham**

|                                         |                  |                             |            |              |             |             |             |             |             |
|-----------------------------------------|------------------|-----------------------------|------------|--------------|-------------|-------------|-------------|-------------|-------------|
| <b>Client: Geoenviron Solutions Ltd</b> |                  | <b>Chemtest Job No.:</b>    |            | 25-27730     | 25-27730    | 25-27730    | 25-27730    | 25-27730    | 25-27730    |
| <b>Quotation No.:</b>                   |                  | <b>Chemtest Sample ID.:</b> |            | 2018608      | 2018609     | 2018610     | 2018611     | 2018612     | 2018613     |
|                                         |                  | <b>Client Reference:</b>    |            | WS01         | WS01        | WS02        | WS03        | WS04        | WS04        |
|                                         |                  | <b>Sample Type:</b>         |            | SOIL         | SOIL        | SOIL        | SOIL        | SOIL        | SOIL        |
|                                         |                  | <b>Top Depth (m):</b>       |            | 0.50         | 3.00        | 1.00        | 0.80        | 0.80        | 1.80        |
|                                         |                  | <b>Bottom Depth (m):</b>    |            | 0.50         | 3.00        | 1.00        | 0.80        | 0.60        | 1.80        |
|                                         |                  | <b>Date Sampled:</b>        |            | 20-Aug-2025  | 20-Aug-2025 | 20-Aug-2025 | 20-Aug-2025 | 20-Aug-2025 | 20-Aug-2025 |
|                                         |                  | <b>Asbestos Lab:</b>        |            | DURHAM       | DURHAM      | DURHAM      | DURHAM      | DURHAM      | DURHAM      |
| <b>Determinand</b>                      | <b>HWOL Code</b> | <b>Accred.</b>              | <b>SOP</b> | <b>Units</b> | <b>LOD</b>  |             |             |             |             |
| Aromatic EPH >C10-C12 MC                | EH 2D AR #1      | U                           | 2690       | mg/kg        | 1.00        | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Aromatic EPH >C12-C16 MC                | EH 2D AR #1      | U                           | 2690       | mg/kg        | 1.00        | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Aromatic EPH >C16-C21 MC                | EH 2D AR #1      | U                           | 2690       | mg/kg        | 2.00        | 2.1         | < 2.0       | < 2.0       | < 2.0       |
| Aromatic EPH >C21-C35 MC                | EH 2D AR #1      | U                           | 2690       | mg/kg        | 2.00        | 4.6         | < 2.0       | 3.4         | < 2.0       |
| Aromatic EPH >C35-C40 MC                | EH 2D AR #1      | N                           | 2690       | mg/kg        | 1.00        | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Total Aromatic EPH >C10-C35 MC          | EH 2D AR #1      | U                           | 2690       | mg/kg        | 5.00        | 6.7         | < 5.0       | < 5.0       | < 5.0       |
| Total Aromatic EPH >C10-C40 MC          | EH 2D AR #1      | N                           | 2690       | mg/kg        | 10.00       | < 10        | < 10        | < 10        | < 10        |
| Total VPH >C5-C10                       | HS 2D Total      | U                           | 2780       | mg/kg        | 0.50        | < 0.50      | < 0.50      | < 0.50      | < 0.50      |
| Total EPH >C10-C35 MC                   | EH 2D Total      | U                           | 2690       | mg/kg        | 10.00       | 17          | < 10        | < 10        | < 10        |
| Total EPH >C10-C40 MC                   | EH 2D Total      | N                           | 2690       | mg/kg        | 10.00       | 17          | < 10        | < 10        | < 10        |
| Organic Matter                          |                  | M                           | 2625       | %            | 0.40        | 1.5         | < 0.40      | < 0.40      | 0.98        |
| Benzene                                 |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Toluene                                 |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Ethylbenzene                            |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| m & p-Xylene                            |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| o-Xylene                                |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Methyl Tert-Butyl Ether                 |                  | M                           | 2760       | µg/kg        | 1.0         | < 1.0       | < 1.0       | < 1.0       | < 1.0       |
| Naphthalene                             |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Acenaphthylene                          |                  | N                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Acenaphthene                            |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Fluorene                                |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Phenanthrene                            |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | 0.20        |
| Anthracene                              |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Fluoranthene                            |                  | M                           | 2800       | mg/kg        | 0.10        | 0.21        | < 0.10      | < 0.10      | 0.48        |
| Pyrene                                  |                  | M                           | 2800       | mg/kg        | 0.10        | 0.16        | < 0.10      | < 0.10      | 0.34        |
| Benzo[a]anthracene                      |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Chrysene                                |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Benzo[b]fluoranthene                    |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Benzo[k]fluoranthene                    |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Benzo[a]pyrene                          |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Indeno(1,2,3-c,d)Pyrene                 |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Dibenz(a,h)Anthracene                   |                  | N                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Benzo[g,h,i]perylene                    |                  | M                           | 2800       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |
| Total Of 16 PAH's                       |                  | N                           | 2800       | mg/kg        | 2.0         | < 2.0       | < 2.0       | < 2.0       | < 2.0       |
| Total Phenols                           |                  | M                           | 2920       | mg/kg        | 0.10        | < 0.10      | < 0.10      | < 0.10      | < 0.10      |

