



SOLUTIONS LIMITED

**PHASE II GROUND INVESTIGATION
AND UPDATED RISK ASSESSMENT
REPORT**

AT

**10 WARWICK HOUSE, SMITHIES MOOR
LANE, BATLEY, WF17 9AT**

FOR

SIMON KAYE

Report Reference: 5461-25 PII

GeoEnviro Solutions Ltd
4A Haggwood Stone Quarry
Woodhead Road
Honley
West Yorkshire
HD9 6PW

[www: geoenvirosolutions.com](http://www.geoenvirosolutions.com)

QUALITY ASSURANCE

	Name	Position	Date
Prepared by:	Jacob Fenton	Geoenvironmental Engineer	December 2025
Reviewed by:	Rob Lewis	Director	December 2025
Approved by:	Rob Lewis	Director	December 2025

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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 Mr Simon Kaye (the Client) to conduct a Phase II geoenvironmental ground investigation at Warwick House, Smithies Moor Lane, Batley, WF17 9AT.

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).

1.2 PROPOSED DEVELOPMENT

We understand current plans for the development of the site include the change of use to residential of the existing structure.

GES have not, at this stage, been provided with any proposed development plans.

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 recommendations made in a previously undertaken Phase I report.

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

- Three window sampling boreholes to a nominal depth of up to 5.00 mbgl or refusal.
- Environmental sampling, and in situ geotechnical testing (SPTs).

- Collection and subsequent environmental laboratory testing of samples.
- The installation of three combined gas and groundwater monitoring standpipes to a nominal depth of 5.00mbgl.
- 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 any future 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: 5461-25 T1, issued in June, 2025), which this report should be read in conjunction with.

2. PHYSICAL SETTING

2.1 SITE INFORMATION

Location

The site is located at 10 Warwick House, Smithies Moor Lane, Batley, WF17 9AT, at approximate National Grid Reference (NGR): 422480, 425830 (centre of the site).

Topography

The site slopes gently from west to east.

Access

The site was accessible via Smithies Moor Lane from the West.

Site Description

A site reconnaissance was carried out on the 26th of November 2025. 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 0.07 Ha.

At the time of the investigation the site was occupied by the existing premises of a two-storey building with extension and connected warehouse with rear external garden containing mature trees and shrubs.

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)	2
Hardstanding	8
Roadways	0
Buildings	90
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	Pennine Lower Coal Measures Formation

There are no known artificial deposits recorded underlying the site.

There are no records of superficial deposits underlying the site.

The bedrock geology beneath the site is recorded to be the Pennine Lower Coal Measures Formation, generally described as *'mudstone, siltstone and sandstone'* (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, as summarised in Table 2.3 below.

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 Secondary A aquifer 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.

2.4 HYDROLOGY

The nearest surface watercourse to the site is Smithies Beck located approximately 57 m to the Southwest.

The site lies within the Batley beck from Source to Calder catchment, which the EA recorded to have a Fail chemical and Moderate ecological classification in 2019.

2.5 CONTAMINANT SOURCES

On-Site Sources

The following possible on-site sources have been identified from the historical study and previous desktop:

- Historical made ground
- Smithy activities recorded in the area

Offsite Sources

The following possible off-site sources have been identified from the historical study and previous desktop:

- Historical industrial activity
- Historical Landfills

3. FIELDWORKS

3.1 GROUND INVESTIGATION

All ground investigation works were carried out on the 26th of November 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.

Combined groundwater and ground gas monitoring installations were installed in all window sample boreholes.

The positions of the exploratory holes in relation to the existing site layout can be reviewed on drawing number GES 5461-25 / 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			
Made Ground-Topsoil	0.00	0.00	0.3	1.1	0..	1.1	All BH's
Firm Gravelly Clay and sand	0.3	1.1	1.2	2.3	0.9	1.15	All BH's
Weathered Mudstone	1.2	2.3	<i>Not Proved</i>	<i>Not Proved</i>	-	-	All BH's

Detailed strata descriptions are presented on the exploratory point logs presented in [Appendix 2](#) and photographs of the exploratory boreholes in [Appendix 3](#).

4.2 MADE GROUND- OPSOIL

Topsoil was recorded in all boreholes and generally comprised clayey Sandy gravelly TOPOSIL

4.3 PENNINE LOWER COAL MEASURES FORMATION

Deposits considered to represent the Pennine Lower Coal Measured formation generally comprised from, sandy gravelly clays and sand deposits overlying Highly to completely weathered mudstone.

4.4 GROUNDWATER

Groundwater was generally 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

5.1 STANDARD PENETRATION TESTS

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

- SPT 'N' values of between 22 and refusal were recorded in the weathered Pennine Lower coal measures formation deposits.

6. LABORATORY TESTING – SULPHATES

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

Three samples of the underlying naturally occurring deposits were submitted for assessment of water-soluble sulphate, total sulphate, pH value and total sulphur concentrations.

Water-soluble sulphate concentrations of 61.8mg/l to 223mg/l were recorded, total (acid) sulphate concentrations ranged from 0.02% to 0.08%, total sulphur concentrations ranged from 0.022% to 0.041% with pH values ranging from of 6.4 to 7.5 units. Total Potential Sulphates ranged between 0.066% and 0.123%.

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	4
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	4
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	4

All chemical testing results are presented in [Appendix 4](#).

8. CONTAMINATION

8.1 SOIL TESTING

A total of four samples have been analysed by Chemtech 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 of residential and therefore screening has been made against a land use of 'Residential with Homegrown Produce'.

A set of Screening Values are provided in [Appendix 5](#).

8.2 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 with 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 criteria¹ 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 6% 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 4.89-38.9%, and so this conservative approach is considered appropriate for initial screening.

Where no S4UL are available, the EIC/ AGS/ CL:AIRE/ GAC² 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.

8.3 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 4](#).

Tables 10.1 – 10.3 overleaf summarize the soil testing results.

¹ 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

² 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	21.3	75.6	37*	3	BH1 @ 0.30, BH1 @ 1.20, BH3 @0.70
Cadmium	<1.6	2.0	1.7	1	BH3@0.70
Chromium total	24.9	32.8	910*	0	-
Copper	28.1	94.9	2400*	0	-
Lead	26.5	227	200*	1	BH03@0.70
Mercury	<0.7	<0.7	1.2 ^a	0	-
Nickel	28.5	44.6	180 ^b	0	-
Selenium	<3.0	3.2	250*	0	-
Zinc	85.1	226	3700*	0	-
Total Phenols	<0.50	<0.50	1100*	0	-
Total Cyanide	<1.0	<1.0	34*	0	-

*LQM/CIEH GAC for 'Residential with Home Grown Produce' use scenario based on a sandy loam soil and 6% 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	<0.016	0.173	13*	0	-
Acenaphthylene	<0.015	0.116	1100*	0	-
Acenaphthene	<0.013	0.084	920*	0	-
Fluorene	<0.013	0.081	860*	0	-
Phenanthrene	0.138	1.40	440*	0	-
Anthracene	0.031	0.336	11000*	0	-
Fluoranthene	0.233	3.63	890*	0	-
Pyrene	0.207	3.12	2000*	0	-
Benzo(a)anthracene	0.144	2.48	13*	0	-
Chrysene	0.127	2.45	27*	0	-
Benzo(b)fluoranthene	0.154	2.56	3.7*	0	-
Benzo(k)fluoranthene	<0.025	1.08	100*	0	-

Determinant	Min	Max	GAC	Number of exceedances	Location of exceedances
Benzo(a)pyrene	0.123	2.17	3*	0	-
Indeno(1,2,3-cd)pyrene	<0.019	1.64	41*	0	-
Dibenz(a,h)anthracene	<0.017	0.254	0.3*	0	-
Benzo(ghi)perylene	<0.019	1.16	350*	0	-

*LQM/CIEH GAC for 'Residential with Home Grown Produce' use scenario based on a sandy loam soil and 6% SOM.