## Test Methods

| SOP  | Title                                                                                               | Parameters included                                                                                                                                                                                                                                                       | Method summary                                                                                                                                                                         | Water Accred. |
|------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 2010 | pH Value of Soils                                                                                   | pH at 20°C                                                                                                                                                                                                                                                                | pH Meter                                                                                                                                                                               |               |
| 2030 | Moisture and Stone Content of Soils(Requirement of MCERTS)                                          | Moisture content                                                                                                                                                                                                                                                          | Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.                                                                                   |               |
| 2120 | Water Soluble Boron, Sulphate, Magnesium & Chromium                                                 | Boron; Sulphate; Magnesium; Chromium                                                                                                                                                                                                                                      | Aqueous extraction / ICP-OES                                                                                                                                                           |               |
| 2175 | Total Sulphur in Soils                                                                              | Total Sulphur                                                                                                                                                                                                                                                             | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.                                                                                             |               |
| 2192 | Asbestos Quantification in Soils Sediments Ballast & Aggregate Crushed Concrete & Demolition Rubble | Asbestos                                                                                                                                                                                                                                                                  | Polarised light microscopy / Gravimetry                                                                                                                                                |               |
| 2300 | Cyanides & Thiocyanate in Soils                                                                     | Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate                                                                                                                                                                                           | Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.                                                                                    |               |
| 2430 | Total Sulphate in soils                                                                             | Total Sulphate                                                                                                                                                                                                                                                            | Acid digestion followed by determination of sulphate in extract by ICP-OES.                                                                                                            |               |
| 2455 | Acid Soluble Metals in Soils                                                                        | Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc                                                                                                                  | Acid digestion followed by determination of metals in extract by ICP-MS.                                                                                                               |               |
| 2490 | Hexavalent Chromium in Soils                                                                        | Chromium [VI]                                                                                                                                                                                                                                                             | Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine. |               |
| 2625 | Total Organic Carbon in Soils                                                                       | Total organic Carbon (TOC)                                                                                                                                                                                                                                                | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.                                                                                             |               |
| 2690 | EPH A/A Split                                                                                       | Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40<br>Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40                                                                                                                                           | Acetone/Heptane extraction / GCxGC FID detection                                                                                                                                       |               |
| 2760 | Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS                                       | Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule                                                                                                                                      | Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.                             |               |
| 2780 | VPH A/A Split                                                                                       | Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7–C8,>C8–C10                                                                                                                                                                                                | Water extraction / Headspace GCxGC FID detection                                                                                                                                       |               |
| 2800 | Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS                                  | Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene* | Dichloromethane extraction / GC-MS                                                                                                                                                     |               |
| 2920 | Phenols in Soils by HPLC                                                                            | Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.                                                                                                                         | 60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.                                                                               |               |

## **Report Information**

### **Key**

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|     |                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------|
| U   | UKAS accredited                                                                                               |
| M   | MCERTS and UKAS accredited                                                                                    |
| N   | Unaccredited                                                                                                  |
| S   | This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis     |
| SN  | This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis |
| T   | This analysis has been subcontracted to an unaccredited laboratory                                            |
| I/S | Insufficient Sample                                                                                           |
| U/S | Unsuitable Sample                                                                                             |
| N/E | not evaluated                                                                                                 |
| <   | "less than"                                                                                                   |
| >   | "greater than"                                                                                                |
| SOP | Standard operating procedure                                                                                  |
| LOD | Limit of detection                                                                                            |

*Text example* All items indicated in italic font represent customer-supplied information that may not be independently verified by the laboratory

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at  $\leq 30^{\circ}\text{C}$  prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

NEW\_ASB Eurofins Chemtest Limited, 11 Depot Road, Newmarket, CB8 0AL

DURHAM Eurofins Chemtest Limited, Unit A North Wing, Prospect Business Park, Crookhall Lane, Consett, Co Durham, DH8 7PW

### **Sample Deviation Codes**

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**As a result of any of the below deviations applying, the test results may be unreliable**

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - The required amount of sample for analysis was not received

H - Appropriate cooling measures were not taken for sample transportation

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

## **Report Information**

### **Water Sample Category Key for Accreditation**

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DW - Drinking Water (Non-Regulatory)  
GW - Ground Water  
LE - Land Leachate  
NA - Not Applicable  
PL - Prepared Leachate  
PW - Processed Water  
RE - Recreational Water  
SA - Saline Water  
SW - Surface Water  
TE - Treated Effluent  
TS - Treated Sewage  
UL - Unspecified Liquid

### **Clean Up Codes**

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NC - No Clean Up  
MC - Mathematical Clean Up  
FC - Florisil Clean Up

### **HWOL Acronym System**

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HS - Headspace analysis  
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent  
CU - Clean-up – e.g. by Florisil, silica gel  
1D - GC – Single coil gas chromatography  
Total - Aliphatics & Aromatics  
AL - Aliphatics only  
AR - Aromatic only  
2D - GC-GC – Double coil gas chromatography  
#1 - EH\_2D\_Total but with humics mathematically subtracted  
#2 - EH\_2D\_Total but with fatty acids mathematically subtracted  
+ - Operator to indicate cumulative e.g. EH+EH\_Total or EH\_CU+HS\_Total

### **Asbestos Tests LOD = LOQ**

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Limit of Detection = Limit of Quantification for asbestos results only

If you require extended retention of samples, please email your requirements to:  
[customerservices@chemtest.com](mailto:customerservices@chemtest.com)

APPENDIX 6  
CHEMICAL SCREENING CRITERIA

[illegible]

| Parameter                 | Residential <u>with</u><br>homegrown produce |       |       | Residential <u>without</u><br>homegrown produce |                |               | Allotment                           |       |      | Commercial / Industrial             |                |        | Public Open Space near<br>Residential |       |       | Public Open Space - Park |        |        | Source     |
|---------------------------|----------------------------------------------|-------|-------|-------------------------------------------------|----------------|---------------|-------------------------------------|-------|------|-------------------------------------|----------------|--------|---------------------------------------|-------|-------|--------------------------|--------|--------|------------|
|                           | (mg/kg, unless otherwise<br>stated)          |       |       | (mg/kg, unless otherwise<br>stated)             |                |               | (mg/kg, unless<br>otherwise stated) |       |      | (mg/kg, unless otherwise<br>stated) |                |        | (mg/kg, unless otherwise<br>stated)   |       |       |                          |        |        |            |
| SOM                       | 1%                                           | 2.50% | 6%    | 1%                                              | 2.50%          | 6%            | 1%                                  | 2.50% | 6%   | 1%                                  | 2.50%          | 6%     | 1%                                    | 2.50% | 6%    | 1%                       | 2.50%  | 6%     |            |
| PAHs                      |                                              |       |       |                                                 |                |               |                                     |       |      |                                     |                |        |                                       |       |       |                          |        |        |            |
| Acenaphthene              | 210                                          | 510   | 1100  | 3000<br>(57)                                    | 4700(141)      | 6000<br>(336) | 34                                  | 85    | 200  | 84000<br>(57)                       | 97000<br>(141) | 100000 | 15000                                 | 15000 | 15000 | 29000                    | 30000  | 30000  | LQM (2014) |
| Acenaphthylene            | 170                                          | 420   | 920   | 2900<br>(86.1)                                  | 4600 (212)     | 6000<br>(506) | 28                                  | 69    | 160  | 8300<br>(86.1)                      | 97000<br>(212) | 100000 | 15000                                 | 15000 | 15000 | 29000                    | 30000  | 30000  | LQM (2014) |
| Anthracene                | 2400                                         | 5400  | 11000 | 31000<br>(1.17)                                 | 35000          | 37000         | 380                                 | 950   | 2200 | 520000                              | 540000         | 540000 | 74000                                 | 74000 | 74000 | 150000                   | 150000 | 150000 | LQM (2014) |
| Benzo(a)anthracen<br>e    | 7.2                                          | 11    | 13    | 11                                              | 14             | 15            | 2.9                                 | 6.5   | 13   | 170                                 | 170            | 180    | 29                                    | 29    | 29    | 49                       | 56     | 62     | LQM (2014) |
| Benzo(a)pyrene            | 2.2                                          | 2.7   | 3     | 3.2                                             | 3.2            | 3.2           | 0.97                                | 2     | 3.5  | 35                                  | 35             | 36     | 5.7                                   | 5.7   | 5.7   | 11                       | 12     | 13     | LQM (2014) |
| Benzo(b)fluoranth<br>ene  | 2.6                                          | 3.3   | 3.7   | 3.9                                             | 4              | 4             | 0.99                                | 2.1   | 3.9  | 44                                  | 44             | 45     | 7.1                                   | 7.1   | 7.1   | 13                       | 15     | 16     | LQM (2014) |
| Benzo(g,h,i)peryle<br>ne  | 320                                          | 340   | 350   | 360                                             | 360            | 360           | 290                                 | 470   | 640  | 3900                                | 4000           | 4000   | 640                                   | 640   | 640   | 1400                     | 1500   | 1600   | LQM (2014) |
| Benzo(k)fluoranth<br>ene  | 77                                           | 93    | 100   | 110                                             | 110            | 110           | 37                                  | 75    | 130  | 1200                                | 1200           | 1200   | 190                                   | 190   | 190   | 370                      | 410    | 440    | LQM (2014) |
| Chrysene                  | 15                                           | 22    | 27    | 30                                              | 31             | 32            | 4.1                                 | 9.4   | 19   | 350                                 | 350            | 350    | 57                                    | 57    | 57    | 93                       | 110    | 120    | LQM (2014) |
| Dibenz(a,h)anthra<br>cene | 0.24                                         | 0.28  | 0.3   | 0.31                                            | 0.32           | 0.32          | 0.14                                | 0.27  | 0.61 | 3.5                                 | 3.6            | 3.6    | 0.57                                  | 0.57  | 0.58  | 1.1                      | 1.3    | 1.4    | LQM (2014) |
| Fluoranthene              | 280                                          | 560   | 890   | 1500                                            | 1600           | 1600          | 52                                  | 130   | 290  | 23000                               | 23000          | 23000  | 3100                                  | 3100  | 3100  | 63                       | 6300   | 6400   | LQM (2014) |
| Fluorene                  | 170                                          | 400   | 860   | 2800<br>(30.9)                                  | 3800<br>(76.5) | 4500<br>(183) | 27                                  | 67    | 160  | 63000<br>(30.9)                     | 68000          | 71000  | 9900                                  | 9900  | 9900  | 20000                    | 20000  | 20000  | LQM (2014) |
| Indeno(1,2,3-cd)pyrene    | 27                                           | 36    | 41    | 45                                              | 46             | 46            | 9.5                                 | 21    | 39   | 500                                 | 510            | 510    | 82                                    | 82    | 82    | 150                      | 170    | 180    | LQM (2014) |

| Parameter                             | Residential <u>with</u><br>homegrown produce |       |      | Residential <u>without</u><br>homegrown produce |       |      | Allotment                           |       |       | Commercial / Industrial             |                         |                         | Public Open Space near<br>Residential |        |        | Public Open Space - Park            |                        |                         | Source     |
|---------------------------------------|----------------------------------------------|-------|------|-------------------------------------------------|-------|------|-------------------------------------|-------|-------|-------------------------------------|-------------------------|-------------------------|---------------------------------------|--------|--------|-------------------------------------|------------------------|-------------------------|------------|
|                                       | (mg/kg, unless otherwise<br>stated)          |       |      | (mg/kg, unless otherwise<br>stated)             |       |      | (mg/kg, unless<br>otherwise stated) |       |       | (mg/kg, unless otherwise<br>stated) |                         |                         | (mg/kg, unless otherwise<br>stated)   |        |        | (mg/kg, unless otherwise<br>stated) |                        |                         |            |
| SOM                                   | 1%                                           | 2.50% | 6%   | 1%                                              | 2.50% | 6%   | 1%                                  | 2.50% | 6%    | 1%                                  | 2.50%                   | 6%                      | 1%                                    | 2.50%  | 6%     | 1%                                  | 2.50%                  | 6%                      |            |
| Naphthalene                           | 2.3                                          | 5.6   | 13   | 2.3                                             | 5.6   | 13   | 4.1                                 | 10    | 24    | 190<br>(76.4)                       | 460 (183)               | 1100<br>(432)           | 4900                                  | 4900   | 4900   | 1200<br>(76.4)                      | 1900<br>(183)          | 3000                    | LQM (2014) |
| Phenanthrene                          | 95                                           | 220   | 440  | 1300<br>(36)                                    | 1500  | 1500 | 15                                  | 38    | 90    | 22000                               | 22000                   | 23000                   | 3100                                  | 3100   | 3100   | 6200                                | 6200                   | 6300                    | LQM (2014) |
| Pyrene                                | 620                                          | 1200  | 2000 | 3700                                            | 3800  | 3800 | 110                                 | 270   | 620   | 54000                               | 54000                   | 54000                   | 7400                                  | 7400   | 7400   | 15000                               | 15000                  | 15000                   | LQM (2014) |
| Coal Tar (BaP as<br>surrogate marker) | 0.79                                         | 0.98  | 1.1  | 1.2                                             | 1.2   | 1.2  | 0.32                                | 0.67  | 1.2   | 15                                  | 15                      | 15                      | 2.2                                   | 2.2    | 2.2    | 4.4                                 | 4.7                    | 4.8                     | LQM (2014) |
| BTEX and TPH                          |                                              |       |      |                                                 |       |      |                                     |       |       |                                     |                         |                         |                                       |        |        |                                     |                        |                         |            |
| Benzene                               | 0.087                                        | 0.17  | 0.37 | 0.38                                            | 0.7   | 1.4  | 0.017                               | 0.034 | 0.075 | 27                                  | 47                      | 90                      | 72                                    | 72     | 73     | 90                                  | 100                    | 110                     | LQM (2014) |
| Toluene                               | 130                                          | 290   | 660  | 880 vap<br>(869)                                | 1900  | 3900 | 22                                  | 51    | 120   | 56000<br>vap<br>(869)               | 110000<br>vap<br>(1920) | 180000<br>vap<br>(4360) | 56000                                 | 56000  | 56000  | 87000<br>vap<br>(869)               | 95000<br>vap<br>(1920) | 100000<br>vap<br>(4360) | LQM (2014) |
| Ethylbenzene                          | 47                                           | 110   | 260  | 83                                              | 190   | 440  | 16                                  | 39    | 91    | 5700<br>vap<br>(518)                | 13000<br>vap<br>(1220)  | 27000<br>vap<br>(2840)  | 24000                                 | 24000  | 25000  | 17000<br>vap<br>(518)               | 22000<br>vap<br>(1220) | 27000<br>vap<br>(2840)  | LQM (2014) |
| Xylene - o                            | 60                                           | 140   | 330  | 88                                              | 210   | 480  | 28                                  | 67    | 160   | 6600<br>(478)                       | 15000<br>(1120)         | 33000<br>(2620)         | 41000                                 | 42000  | 43000  | 17000<br>(478)                      | 24000<br>(1120)        | 33000<br>(2620)         | LQM (2014) |
| Xylene - m                            | 59                                           | 140   | 320  | 82                                              | 190   | 450  | 31                                  | 74    | 170   | 6200<br>(625)                       | 14000<br>(1470)         | 31000<br>(3460)         | 41000                                 | 42000  | 43000  | 17000<br>(625)                      | 24000<br>(1470)        | 32000<br>(3460)         | LQM (2014) |
| Xylene - p                            | 56                                           | 130   | 310  | 79                                              | 180   | 430  | 29                                  | 69    | 160   | 5900<br>(576)                       | 14000<br>(1350)         | 30000<br>(3170)         | 41000                                 | 42000  | 43000  | 17000<br>(576)                      | 23000<br>(1350)        | 31000<br>(3170)         | LQM (2014) |
| Aliphatic EC 5-6                      | 42                                           | 78    | 160  | 42                                              | 78    | 160  | 730                                 | 1700  | 3900  | 3200<br>(304)                       | 5900<br>(558)           | 12000<br>(1150)         | 570000<br>(304)                       | 590000 | 600000 | 95000<br>(304)                      | 130000<br>(558)        | 180000<br>(1150)        | LQM (2014) |
| Aliphatic EC >6-8                     | 100                                          | 230   | 530  | 100                                             | 230   | 530  | 2300                                | 5600  | 13000 | 7800<br>(144)                       | 17000<br>(322)          | 40000<br>(736)          | 600000                                | 610000 | 620000 | 150000<br>(144)                     | 220000<br>(322)        | 320000<br>(736)         | LQM (2014) |