Table 10.3: TPH CWG Aliphatic/Aromatic Soil Exceedances

Determinant	Min	Max	GAC	Number of exceedances	Location of exceedances
Aromatic >C6 - C7	<0.010	<0.010	300	0	-
Aromatic >C7 - C8	<0.010	<0.010	660*	0	-
Aromatic >C8 - C10	<0.010	<0.010	190*	0	-
Aromatic >C10 - C12	<0.6	5.7	380*	0	-
Aromatic >C12 - C16	<1.0	11.7	660*	0	-
Aromatic >C16 - C21	<2.0	31.4	930*	0	-
Aromatic >C21 - C35	<4.5	61.4	1700*	0	-
Aromatic >C35 - C44	<2.0	10.9	1700*	0	-
Aliphatic >C5 - C6	<0.10	<0.10	160*	0	-
Aliphatic >C6 - C8	<0.10	<0.10	530*	0	-
Aliphatic >C8 - C10	<0.10	<0.10	150*	0	-
Aliphatic >C10 - C12	<1.0	1.3	760*	0	-
Aliphatic >C12 - C16	<0.5	1.0	4300*	0	-
Aliphatic >C16 - C21	<0.7	0.8	110,000*	0	-
Aliphatic >C21 - C35	<4.0	9.4	110,000*	0	-
Aliphatic >C35-C44	<0.5	0.7	110,000*	0	-

*LQM/CIEH GAC scenario based on a sandy loam soil and 6% 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.

9. 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
eOn-site: 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 potentially active	Likely	Medium	Moderate ●	Exceedances have been identified in heavy metals across the external areas which require remediation
		Construction Workers	Considered potentially active	Likely	Medium	Moderate ●	Exceedances have been identified in heavy metals across the external areas which require remediation
	Leaching through soils and migration via groundwater or soil pore moisture	Controlled Waters	Considered potentially active	Low Likelihood	Medium	Low / moderate ●	A moderate to low risk rating has been identified due to the presence of heavy metals in soils on site, though metals are generally not highly mobile and as a result may be limited in spread.
	Permeation of water pipes	Construction materials, future end users and site visitors	Considered potentially active	Low Likelihood	Medium	Low / moderate ●	Returned samples indicated low hydrocarbon concentrations from tested soils. Provision of water supply pipes and connectors formed from proprietary "barrier pipe" materials (e.g., polyethylene-aluminium-polyethylene) may be required by the water supply company.

Contaminant Source	Pathways	Receptor	Pollutant Linkage	Probability of Risk	Classification of Consequence	Level of Risk	Justification
	Uptake	Plant and Wildlife	Considered potentially active	Likely	Medium	Moderate ●	Exceedances have been identified in heavy metals across the external areas which require remediation
On-site: 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 ●	A very low, risk rating has been assessed due to the asbestos screening returning a negative result for the presence of fibrous material from all samples analysed.
		Construction Workers	Considered inactive	-	-	Very Low ●	A very low, risk rating has been assessed due to the asbestos screening returning a negative result for the presence of fibrous material from all samples analysed.
On-site: Ground Gases (CH ₄ , CO ₂) 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 ●	No change identified from Phase I Desktop study.
Offsite: Ground Gases (CH ₄ , CO ₂ , H ₂ S) from off-site historical landfilling activities.	Gas migration and build up within buildings (explosion/asphyxiation risk)	Future end users and building structures.	Considered potentially active	Low Likelihood	Minor	Very Low ●	No change identified from Phase I Desktop study.

10. RECOMMENDATIONS

The results of the general testing undertaken across the site indicates that heavy metal contamination is present on site which will require remedial action as part of the change of use to the residential premises. This could be undertaken by removal of soils off site and replacing with clean soil in garden areas where the linkage to end user is not broken by developments.

At this stage as a minimum, the made ground materials should be removed from site in accordance with BRE 465 (Cover systems for land regeneration) 2004. This document recommends that based on the soil testing results, up to 600 mm of made ground below proposed formation level should be removed from site and replaced with clean inert materials comprising of clean inert imported topsoil material in line with BS 3882: 2015 Specification for Topsoil.

Where the Made Ground materials are less than 600 mm thick, only the made ground materials will require removal.

10.1 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.

10.2 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.

10.3 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.

10.4 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.

10.5 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.

10.6 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.

10.7 BOREHOLE DECOMMISSIONING

Prior to the development of the site, it is recommended that all the boreholes installed at the site by GES are decommissioned in line with EA Guidance document '*Good Practice for Decommissioning Redundant Boreholes and Wells*' (October 2012).

11. 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.

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.

APPENDIX 1
DRAWINGS AND PLANS



General
Site
Location



GeoEnviro Solutions Ltd
4A Haggwood Stone Quarry,
Woodhead Road, Honley,
HD9 6PW
Tel: 01484 986010
Email: info@geoenvirosolutions.com
Web: www.geoenvirosolutions.com



PROJECT NAME	Smithies Moor Lane, Batley
PROJECT NUMBER	5461-25
TITLE	Site Location Plan

DRAWING NO.	5461-25/01
DATE	June 2025

SCALE	N.T.S
DRAWN BY	ADD



Window Sample
Borehole Location



GeoEnviro Solutions Ltd
4A Haggwood Stone Quarry,
Woodhead Road, Honley,
HD9 6PW
Tel: 01484 986010
Email: info@geoenvirosolutions.com
Web: www.geoenvirosolutions.com

PROJECT NAME Smithies Moor Lane, Batley

DRAWING NO.