| Parameter           | Residential <u>with</u><br>homegrown produce |               |               | Residential <u>without</u><br>homegrown produce |            |               | Allotment                           |        |        | Commercial / Industrial             |                  |                  | Public Open Space near<br>Residential |        |        | Public Open Space - Park |                 |                  | Source     |
|---------------------|----------------------------------------------|---------------|---------------|-------------------------------------------------|------------|---------------|-------------------------------------|--------|--------|-------------------------------------|------------------|------------------|---------------------------------------|--------|--------|--------------------------|-----------------|------------------|------------|
|                     | (mg/kg, unless otherwise<br>stated)          |               |               | (mg/kg, unless otherwise<br>stated)             |            |               | (mg/kg, unless<br>otherwise stated) |        |        | (mg/kg, unless otherwise<br>stated) |                  |                  | (mg/kg, unless otherwise<br>stated)   |        |        |                          |                 |                  |            |
| SOM                 | 1%                                           | 2.50%         | 6%            | 1%                                              | 2.50%      | 6%            | 1%                                  | 2.50%  | 6%     | 1%                                  | 2.50%            | 6%               | 1%                                    | 2.50%  | 6%     | 1%                       | 2.50%           | 6%               |            |
| Aliphatic EC >8-10  | 27                                           | 65            | 150           | 27                                              | 65         | 150           | 320                                 | 770    | 1700   | 2000<br>(78)                        | 4800<br>(190)    | 11000<br>(451)   | 13000                                 | 13000  | 13000  | 14000<br>(78)            | 18000<br>(190)  | 21000<br>(451)   | LQM (2014) |
| Aliphatic EC >10-12 | 130<br>(48)                                  | 330<br>(118)  | 760<br>(283)  | 130<br>(48)                                     | 330 (118)  | 760<br>(283)  | 2200                                | 4400   | 7300   | 9700<br>(48)                        | 23000<br>(118)   | 47000<br>(283)   | 13000                                 | 13000  | 13000  | 21000<br>(48)            | 23000<br>(118)  | 24000(2<br>83)   | LQM (2014) |
| Aliphatic EC >12-16 | 1100<br>(24)                                 | 2400<br>(59)  | 4300<br>(142) | 1100<br>(24)                                    | 2400 (59)  | 4300<br>(142) | 11000                               | 13000  | 13000  | 59000<br>(24)                       | 82000<br>(59)    | 90000<br>(142)   | 13000                                 | 13000  | 13000  | 25000<br>(24)            | 25000<br>(59)   | 26000<br>(142)   | LQM (2014) |
| Aliphatic EC >16-35 | 65000<br>(8.48)                              | 92000<br>(21) | 110000        | 65000<br>(8.48)                                 | 92000 (21) | 110000        | 260000                              | 270000 | 270000 | 1600000                             | 1700000          | 1800000          | 250000                                | 250000 | 250000 | 450000                   | 480000          | 490000           | LQM (2014) |
| Aliphatic EC >35-44 | 65000<br>(8.48)                              | 92000<br>(21) | 110000        | 65000<br>(8.48)                                 | 92000 (21) | 110000        | 260000                              | 270000 | 270000 | 1600000                             | 1700000          | 1800000          | 250000                                | 250000 | 250000 | 450000                   | 480000          | 490000           | LQM (2014) |
| Aromatic EC 5-7     | 70                                           | 140           | 300           | 370                                             | 690        | 1400          | 13                                  | 27     | 57     | 26000<br>(1220)                     | 46000<br>(2260)  | 86000<br>(4710)  | 56000                                 | 56000  | 56000  | 76000<br>(1220)          | 84000<br>(2260) | 92000<br>(4710)  | LQM (2014) |
| Aromatic EC >7-8    | 130                                          | 290           | 660           | 860                                             | 1800       | 3900          | 22                                  | 51     | 120    | 56000<br>(869)                      | 110000<br>(1920) | 180000<br>(4360) | 56000                                 | 56000  | 56000  | 87000<br>(869)           | 95000<br>(1920) | 100000<br>(4360) | LQM (2014) |
| Aromatic EC >8-10   | 34                                           | 83            | 190           | 47                                              | 110        | 270           | 8.6                                 | 21     | 51     | 3500<br>(613)                       | 8100<br>(1500)   | 17000<br>(3580)  | 5000                                  | 5000   | 5000   | 7200<br>(613)            | 8500<br>(1500)  | 9300<br>(3580)   | LQM (2014) |
| Aromatic EC >10-12  | 74                                           | 180           | 380           | 250                                             | 590        | 1200          | 13                                  | 31     | 74     | 16000<br>(364)                      | 28000<br>(899)   | 34000<br>(2150)  | 5000                                  | 5000   | 5000   | 9200<br>(364)            | 9700<br>(899)   | 10000            | LQM (2014) |
| Aromatic EC >12-16  | 140                                          | 330           | 660           | 1800                                            | 2300 (419) | 2500          | 23                                  | 27     | 130    | 36000<br>(169)                      | 37000            | 38000            | 5100                                  | 5100   | 5000   | 10000                    | 10000           | 10000            | LQM (2014) |
| Aromatic EC >16-21  | 260                                          | 540           | 930           | 1900                                            | 1900       | 1900          | 46                                  | 110    | 260    | 28000                               | 28000            | 28000            | 3800                                  | 3800   | 3800   | 7600                     | 7700            | 7800             | LQM (2014) |
| Aromatic EC >21-35  | 1100                                         | 1500          | 1700          | 1900                                            | 1900       | 1900          | 370                                 | 820    | 1600   | 28000                               | 28000            | 28000            | 3800                                  | 3800   | 3800   | 7800                     | 7800            | 7900             | LQM (2014) |