SCALE

PROJECT NUMBER 5461-25

5461-25/02

N.T.S

TITLE
Borehole Location Plan

DATE
December 2025

DRAWN BY
JF

APPENDIX 2
EXPLORATORY HOLE LOGS

Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample	AMAL - Amalgamated sample	B - Bulk disturbed sample
BLK - Block sample	C - Core sample	CBR - CBR test sample
D - Disturbed sample	ES - Environmental sample	EW - Environmental water sample
G - Gas sample	J - Jar sample	L - Liner sample
TW - Pushed thin wall sample	U - Undisturbed sample	UT - Undisturbed thin wall sample
W - Water sample		

IN-SITU TESTS

HV - Hand shear vane	HV(r) - Hand shear vane residual	PID - Photo ionisation detector
PP - Hand penetrometer	SPT - Standard penetration test	SPT(C) - SPT using cone

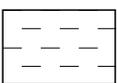
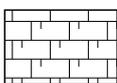
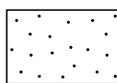
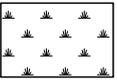
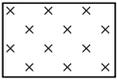
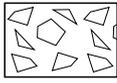
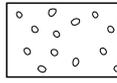
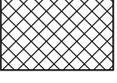
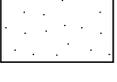
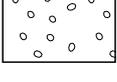
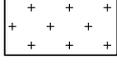
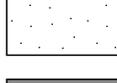
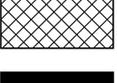
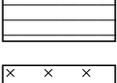
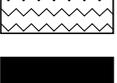
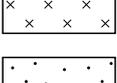
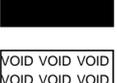
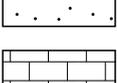
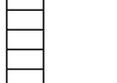
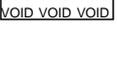
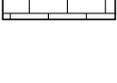
GROUNDWATER

 Groundwater strike	 Groundwater rest level
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ROTARY CORE DETAILS

TCR - Total core recovery (%)	SCR - Solid core recovery (%)	RQD - Rock quality designation (%)
FI - Fracture index	NI - Non-intact core	AZCL - Assumed zone of core loss

LEGEND

 Topsoil	 Clay	 Chalk	 Sand backfill
 Peat	 Silt	 Breccia	 Gravel backfill
 Made ground	 Sand	 Conglomerate	 Arisings
 Concrete	 Gravel	 Metamorphic	 Bentonite
 Wood	 Cobbles	 Igneous	 Concrete
 Brick	 Boulders		 Grout
 Bituminous material	 Mudstone		 Plain pipe
 Gypsum	 Siltstone		
 Coal	 Sandstone		 Slotted pipe
 Void	 Limestone		



Dynamic (Windowless) Sampler

BH01

Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:50
Project Name Smithies Moor Lane, Batley	Project No. 5461-25	Start Date 2025-11-26	End Date 2025-11-26	

Client Simon Kaye	Consultant GeoEnviro Solutions Ltd	Contractor GeoEnviro Solutions Ltd
----------------------	---------------------------------------	---------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.60)		MADE GROUND: Dark brown slightly clayey silty sandy TOPSOIL	
						0.60			
			1.00	SPT	N=13 (3,2/2,3,3,5)		(0.55)		MADE GROUND: Dark brown slightly gravelly clayey sandy TOPSOIL. Gravel is subrounded fine and medium
							1.15		Firm orange brown mottled grey slightly gravelly slightly sandy to sandy CLAY. Gravel is angular and subangular fine and medium sandstone and ironstone
			2.00	SPT	N=40 (7,12/16,10,7,7)		(0.65)		Orange brown mottled grey silty gravelly fine, medium and coarse SAND. Gravel is angular and subangular fine and medium sandstone
						1.80			
						2.30		Highly to completely weathered MUDSTONE recovered as stiff friable brown mottled grey gravelly CLAY. Relict structures intact. Gravel is angular to subrounded fine and medium mudstone	
		3.00	SPT	N=50 for 25mm (11,15/50 for 25mm)		(0.70)			
						3.00		End of Borehole at 3.00m	

Remarks
 1. Service inspection pit carried out to 1.20m. No groundwater. No visual or olfactory contamination noted. Refusal at 3.00m. Upon completion - location backfilled with bentonite

Method, Plant, Stability, Dimensions		Logger
0.00 - 1.00m	IP Hand Tools	JF
$L = 0.50m$ $W = 0.50m$		
1.00 - 3.00m	WLS Archway Dart	JF



Dynamic (Windowless) Sampler

BH02

Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:50
Project Name Smithies Moor Lane, Batley	Project No. 5461-25	Start Date 2025-11-26	End Date 2025-11-26	

Client Simon Kaye	Consultant GeoEnviro Solutions Ltd	Contractor GeoEnviro Solutions Ltd
-----------------------------	--	--

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		1.00	SPT	N=22 (2,3/3,3,9,7)	(0.30)	(0.30)		MADE GROUND: Dark brown clayey gravelly sandy TOPSOIL. Gravel is angular and subangular fine, medium and coarse
		2.00	SPT	N=51 (7,13/12,12,14,13)	(0.90)	(1.20)		Firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine, medium and coarse sandstone and mudstone
					(1.20)	(1.40)		Highly to completely weathered MUDSTONE recovered as firm to stiff friable brown, grey and orange brown slightly sandy gravelly CLAY. Gravel is angular and subangular fine and medium sandstone and mudstone
					(2.00)	(2.00)		Highly weathered MUDSTONE recovered as stiff brown mottled red brown gravelly CLAY. Relict structure intact. Gravel is angular and subangular fine and medium mudstone
								<i>End of Borehole at 2.00m</i>

Remarks
1. Service inspection pit carried out to 1.20m. No groundwater. No visual or olfactory contamination noted. Refusal at 2.00m. Upon completion - location backfilled with bentonite

Method, Plant, Stability, Dimensions		Logger
0.00 - 1.00m	IP Hand Tools	JF
<i>L = 0.50m</i>		
	W = 0.50m	
1.00 - 2.00m	WLS Archway Dart	JF



Dynamic (Windowless) Sampler

BH03

Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:50
Project Name Smithies Moor Lane, Batley	Project No. 5461-25	Start Date 2025-11-26	End Date 2025-11-26	

Client Simon Kaye	Consultant GeoEnviro Solutions Ltd	Contractor GeoEnviro Solutions Ltd
----------------------	---------------------------------------	---------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.70)		MADE GROUND: Dark brown clayey gravelly sandy TOPSOIL. Gravel is angular and subangular fine, medium and coarse	0.5
		1.00	SPT	N=22 (2,3/5,5,6,6)		0.70 (0.50)		Firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine, medium and coarse sandstone and mudstone	1.0
		2.00	SPT	N=31 (2,2/5,5,11,10)		1.20 (2.40)		Highly to completely weathered MUDSTONE recovered as firm to stiff friable orange brown, yellow brown and grey mottled black slightly sandy gravelly CLAY. Gravel is angular and subangular fine and medium sandstone, mudstone, ironstone and coal	1.5 2.0 2.5
		3.00	SPT	N=23 (3,4/5,6,6,6)		3.60			3.0 3.5
		4.00	SPT	N=20 (4,3/4,5,5,6)		(1.40)		Moderately to highly weathered MUDSTONE recovered as stiff friable grey gravelly CLAY. Gravel is angular and subangular fine and medium mudstone	4.0 4.5
		5.00	SPT	N=26 (4,5/5,8,7,6)		5.00			5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0
----- End of Borehole at 5.00m									

Remarks
1. Service inspection pit carried out to 1.20m. No groundwater. No visual or olfactory contamination noted. Upon completion - location backfilled with bentonite

Method, Plant, Stability, Dimensions		Logger
0.00 - 1.00m	IP Hand Tools	JF
$L = 0.50m$ $W = 0.50m$		
1.00 - 5.00m	WLS Archway Dart	JF

APPENDIX 3
CHEMICAL TESTING RESULTS



ANALYTICAL TEST REPORT

Report Number 25-11769, issue number 1
Contract name: Smithies Moor Lane Batley
Client reference: 5461-25
Clients name: GeoEnviro Solutions Ltd
Clients address: GeoEnviro Solutions Ltd
Unit 7 Springvale Works
Brookfoot Lane
Brighouse
HD6 2RA
Samples received: 01/12/2025
Analysis started: 01/12/2025
Analysis completed: 10/12/2025
Report issued: 10/12/2025

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
I/S	Insufficient sample to carry out test
U/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by: Abbie Neasham-Bourn
Senior Reporting Administrator

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample ID	Depth (m)	Sample description	Material removed	% Removed	% Moisture
78649	BH1	0.30	Brown Sandy Clay with Gravel and Vegetation.	-	-	19.6
78650	BH1	1.20	Brown Sandy Clay with Gravel and Vegetation.	-	-	20.9
78651	BH1	2.00	Brown Sand with Gravel and Vegetation.	-	-	7.2
78652	BH2	0.50	Brown Clay with Gravel and Vegetation.	-	-	16.9
78653	BH2	1.20	Brown Sandy Clay with Gravel and Vegetation.	-	-	9.0
78654	BH3	0.70	Brown Sandy Clay with Gravel and Vegetation.	-	-	20.1
78655	BH3	1.20	Brown Clay with Gravel and Vegetation.	-	-	16.4

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

- a Sampling date not provided
- b Sampling time not provided (waters only)
- c Sample not received in appropriate containers
- d Storage Temperature
- e Headspace present in sample container
- f Sample exceeded sampling to receipt
- g Sample exceeded holding time(s)

Lab ref	Sample ID	Depth (m)	Deviating	Tests (Reason for deviation)
78649	BH1	0.30	N	
78650	BH1	1.20	N	
78651	BH1	2.00	N	
78652	BH2	0.50	N	
78653	BH2	1.20	N	
78654	BH3	0.70	N	
78655	BH3	1.20	N	

SOILS

Lab Number					78649	78650	78651	78652	78653
Client Reference					SOIL	SOIL	SOIL	SOIL	SOIL
Sample ID					BH1	BH1	BH1	BH2	BH2
Depth (m)					0.30	1.20	2.00	0.50	1.20
Sampling Date					25/11/2025	25/11/2025	25/11/2025	25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	n/t	NAD	n/t
Metals									
Water Soluble Sulphate	CE061	M	10	mg/l	n/t	n/t	112	n/t	30.9
Water Soluble Sulphate	CE061	M	20	mg/kg	n/t	n/t	223	n/t	61.8
Acid Soluble Sulphate (SO4)	CE062	M	100	mg/kg	n/t	n/t	3820	n/t	258
Acid Soluble Sulphate (SO4)	CE062	M	0.01	%	n/t	n/t	0.38	n/t	0.03
Arsenic	CE264	U	1.8	mg/kg	69.6	75.6	n/t	21.3	n/t
Cadmium	CE264	M	1.6	mg/kg	< 1.6	< 1.6	n/t	< 1.6	n/t
Chromium	CE264	U	2	mg/kg	25.8	29.4	n/t	24.9	n/t
Copper	CE264	U	1.6	mg/kg	86.5	67.4	n/t	28.1	n/t
Lead	CE264	U	2.3	mg/kg	165	107	n/t	26.5	n/t
Mercury	CE264	U	0.7	mg/kg	< 0.7	< 0.7	n/t	< 0.7	n/t
Nickel	CE264	M	2.1	mg/kg	37.0	36.2	n/t	28.5	n/t
Selenium	CE264	U	3	mg/kg	3.2	< 3.0	n/t	< 3.0	n/t
Sulphur %	CE264	N	0.0032	%	n/t	n/t	0.0407	n/t	0.0265
Sulphur	CE264	N	32	mg/kg	n/t	n/t	407	n/t	265
Zinc	CE264	M	4	mg/kg	164	97.5	n/t	85.1	n/t
Colourimetric									
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	n/t	< 0.040	n/t
Water Soluble Sulphate	CE261	U	1.8	mg/l	306	260	n/t	9.38	n/t
Total Monohydric Phenols	CE078	N	0.5	mg/kg	< 0.50	< 0.50	n/t	< 0.50	n/t
Total Cyanide	CE077	N	1	mg/kg	< 1.0	< 1.0	n/t	< 1.0	n/t
Combustion									
Moisture Content	CE001	N	0.1	%	19.6	20.9	7.2	16.9	9.0
Soil Organic Matter	CE192	N	0.1	%	18.5	12.8	n/t	2.84	n/t
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	0.173	< 0.016	n/t	< 0.016	n/t
Acenaphthylene	CE087	M	0.015	mg/kg	0.116	< 0.015	n/t	0.075	n/t
Acenaphthene	CE087	M	0.013	mg/kg	0.084	< 0.013	n/t	0.015	n/t
Fluorene	CE087	U	0.013	mg/kg	0.081	< 0.013	n/t	0.037	n/t

SOILS

Lab Number					78649	78650	78651	78652	78653
Client Reference					SOIL	SOIL	SOIL	SOIL	SOIL
Sample ID					BH1	BH1	BH1	BH2	BH2
Depth (m)					0.30	1.20	2.00	0.50	1.20
Sampling Date					25/11/2025	25/11/2025	25/11/2025	25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units					
Phenanthrene	CE087	M	0.014	mg/kg	1.40	0.138	n/t	0.806	n/t
Anthracene	CE087	U	0.017	mg/kg	0.336	0.031	n/t	0.180	n/t
Fluoranthene	CE087	M	0.017	mg/kg	3.63	0.233	n/t	1.33	n/t
Pyrene	CE087	M	0.016	mg/kg	3.12	0.207	n/t	1.10	n/t
Benzo(a)anthracene	CE087	U	0.012	mg/kg	2.48	0.144	n/t	0.651	n/t
Chrysene	CE087	M	0.028	mg/kg	2.45	0.127	n/t	0.620	n/t
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	2.56	0.154	n/t	0.696	n/t
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	1.08	< 0.025	n/t	0.265	n/t
Benzo(a)pyrene	CE087	U	0.019	mg/kg	2.17	0.123	n/t	0.571	n/t
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	1.64	< 0.019	n/t	0.495	n/t
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.254	< 0.017	n/t	0.087	n/t
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	1.16	< 0.019	n/t	0.344	n/t
Total PAH(16)	CE087	N	0.28	mg/kg	22.7	1.16	n/t	7.27	n/t
BTEX									
Benzene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	n/t	< 0.001	n/t
Toluene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	n/t	< 0.001	n/t
Ethylbenzene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	n/t	< 0.001	n/t
Xylenes	CE267	N	0.004	mg/kg	< 0.004	< 0.004	n/t	< 0.004	n/t
MTBE	CE267	N	0.002	mg/kg	< 0.002	< 0.002	n/t	< 0.002	n/t
m,p-Xylene	CE267	U	0.002	mg/kg	< 0.002	< 0.002	n/t	< 0.002	n/t
oXylenes	CE267	U	0.002	mg/kg	< 0.002	< 0.002	n/t	< 0.002	n/t
Total Petroleum Hydrocarbons									
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	n/t	< 0.10	n/t
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	n/t	< 0.10	n/t
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	n/t	< 0.10	n/t
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	1.3	< 1.0	n/t	< 1.0	n/t
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	1.0	< 0.5	n/t	< 0.5	n/t
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	0.8	< 0.7	n/t	< 0.7	n/t
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	9.4	< 4.0	n/t	< 4.0	n/t
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	0.7	< 0.5	n/t	< 0.5	n/t
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	n/t	< 0.010	n/t