| Parameter                                 | Residential <u>with</u><br>homegrown produce |         |        | Residential <u>without</u><br>homegrown produce |       |        | Allotment                           |        |        | Commercial / Industrial             |       |       | Public Open Space near<br>Residential |        |        | Public Open Space - Park            |              |               | Source     |
|-------------------------------------------|----------------------------------------------|---------|--------|-------------------------------------------------|-------|--------|-------------------------------------|--------|--------|-------------------------------------|-------|-------|---------------------------------------|--------|--------|-------------------------------------|--------------|---------------|------------|
|                                           | (mg/kg, unless otherwise<br>stated)          |         |        | (mg/kg, unless otherwise<br>stated)             |       |        | (mg/kg, unless<br>otherwise stated) |        |        | (mg/kg, unless otherwise<br>stated) |       |       | (mg/kg, unless otherwise<br>stated)   |        |        | (mg/kg, unless otherwise<br>stated) |              |               |            |
| SOM                                       | 1%                                           | 2.50%   | 6%     | 1%                                              | 2.50% | 6%     | 1%                                  | 2.50%  | 6%     | 1%                                  | 2.50% | 6%    | 1%                                    | 2.50%  | 6%     | 1%                                  | 2.50%        | 6%            |            |
| Aromatic EC >35-44                        | 1100                                         | 1500    | 1700   | 1900                                            | 1900  | 1900   | 370                                 | 820    | 1600   | 28000                               | 28000 | 28000 | 3800                                  | 3800   | 3800   | 7800                                | 7800         | 7900          | LQM (2014) |
| Aromatic EC >44-75                        | 1600                                         | 1800    | 1900   | 1900                                            | 1900  | 1900   | 1200                                | 2100   | 3000   | 28000                               | 28000 | 28000 | 3800                                  | 3800   | 3800   | 7800                                | 7800         | 7900          | LQM (2014) |
| VOCs                                      |                                              |         |        |                                                 |       |        |                                     |        |        |                                     |       |       |                                       |        |        |                                     |              |               |            |
| 1,2-dichloroethane (1,2-DCA)              | 0.0071                                       | 0.011   | 0.019  | 0.0092                                          | 0.013 | 0.023  | 0.0046                              | 0.0083 | 0.016  | 0.67                                | 0.97  | 1.7   | 29                                    | 29     | 29     | 21                                  | 24           | 28            | LQM (2014) |
| 1,1,1-trichloroethane                     | 8.8                                          | 18      | 39     | 9                                               | 18    | 40     | 48                                  | 110    | 240    | 660                                 | 1300  | 3000  | 140000                                | 140000 | 140000 | 57000 (1425)                        | 76000 (2915) | 100000 (6392) | LQM (2014) |
| 1,1,2,2,tetrachloroethane                 | 1.6                                          | 3.4     | 7.5    | 3.9                                             | 8     | 17     | 0.41                                | 0.89   | 2      | 270                                 | 550   | 1100  | 1400                                  | 1400   | 1400   | 1800                                | 2100         | 2300          | LQM (2014) |
| tetrachloroethene                         | 0.18                                         | 0.39    | 0.9    | 0.18                                            | 0.4   | 0.92   | 0.65                                | 1.5    | 3.6    | 19                                  | 45    | 95    | 1400                                  | 1400   | 1400   | 810 (424)                           | 1100 (951)   | 1500          | LQM (2014) |
| tetrachloromethane (Carbon tetrachloride) | 0.026                                        | 0.056   | 0.13   | 0.026                                           | 0.056 | 0.13   | 0.45                                | 1      | 2.4    | 2.9                                 | 6.3   | 14    | 890                                   | 920    | 950    | 190                                 | 270          | 400           | LQM (2014) |
| Trichloroethene                           | 0.016                                        | 0.034   | 0.075  | 0.017                                           | 0.036 | 0.08   | 0.041                               | 0.091  | 0.21   | 1.2                                 | 2.6   | 5.7   | 120                                   | 120    | 120    | 70                                  | 91           | 120           | LQM (2014) |
| Trichloromethane (chloroform)             | 0.91                                         | 1.7     | 3.4    | 1.2                                             | 2.1   | 4.2    | 0.42                                | 0.83   | 1.7    | 99                                  | 170   | 350   | 2500                                  | 2500   | 2500   | 2600                                | 2800         | 3100          | LQM (2014) |
| Chloroethene (Vinyl chloride)             | 0.00064                                      | 0.00087 | 0.0014 | 0.00077                                         | 0.001 | 0.0015 | 0.00055                             | 0.001  | 0.0018 | 0.059                               | 0.077 | 0.12  | 3.5                                   | 3.5    | 3.5    | 4.8                                 | 5            | 5.4           | LQM (2014) |
| 2,4,6 Trinitrotoluene (TNT)               | 1.6                                          | 3.7     | 8.1    | 65                                              | 66    | 66     | 0.24                                | 0.58   | 1.4    | 1000                                | 1000  | 1000  | 130                                   | 130    | 130    | 260                                 | 270          | 270           | LQM (2014) |

| Parameter                            | Residential <u>with</u><br>homegrown produce |       |       | Residential <u>without</u><br>homegrown produce |                |                | Allotment                           |       |       | Commercial / Industrial             |                 |                 | Public Open Space near<br>Residential |       |       | Public Open Space - Park            |                 |                 | Source     |
|--------------------------------------|----------------------------------------------|-------|-------|-------------------------------------------------|----------------|----------------|-------------------------------------|-------|-------|-------------------------------------|-----------------|-----------------|---------------------------------------|-------|-------|-------------------------------------|-----------------|-----------------|------------|
|                                      | (mg/kg, unless otherwise<br>stated)          |       |       | (mg/kg, unless otherwise<br>stated)             |                |                | (mg/kg, unless<br>otherwise stated) |       |       | (mg/kg, unless otherwise<br>stated) |                 |                 | (mg/kg, unless otherwise<br>stated)   |       |       | (mg/kg, unless otherwise<br>stated) |                 |                 |            |
| SOM                                  | 1%                                           | 2.50% | 6%    | 1%                                              | 2.50%          | 6%             | 1%                                  | 2.50% | 6%    | 1%                                  | 2.50%           | 6%              | 1%                                    | 2.50% | 6%    | 1%                                  | 2.50%           | 6%              |            |
| RDX                                  | 120                                          | 250   | 540   | 13000                                           | 13000          | 13000          | 17                                  | 38    | 85    | 210000                              | 210000          | 210000          | 26000                                 | 26000 | 27000 | 49000<br>(18.7)                     | 51000           | 53000           | LQM (2014) |
| HMX                                  | 5.7                                          | 13    | 26    | 6700                                            | 6700           | 6700           | 0.86                                | 1.9   | 3.9   | 110000                              | 110000          | 110000          | 13000                                 | 13000 | 13000 | 23000<br>(0.35)                     | 23000<br>(0.39) | 24000<br>(0.48) | LQM (2014) |
| Aldrin                               | 5.7                                          | 6.6   | 7.1   | 7.3                                             | 7.4            | 7.5            | 3.2                                 | 6.1   | 9.6   | 170                                 | 170             | 170             | 18                                    | 18    | 18    | 30                                  | 31              | 31              | LQM (2014) |
| Dieldrin                             | 0.97                                         | 2     | 3.5   | 7                                               | 7.3            | 7.4            | 0.17                                | 0.41  | 0.96  | 170                                 | 170             | 170             | 18                                    | 18    | 18    | 30                                  | 30              | 31              | LQM (2014) |
| Atrazine                             | 3.3                                          | 7.6   | 17.4  | 610                                             | 620            | 620            | 0.5                                 | 1.2   | 2.7   | 9300                                | 9400            | 9400            | 1200                                  | 1200  | 1200  | 2300                                | 2400            | 2400            | LQM (2014) |
| Dichlovos                            | 0.032                                        | 0.066 | 0.014 | 6.4                                             | 6.5            | 6.6            | 0.0049                              | 0.01  | 0.022 | 140                                 | 140             | 140             | 16                                    | 16    | 16    | 26                                  | 26              | 27              | LQM (2014) |
| Alpha-Endosulfan                     | 7.4                                          | 18    | 41    | 160<br>(0.003)                                  | 280<br>(0.007) | 410<br>(0.016) | 1.2                                 | 2.9   | 6.8   | 5600<br>(0.003)                     | 7400<br>(0.007) | 8400<br>(0.016) | 1200                                  | 1200  | 1200  | 2400                                | 2400            | 2500            | LQM (2014) |
| alpha-<br>Hexachlorocyclohe<br>xane  | 0.23                                         | 0.55  | 1.2   | 6.9                                             | 9.2            | 11             | 0.035                               | 0.087 | 0.21  | 170                                 | 180             | 180             | 24                                    | 24    | 24    | 47                                  | 48              | 48              | LQM (2014) |
| beta-<br>hexachlorocyclohe<br>xanes  | 0.085                                        | 0.2   | 0.46  | 3.7                                             | 3.8            | 3.8            | 0.013                               | 0.032 | 0.077 | 65                                  | 65              | 65              | 8.1                                   | 8.1   | 8.1   | 15                                  | 15              | 16              | LQM (2014) |
| gamma-<br>hexachlorocyclohe<br>xanes | 0.06                                         | 0.14  | 0.33  | 2.9                                             | 3.3            | 3.5            | 0.0092                              | 0.023 | 0.054 | 67                                  | 69              | 70              | 8.2                                   | 8.2   | 8.2   | 14                                  | 15              | 15              | LQM (2014) |
| Chlorobenzene                        | 0.46                                         | 1     | 2.4   | 0.46                                            | 1              | 2.4            | 5.9                                 | 14    | 32    | 56                                  | 130             | 290             | 11000                                 | 13000 | 14000 | 1300<br>(675)                       | 2000<br>(1520)  | 2900            | LQM (2014) |
| 1,2-<br>Dichlorobenzene              | 23                                           | 55    | 130   | 24                                              | 57             | 130            | 94                                  | 230   | 540   | 2000<br>(571)                       | 4800<br>(1370)  | 11000<br>(3240) | 90000                                 | 95000 | 98000 | 24000<br>(571)                      | 36000<br>(1370) | 51000<br>(3240) | LQM (2014) |
| 1,3-<br>Dichlorobenzene              | 0.4                                          | 1     | 2.3   | 0.44                                            | 1.1            | 2.5            | 0.25                                | 0.6   | 1.5   | 30                                  | 73              | 170             | 300                                   | 300   | 300   | 390                                 | 440             | 470             | LQM (2014) |