SOILS

Lab Number					78649	78650	78651	78652	78653
Client Reference					SOIL	SOIL	SOIL	SOIL	SOIL
Sample ID					BH1	BH1	BH1	BH2	BH2
Depth (m)					0.30	1.20	2.00	0.50	1.20
Sampling Date					25/11/2025	25/11/2025	25/11/2025	25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units					
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	n/t	< 0.010	n/t
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	n/t	< 0.010	n/t
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	5.7	< 0.6	n/t	3.1	n/t
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	11.7	< 1.0	n/t	6.2	n/t
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	31.4	< 2.0	n/t	11.1	n/t
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	61.4	< 4.5	n/t	26.9	n/t
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	10.9	< 2.0	n/t	5.8	n/t
Wet Chem									
pH	CE004	M	0.1	pH units	7.3	6.5	7.1	6.4	7.5

SOILS

Lab Number					78654	78655
Client Reference					SOIL	SOIL
Sample ID					BH3	BH3
Depth (m)					0.70	1.20
Sampling Date					25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units		
Asbestos						
Asbestos Identification	SUBCO N	SU	0	-	NAD	n/t
Metals						
Water Soluble Sulphate	CE061	M	10	mg/l	n/t	37.7
Water Soluble Sulphate	CE061	M	20	mg/kg	n/t	75.3
Acid Soluble Sulphate (SO4)	CE062	M	100	mg/kg	n/t	244
Acid Soluble Sulphate (SO4)	CE062	M	0.01	%	n/t	0.02
Arsenic	CE264	U	1.8	mg/kg	71.7	n/t
Cadmium	CE264	M	1.6	mg/kg	2.0	n/t
Chromium	CE264	U	2	mg/kg	32.8	n/t
Copper	CE264	U	1.6	mg/kg	94.9	n/t
Lead	CE264	U	2.3	mg/kg	227	n/t
Mercury	CE264	U	0.7	mg/kg	< 0.7	n/t
Nickel	CE264	M	2.1	mg/kg	44.6	n/t
Selenium	CE264	U	3	mg/kg	< 3.0	n/t
Sulphur %	CE264	N	0.0032	%	n/t	0.0221
Sulphur	CE264	N	32	mg/kg	n/t	221
Zinc	CE264	M	4	mg/kg	226	n/t
Colourimetric						
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	n/t
Water Soluble Sulphate	CE261	U	1.8	mg/l	21.0	n/t
Total Monohydric Phenols	CE078	N	0.5	mg/kg	< 0.50	n/t
Total Cyanide	CE077	N	1	mg/kg	< 1.0	n/t
Combustion						
Moisture Content	CE001	N	0.1	%	20.1	16.4
Soil Organic Matter	CE192	N	0.1	%	15.2	n/t
Polyaromatic hydrocarbons						
Naphthalene	CE087	M	0.016	mg/kg	0.082	n/t
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	n/t
Acenaphthene	CE087	M	0.013	mg/kg	0.025	n/t
Fluorene	CE087	U	0.013	mg/kg	0.019	n/t

SOILS

Lab Number					78654	78655
Client Reference					SOIL	SOIL
Sample ID					BH3	BH3
Depth (m)					0.70	1.20
Sampling Date					25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units		
Phenanthrene	CE087	M	0.014	mg/kg	0.296	n/t
Anthracene	CE087	U	0.017	mg/kg	0.054	n/t
Fluoranthene	CE087	M	0.017	mg/kg	0.475	n/t
Pyrene	CE087	M	0.016	mg/kg	0.421	n/t
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.259	n/t
Chrysene	CE087	M	0.028	mg/kg	0.295	n/t
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.383	n/t
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.143	n/t
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.315	n/t
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.326	n/t
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	< 0.017	n/t
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.253	n/t
Total PAH(16)	CE087	N	0.28	mg/kg	3.35	n/t
BTEX						
Benzene	CE267	U	0.001	mg/kg	< 0.001	n/t
Toluene	CE267	U	0.001	mg/kg	< 0.001	n/t
Ethylbenzene	CE267	U	0.001	mg/kg	< 0.001	n/t
Xylenes	CE267	N	0.004	mg/kg	< 0.004	n/t
MTBE	CE267	N	0.002	mg/kg	< 0.002	n/t
m,p-Xylene	CE267	U	0.002	mg/kg	< 0.002	n/t
oXylenes	CE267	U	0.002	mg/kg	< 0.002	n/t
Total Petroleum Hydrocarbons						
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	n/t
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	n/t
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	n/t
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	< 1.0	n/t
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	< 0.5	n/t
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	< 0.7	n/t
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	< 4.0	n/t
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	< 0.5	n/t
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	n/t

SOILS

Lab Number					78654	78655
Client Reference					SOIL	SOIL
Sample ID					BH3	BH3
Depth (m)					0.70	1.20
Sampling Date					25/11/2025	25/11/2025
Test	Method	Accred	LoD	Units		
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	n/t
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	n/t
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	2.1	n/t
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	4.8	n/t
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	4.4	n/t
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	20.3	n/t
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	4.7	n/t
Wet Chem						
pH	CE004	M	0.1	pH units	7.8	7.6

METHOD DETAILS

METHOD	TESTNAME	METHOD SUMMARY	ANALYSIS BASIS
CE267	VPH in Soil	HS-GCFID	As submitted sample
CE250	GCXGC in Soil	DCM Extraction and GCxGC-FID	As submitted sample
SUBCON	Asbestos Soil	HSG248	Air Dried Sample
CE061	W. Sol Metals	ICPOES	Air dried sample
CE062	Acid Soluble Sulphate in Soils	HCl Extract and ICPOES	Air dried sample
CE264	Metals by ICP in Soil	ICPOES	Air dried sample
CE267	BTEX in Soils	Analysis by HSGCFID	As submitted sample
CE263	ChromiumVI by Discrete Analyser in Soil	Gallery	Air dried sample
CE261	Anions by Discrete Analyser in Soils	Gallery	Air dried sample
CE087	PAH in Soil	DCM Extraction and GCMS	As submitted sample
CE078	Phenols in Soil	Continuous Flow Analyser	As submitted sample
CE077	Cyanides in Soils	Continuous Flow Analyser	As submitted sample

REPORT INFORMATION

Report No.:25-11769, issue number 1

Key

U	ISO17025 Accredited Result
M	ISO17025 and MCERTS Accredited Result
N	Do not currently hold accreditation
^	MCERTS accreditation not applicable for sample matrix. Result is unaccredited.
*	ISO17025 accreditation not applicable for sample matrix. Result is unaccredited.
S	Subcontracted
I/S	Insufficient Sample
U/S	Unsuitable sample
N/T	Not tested
<	Means "less than"
>	Means "greater than"

LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.

This report shall not be reproduced except in full, without prior written approval.

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

The results relate only to the sample received.

Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Moisture Content Calculated on a Wet Weight basis

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Sampling was undertaken by Chemtech Environmental Limited and is outside the UKAS accreditation scope.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying

For soils and solids, analytical results are inclusive of stones, where applicable.

Sample Retention and Disposal

All soil samples will be retained for a period of 4 weeks from the point of receipt

All water samples will be retained for a period of 2 weeks from the point of Reporting

Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

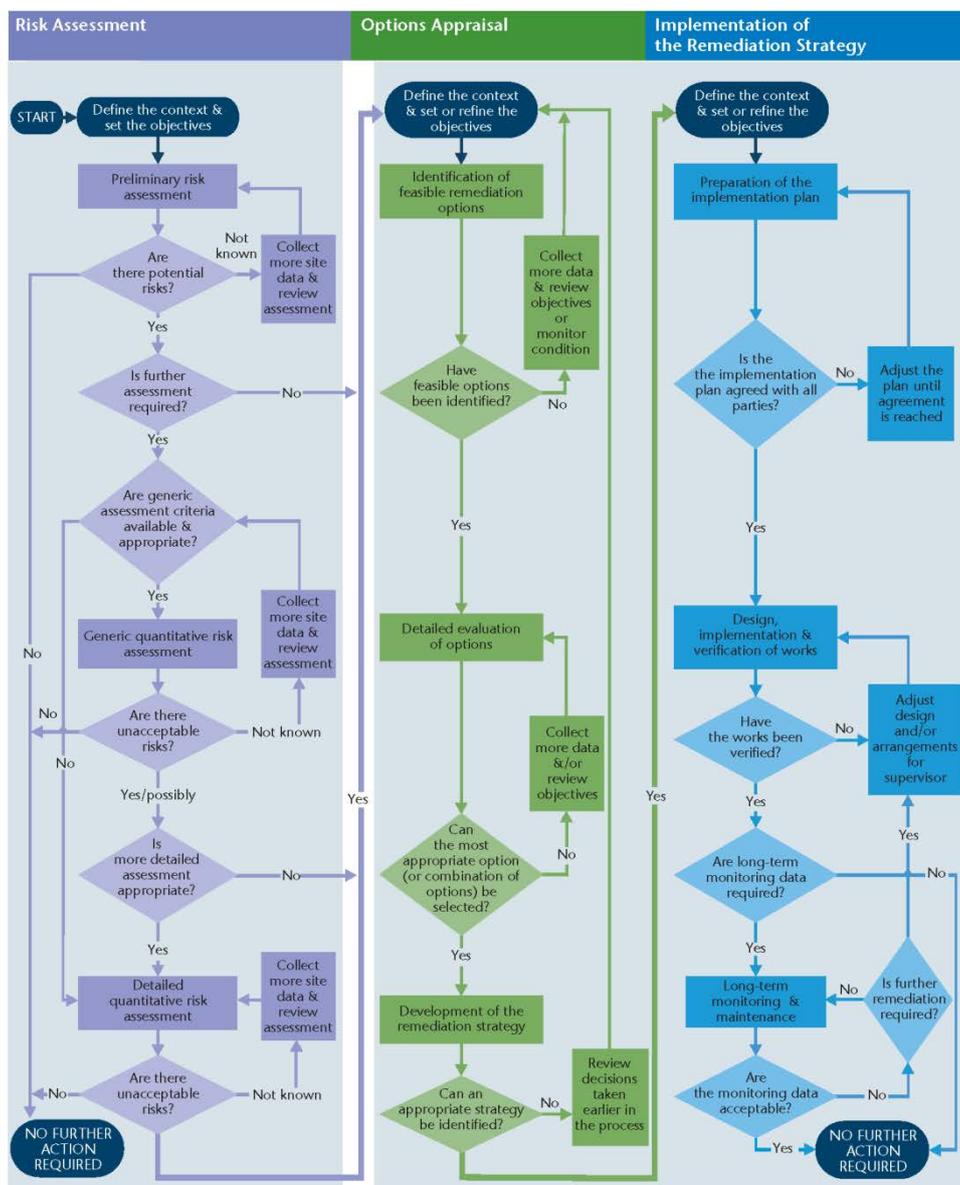
APPENDIX 4
CHEMICAL SCREENING CRITERIA

APPENDIX H - HUMAN HEALTH ASSESSMENT CRITERIA

Context

Contaminated Land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995 and associated guidance (“Part IIA”). These specify that a “suitable for use” approach is to be applied in the assessment of potentially contaminated land, implemented through a phased programme of site investigation and risk assessment appropriate to the site under consideration.

The assessment of potential risks posed by contaminated land is based upon the assessment of plausible contaminant source - pathway - receptor linkages (“pollutant linkages”) for the current and/or proposed future use of the site. The process for the assessment of contaminated land adopted in this report is in line with guidance issued by DEFRA and Environment Agency (EA) 2004: “Model Procedures for the Management of Contaminated Land (CLR11)”. The overall process for the management of land contamination is shown Figure 1 of CLR11 and reproduced below:



Note: The process may apply to one or more pollutant linkages each of which may follow a different route. For some linkages, it may be possible to stop at an early stage – others will progress all the way through the process. The level of complexity of each stage may also vary and in some cases may be very simple.

The risk assessment and subsequent investigation, remediation and verification must address all potential sources of pollutants that may be present on the site (the “hazards”), all receptors that may be harmed by these (e.g. human health, controlled waters, ecological receptors) and the pathways by which the contamination may be transported from the

contaminant source(s) to the receptor(s). This is defined within the conceptual model for the site, which represents the characteristics of the site in a form that shows the possible pollutant linkages. As further information becomes available (for example, through site investigation), so the conceptual model will be refined.

Remedial action can be specified at any phase within this assessment process to break the identified pollutant linkage. In determining whether or not to undertake further assessment or to undertake remediation, the potential cost-savings arising from a more thorough assessment of the pollutant linkages and more tightly defined remedial strategy must be considered against the direct costs involved in the work and the time that this will take to execute and gain regulatory approval.