| Parameter                      | Residential <u>with</u><br>homegrown produce |              |      | Residential <u>without</u><br>homegrown produce |           |              | Allotment                           |       |      | Commercial / Industrial             |                                |                                | Public Open Space near<br>Residential |                                |                                | Public Open Space - Park      |                                |                                | Source     |
|--------------------------------|----------------------------------------------|--------------|------|-------------------------------------------------|-----------|--------------|-------------------------------------|-------|------|-------------------------------------|--------------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|-------------------------------|--------------------------------|--------------------------------|------------|
|                                | (mg/kg, unless otherwise<br>stated)          |              |      | (mg/kg, unless otherwise<br>stated)             |           |              | (mg/kg, unless<br>otherwise stated) |       |      | (mg/kg, unless otherwise<br>stated) |                                |                                | (mg/kg, unless otherwise<br>stated)   |                                |                                |                               |                                |                                |            |
| SOM                            | 1%                                           | 2.50%        | 6%   | 1%                                              | 2.50%     | 6%           | 1%                                  | 2.50% | 6%   | 1%                                  | 2.50%                          | 6%                             | 1%                                    | 2.50%                          | 6%                             | 1%                            | 2.50%                          | 6%                             |            |
| 1,4-Dichlorobenzene            | 61                                           | 150          | 350  | 61                                              | 150       | 350          | 15                                  | 37    | 88   | 4400<br>(224)                       | 10000<br>(540)                 | 25000<br>(1280)                | 17000                                 | 17000                          | 17000                          | 36000<br>(224)                | 36000<br>(540)                 | 36000<br>(1280)                | LQM (2014) |
| VOCs Continued                 |                                              |              |      |                                                 |           |              |                                     |       |      |                                     |                                |                                |                                       |                                |                                |                               |                                |                                |            |
| 1,2,3-Trichlorobenzene         | 1.5                                          | 3.6          | 8.6  | 1.5                                             | 3.7       | 8.8          | 4.7                                 | 12    | 28   | 102                                 | 250                            | 590                            | 1800                                  | 1800                           | 1800                           | 770<br>(134)                  | 1100<br>(330)                  | 1600<br>(789)                  | LQM (2014) |
| 1,2,4-Trichlorobenzene         | 2.6                                          | 6.4          | 15   | 2.6                                             | 6.4       | 15           | 55                                  | 140   | 320  | 220                                 | 530                            | 1300                           | 15000                                 | 17000                          | 19000                          | 1700<br>(318)                 | 2600<br>(786)                  | 4000<br>(1880)                 | LQM (2014) |
| 1,3,5-Trichlorobenzene         | 0.33                                         | 0.81         | 1.9  | 0.33                                            | 0.81      | 1.9          | 4.7                                 | 12    | 28   | 23                                  | 55                             | 130                            | 1700                                  | 1700                           | 1800                           | 380<br>(36.7)                 | 580<br>(90.8)                  | 860<br>(217)                   | LQM (2014) |
| 1,2,3,4-Tetrachlorobenzen<br>e | 15                                           | 36           | 78   | 24                                              | 56        | 120          | 4.4                                 | 11    | 26   | 1700<br>(122)                       | 3080<br>(304)                  | 4400<br>(728)                  | 830                                   | 830                            | 830                            | 1500<br>(122)                 | 1600                           | 1600                           | LQM (2014) |
| 1,2,3,5-Tetrachlorobenzen<br>e | 0.66                                         | 1.6          | 3.7  | 0.75                                            | 1.9       | 4.3          | 0.38                                | 0.9   | 2.2  | 49<br>(39.4)                        | 120<br>(98.1)                  | 240<br>(235)                   | 78                                    | 79                             | 79                             | 110 (39)                      | 120                            | 130                            | LQM (2014) |
| 1,2,4,5-Tetrachlorobenzen<br>e | 0.33                                         | 0.77         | 1.6  | 0.73                                            | 1.7       | 3.5          | 0.06                                | 0.16  | 0.37 | 42<br>(19.7)                        | 72 (49.1)                      | 96                             | 13                                    | 13                             | 13                             | 25                            | 26                             | 26                             | LQM (2014) |
| Pentachlorobenzen<br>e         | 5.8                                          | 12           | 22   | 19                                              | 30        | 38           | 1.2                                 | 3.1   | 7    | 640<br>(43)                         | 770 (107)                      | 830                            | 100                                   | 100                            | 100                            | 190                           | 190                            | 190                            | LQM (2014) |
| Hexachlorobenzen<br>e          | 1.8<br>(0.2)                                 | 3.3<br>(0.5) | 4.9  | 4.1<br>(0.2)                                    | 5.7 (0.5) | 6.7<br>(1.2) | 0.47                                | 1.1   | 2.5  | 110<br>(0.2)                        | 120                            | 120                            | 16                                    | 16                             | 16                             | 30                            | 30                             | 30                             | LQM (2014) |
| Phenol                         | 280                                          | 550          | 1100 | 750                                             | 1300      | 2300         | 66                                  | 140   | 280  | 760 <sub>dir</sub><br>(31000)       | 1500 <sub>dir</sub><br>(35000) | 3200 <sub>dir</sub><br>(37000) | 760 <sub>dir</sub><br>(31000)         | 1500 <sub>dir</sub><br>(35000) | 3200 <sub>dir</sub><br>(37000) | 760 <sub>dir</sub><br>(31000) | 1500 <sub>dir</sub><br>(35000) | 3200 <sub>dir</sub><br>(37000) | LQM (2014) |

| Parameter                                             | Residential <u>with</u><br>homegrown produce |       |      | Residential <u>without</u><br>homegrown produce |       |      | Allotment                           |       |      | Commercial / Industrial             |       |      | Public Open Space near<br>Residential |       |       | Public Open Space - Park |       |      | Source     |
|-------------------------------------------------------|----------------------------------------------|-------|------|-------------------------------------------------|-------|------|-------------------------------------|-------|------|-------------------------------------|-------|------|---------------------------------------|-------|-------|--------------------------|-------|------|------------|
|                                                       | (mg/kg, unless otherwise<br>stated)          |       |      | (mg/kg, unless otherwise<br>stated)             |       |      | (mg/kg, unless<br>otherwise stated) |       |      | (mg/kg, unless otherwise<br>stated) |       |      | (mg/kg, unless otherwise<br>stated)   |       |       |                          |       |      |            |
| SOM                                                   | 1%                                           | 2.50% | 6%   | 1%                                              | 2.50% | 6%   | 1%                                  | 2.50% | 6%   | 1%                                  | 2.50% | 6%   | 1%                                    | 2.50% | 6%    | 1%                       | 2.50% | 6%   |            |
| Chlorophenols<br>(excluding<br>pentachlorophenol<br>) | 0.87 (g)                                     | 2     | 4.5  | 94                                              | 150   | 210  | 0.13<br>(g)                         | 0.3   | 0.7  | 3500                                | 4000  | 4300 | 620                                   | 620   | 620   | 1100                     | 1100  | 1100 | LQM (2014) |
| Pentachlorophenol                                     | 0.22                                         | 0.52  | 1.2  | 27<br>(16.4)                                    | 29    | 31   | 0.03                                | 0.08  | 0.19 | 400                                 | 400   | 400  | 60                                    | 60    | 60    | 110                      | 120   | 120  | LQM (2014) |
| Carbon Disulphide                                     | 0.14                                         | 0.29  | 0.62 | 0.14                                            | 0.29  | 0.62 | 4.8                                 | 10    | 23   | 11                                  | 22    | 47   | 11000                                 | 11000 | 12000 | 1300                     | 1900  | 2700 | LQM (2014) |
| Hexachlorobutadie<br>ne                               | 0.29                                         | 0.7   | 1.6  | 0.32                                            | 0.78  | 1.8  | 0.25                                | 0.61  | 1.4  | 31                                  | 66    | 120  | 25                                    | 25    | 25    | 48                       | 50    | 51   | LQM (2014) |

(g) derived based on 2,3,4,6-tetrachlorophenol; dir - based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only); (vap) calculated for vapour phase only. SOM - Soil Organic Matter; (4.5) solubility.