A different approach to the statistical appraisal of data is required depending on whether the assessment is being undertaken to assess land as Contaminated Land in accordance with the regulations or whether the assessment is to assess whether the site is suitable for new development in accordance with the Planning regime. The statistical approach to assessment is discussed further in CL:AIRE:2009 "Guidance on Comparing Data with a Critical Concentration".

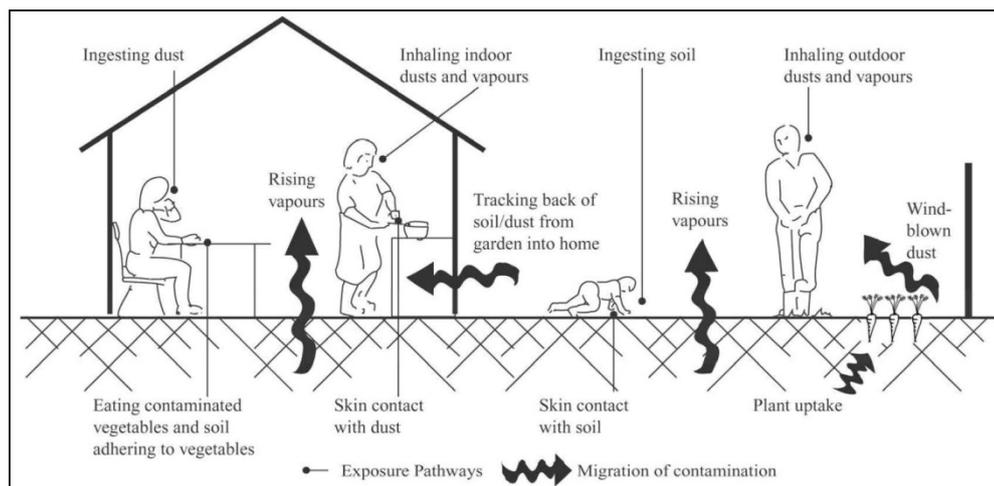
Some form of Detailed Quantitative Risk Assessment (DQRA) will be essential for those cases where appropriate GAC values cannot be established for the contaminant linkages under consideration.

Generic Assessment Criteria for Human Health Risk Assessment

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports and guidance. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. The initial documents (CLR7 - 10) were withdrawn and replaced with revised guidance issued by the Environment Agency including:

- "Using Soil Guideline Values"; SC050021/SGV Introductions, EA, 2009;
- "Human Health toxicology assessment of contaminants in soil"; SC050021/SR2, EA, 2009;
- "Update technical background to the CLEA model"; SC050021/SR3, EA, 2009;
- CLEA Software (Version) Handbook; SC050021/SR4; EA, 2008;
- Compilation of Data for priority Organic Contaminants for Derivation of Soil Guideline Values; Science Report SC050021/SR7, 2008; and,
- Guidance on Comparing Data with a Critical Concentration; CL:AIRE, 2009.

The CLEA model and associated guidance was developed to calculate an estimated tolerable daily intake (TDI) of contaminants for site users given a set of 'typical' human health exposure pathways which are detailed in "SR3: Updated technical background to the CLEA model" (Science Report SC050021/SR3, EA, 2009) and reproduced below.



- **Ingestion**
 - Outdoor soil;
 - Indoor dust;
 - Home grown produce;
 - Soil attached to home grown produce.
- **Dermal Contact**
 - Outdoor soil;
 - Indoor dust.
- **Inhalation**
 - Outdoor dust;
 - Indoor dust;
 - Outdoor vapour;
 - Indoor vapour.

It should be noted that the CLEA model does not include an exhaustive list of potential exposure pathways, e.g. certain compounds can pass through plastic water pipes into drinking water supply.

The potential significance of each of the exposure pathways is dependent upon the type of land use and the nature of the contaminant being considered. The CLEA model considers principal 'default' land use scenarios and makes a series of assumptions with regards to building type (where applicable), identification of the critical human receptor group, exposure frequency and duration. The definitions of the principal land use types given in SR3 (EA, 2009) are:

- **Residential land use;**

A typical residential property consisting of a two story terraced house built on a ground-bearing slab of 0.15m thickness with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden. The critical receptor is a 0 - 6 year old female.

Active exposure pathway are: ingestion of outdoor soil, ingestion of indoor dust, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and indoor dust and vapour.

- **Allotments**

A plot of open space commonly made available by the Local Authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than one hectare. The tenants are assumed to be the parents or grandparents and that young children make occasional accompanied visits to the plots. The critical receptor is a 0 - 6 year old female and there is no building present on Site.

Active exposure pathways are ingestion of outdoor soil, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil; inhalation of outdoor vapour.

- **Commercial and industrial land use.**

A typical commercial or light industrial property consisting of a three-story office building (pre-1970) with a ground bearing floor slab at which employees spend most time indoors and are involved in office based or related light physical work. The critical receptor is a working female adult aged 16 - 65 years.

Active exposure pathway are ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and inhalation of indoor dust and vapour.

Soil Guideline Values

Based on the assumption of each land use type, the EA and DEFRA developed and published Soil Guideline Value (SGV) using the CLEA model for a number of principal contaminants and 'default' end-use scenarios of residential, allotments and commercial/industrial use. The primary purpose of the SGVs are as trigger value for the tolerable daily intake (TDI), below which it can be assumed that the soil does not pose an unacceptable risk to the identified receptor. Where soils contamination is present above this level further assessment may be required. SGVs were developed for the following contaminants:

- Heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury, nickel and selenium;
- Benzene, ethylbenzene, toluene and xylenes;
- Phenol;
- Dioxins and dioxin-like polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs) - 11 substances

LOM/CIEH Generic Assessment Criteria of Human Health Risk Assessment

In addition, in 2009 CIEH through LQM and EIC published generic assessment criteria (GACs) for 82 substances including metals, petroleum hydrocarbons, PAHs and explosive substances for a variety of soil types and the three 'default' land uses - (residential, allotments and commercial end-uses) as described in SR3 (EA, 2009). These have been superseded as described below.

Category 4 Screening Values

In 2013 "SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination" (CL:AIRE 2013) was issued which detailed findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived. This was supplemented in 2014 by "SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination - Policy Companion Document" (DEFRA, 2014). SP1010 proposed several updated toxicology information relating to contaminant behaviour updated assumptions relating to the modelling of human exposure to soil contaminants, derivation of separate C4SLs for residential with the consumption of home grown produce, residential without the consumption of home grown produce, and two new land uses: public open spaces near residential housing (POS resi) and public parks (POS park).

- **Public Open Space: Residential**

For public open space in close proximity to residential housing and the central green area around which houses are located, as on many housing estates from the 1930s to 1970s. It is also applicable for smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting. It is considered to be a generally grassed area up to 0.5ha with up to 50% bare soil. The land use is an important resource for children and the area is near the homes. The critical receptor is a female child age >3 - <9 years old (CLEA age class 4 - 9) as younger children are unlikely to play outdoors unsupervised.

Active exposure pathways are: ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor soil derived dust; inhalation of outdoor and indoor dust and inhalation of outdoor vapour.