## APPENDIX 7

### RISK ASSESSMENT MATRIX

## Preliminary Risk Assessment Methodology (After NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination (2008))

NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination (2008) sets out a methodology for the estimation of risk.

At Phase I the risk estimation will take the form of a qualitative risk assessment, which will be entirely based on the conceptual model for each potential end-use of the site. Comments on level of uncertainty will also need to be included for each source-pathway-target linkage to allow the confidence in the assessed risks to be understood. The results of the qualitative risk assessment will allow the risk evaluation to be concisely described in the following chapters.

The methodology for risk evaluation is a qualitative method for interpreting the output for the risk estimation stage of the assessment. It involves the classification of the:

**The magnitude of probability** (i.e. likelihood).

[takes into account both the presence of the hazard and receptor and the integrity of the pathway]

**The magnitude of the potential consequence** (i.e. severity).

[takes into account both the potential severity of the hazard and the sensitivity of the receptor]

### Classification of Probability

| Classification              | Definition                                                                                                                                                                                                                                                             | Examples                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>High likelihood (Hi)</b> | There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable in the long term, or there is evidence at the receptor of harm or pollution.                                                                         | <p>A) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden.</p> <p>B) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years</p>                                                                                                                              |
| <b>Likely (Li)</b>          | There is a pollutant linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. | <p>A) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space.</p> <p>B) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.</p> |
| <b>Low likelihood (Lw)</b>  | There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term.                                      | <p>A) Elevated concentrations of toxic contaminants are present in soils at depths &gt;1m in a residential garden, or 0.5-1.0m in public open space.</p> <p>B) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.</p>         |
| <b>Unlikely (UI)</b>        | There is a pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.                                                                                                                                    | <p>A) Elevated concentrations of toxic contaminants are present below hardstanding.</p> <p>B) Light industrial unit &lt;10 yrs old containing a double skinned UST with annual integrity testing results available.</p>                                                                                                                                                                                                      |

## Preliminary Risk Assessment Methodology (After NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination (2008))

### Classification of Consequence

|                    | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Severe (Sv)</b> | <p>Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs. A Category 1: Human Health risk is present.</p> <p>Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point major impact on amenity value or major damage to agriculture or commerce.</p> <p>Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long - term maintenance of the population.</p> <p>Catastrophic damage to crops, buildings or property.</p> | <p><i>Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions.</i></p> <p><i>Major fish kill in surface water from large spillage of contaminants from site.</i></p> <p><i>Highly elevated concentrations of List 1 and substances present in groundwater close to small potable abstraction (high sensitivity).</i></p> <p><i>Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).</i></p> |
| <b>Medium (Md)</b> | <p>Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs. A Category 2: Human Health risk is present.</p> <p>Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.</p> <p>Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.</p> <p>Significant damage to crops, buildings or property.</p>                                    | <p><i>Significant harm to humans is defined in circular 01/2006 as death, disease* serious injury, genetic mutation, birth defects or the impairment of reproductive functions.</i></p> <p><i>Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability.</i></p> <p><i>Ingress of contaminants through plastic potable water pipes.</i></p>                                                                                                                                                                                        |
| <b>Mild (MI)</b>   | <p>Exposure to human health unlikely to lead to “significant harm”. A Category 3 Human Health risk is present.</p> <p>Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce</p> <p>Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population</p> <p>Minor damage to crops, buildings or property.</p>                                                                                                                                            | <p><i>Exposure could lead to slight short - term effects (e.g. mild skin rash).</i></p> <p><i>Surface spalling of concrete.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Minor (Mr)</b>  | <p>No measurable effect on humans. A Category 4: Human Health risk is present.</p> <p>Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><i>The presence of contaminants at such concentrations that protective equipment is required during site works.</i></p> <p><i>The loss of plants in a landscaping scheme.</i></p> <p><i>Discoloration of concrete.</i></p>                                                                                                                                                                                                                                                                                                                                             |

\* For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.

The classification of consequence does not take into account the probability of the consequence being realized. Therefore, there may be more than one consequence for a particular pollutant linkage. Both a severe and medium classification can result in death. Severe relates to short term (acute) risk while medium relates to long

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term (chronic) risk. Mild relates to significant harm but to less sensitive receptors. Minor classification relates to harm which is not significant but could have a financial cost.

The classification gives a guide as to the severity and consequence of identified risk when compared with other risk presented on the site. It should be noted that if a risk is identified it cannot be classified as “no risk” but as “very low risk”. Differing stakeholders may have a different view on the acceptability of a risk.

### Risk Evaluation Matrix

|             |                      | Consequence         |                    |                    |                    |
|-------------|----------------------|---------------------|--------------------|--------------------|--------------------|
|             |                      | Severe (Sv)         | Medium (Md)        | Mild (Mi)          | Minor (Mr)         |
| Probability | High likelihood (Hi) | Very high risk (VH) | High Risk (H)      | Moderate Risk (M)  | Mod/low risk (M/L) |
|             | Likely (Li)          | High risk (H)       | Moderate risk (M)  | Mod/low risk (M/L) | Low risk (L)       |
|             | Low likelihood (Lw)  | Moderate risk (M)   | Mod/low risk (M/L) | Low risk (L)       | Very low risk (VL) |
|             | Unlikely (UI)        | Mod/low risk (M/L)  | Low risk (L)       | Very low risk (VL) | Very low risk (VL) |

### Risk Categorizations

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Very high risk (VH)</b> | There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realized, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.                                                                           |
| <b>High risk (H)</b>       | Harm is likely to arise to a designated receptor from an identified hazard. Realization of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.                                                                                                                                          |
| <b>Moderate risk (M)</b>   | It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term. |
| <b>Low risk (L)</b>        | 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.                                                                                                                                                                                                                                                                            |
| <b>Very low risk (VL)</b>  | There is a low possibility that harm could arise to a receptor. In the event of such harm being realized it is not likely to be severe.                                                                                                                                                                                                                                                                                                            |

### Reference

Rudland, D J, Lancefield, R M, Mayell, P N; 2001; Contaminated land Risk Assessment. A guide to Good Practice; CIRIA Report C552.

The NHBC (National House-Building Council) the Environment Agency and the Chartered Institute of Environmental Health, 2008, Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66.