- **Public Open Space: Park**

A public park is defined as an area of open space provided for recreational use and usually owned and maintained by the Local Authority. It is anticipated the park could be used for a wide range of activities, including the following:

- Family visits and picnics;
- Children's play area;
- Sporting activities such as football on an informal basis (i.e. no a dedicated sports pitch); and
- Dog walking.

The park is modelled as an area >0.5 ha of predominantly grasses open space with no more than 25% of exposed soil.

The critical receptor is a female child with CLEA age classes 1 - 6.

Active exposure pathway are: ingestion of outdoor soil; direct dermal contact with outdoor soil; inhalation of outdoor dust and inhalation of outdoor vapour.

Furthermore the C4SLs are based on a different toxicological benchmark, the 'low level of toxicological concern' (LLTC). This difference in approach was adopted because the C4SLs were primarily intended for use under Part2A of the EPA 1990 to quickly screen out Category 4 sites where there is "no risk or that the level of risk posed is low". SGVs and LQM GACs are

based on the more conservative 'minimal or tolerable level of risk' as defined in SR2 (EA, 2009) and were derived for assessment of contamination for the Planning process.

Lead

The SGV for lead was withdrawn in 2011 and is not used in this report. The C4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling than the withdrawn SGV and derived in line with current science of lead toxicology.

LQM/CIEH Suitable 4 Use Levels (S4ULs)

The publication of the C4SLs resulted in considerable and inconclusive debate about the applicability of the lower level of protection of the C4SL, which are underlain by the LLTC, outside of the Part 2A context for which they were derived. In 2014 LQM/CIEH presented a Suitable 4 Use Levels (S4ULs), which incorporate the updated assumption exposure derived for the production of the C4SLs but within the context of deriving screening criteria above which further assessment of the risks or remedial action may be needed. The S4ULs replace the 82 substances, species and fractions and congeners contained in the previous LQM/CIEH GACs issued in 2009. Additionally, following changes and new land uses proposed in the C4SL research project, S4ULs have also been derived for the majority of substances for which the EA derived SGVs in 2009.

The GAC values adopted in this report are summarised in Table 1, below.

Parameter	Residential <u>with</u> homegrown produce			Residential <u>without</u> homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise 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 (57)	4700(141)	6000 (336)	34	85	200	84000 (57)	97000 (141)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Acenaphthylene	170	420	920	2900 (86.1)	4600 (212)	6000 (506)	28	69	160	8300 (86.1)	97000 (212)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Anthracene	2400	5400	11000	31000 (1.17)	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000	LQM (2014)
Benzo(a)anthracene	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)fluoranthene	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)perylene	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	LQM (2014)
Benzo(k)fluoranthene	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)anthracene	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 (30.9)	3800 (76.5)	4500 (183)	27	67	160	63000 (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> homegrown produce			Residential <u>without</u> homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise 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 (76.4)	460 (183)	1100 (432)	4900	4900	4900	1200 (76.4)	1900 (183)	3000	LQM (2014)
Phenanthrene	95	220	440	1300 (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 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 (869)	1900	3900	22	51	120	56000 vap (869)	110000 vap (1920)	180000 vap (4360)	56000	56000	56000	87000 vap (869)	95000 vap (1920)	100000 vap (4360)	LQM (2014)
Ethylbenzene	47	110	260	83	190	440	16	39	91	5700 vap (518)	13000 vap (1220)	27000 vap (2840)	24000	24000	25000	17000 vap (518)	22000 vap (1220)	27000 vap (2840)	LQM (2014)
Xylene - o	60	140	330	88	210	480	28	67	160	6600 (478)	15000 (1120)	33000 (2620)	41000	42000	43000	17000 (478)	24000 (1120)	33000 (2620)	LQM (2014)
Xylene - m	59	140	320	82	190	450	31	74	170	6200 (625)	14000 (1470)	31000 (3460)	41000	42000	43000	17000 (625)	24000 (1470)	32000 (3460)	LQM (2014)
Xylene - p	56	130	310	79	180	430	29	69	160	5900 (576)	14000 (1350)	30000 (3170)	41000	42000	43000	17000 (576)	23000 (1350)	31000 (3170)	LQM (2014)
Aliphatic EC 5-6	42	78	160	42	78	160	730	1700	3900	3200 (304)	5900 (558)	12000 (1150)	570000 (304)	590000	600000	95000 (304)	130000 (558)	180000 (1150)	LQM (2014)
Aliphatic EC >6-8	100	230	530	100	230	530	2300	5600	13000	7800 (144)	17000 (322)	40000 (736)	600000	610000	620000	150000 (144)	220000 (322)	320000 (736)	LQM (2014)

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

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	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise 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)

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	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise 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 (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 (0.35)	23000 (0.39)	24000 (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 (0.003)	280 (0.007)	410 (0.016)	1.2	2.9	6.8	5600 (0.003)	7400 (0.007)	8400 (0.016)	1200	1200	1200	2400	2400	2500	LQM (2014)
alpha- Hexachlorocyclohe 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- hexachlorocyclohe 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- hexachlorocyclohe 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 (675)	2000 (1520)	2900	LQM (2014)
1,2- Dichlorobenzene	23	55	130	24	57	130	94	230	540	2000 (571)	4800 (1370)	11000 (3240)	90000	95000	98000	24000 (571)	36000 (1370)	51000 (3240)	LQM (2014)
1,3- 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)

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	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise 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 (224)	10000 (540)	25000 (1280)	17000	17000	17000	36000 (224)	36000 (540)	36000 (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 (134)	1100 (330)	1600 (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 (318)	2600 (786)	4000 (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 (36.7)	580 (90.8)	860 (217)	LQM (2014)
1,2,3,4-Tetrachlorobenzene	15	36	78	24	56	120	4.4	11	26	1700 (122)	3080 (304)	4400 (728)	830	830	830	1500 (122)	1600	1600	LQM (2014)
1,2,3,5-Tetrachlorobenzene	0.66	1.6	3.7	0.75	1.9	4.3	0.38	0.9	2.2	49 (39.4)	120 (98.1)	240 (235)	78	79	79	110 (39)	120	130	LQM (2014)
1,2,4,5-Tetrachlorobenzene	0.33	0.77	1.6	0.73	1.7	3.5	0.06	0.16	0.37	42 (19.7)	72 (49.1)	96	13	13	13	25	26	26	LQM (2014)
Pentachlorobenzene	5.8	12	22	19	30	38	1.2	3.1	7	640 (43)	770 (107)	830	100	100	100	190	190	190	LQM (2014)
Hexachlorobenzene	1.8 (0.2)	3.3 (0.5)	4.9	4.1 (0.2)	5.7 (0.5)	6.7 (1.2)	0.47	1.1	2.5	110 (0.2)	120	120	16	16	16	30	30	30	LQM (2014)
Phenol	280	550	1100	750	1300	2300	66	140	280	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	LQM (2014)

Parameter	Residential <u>with</u> homegrown produce (mg/kg, unless otherwise stated)			Residential <u>without</u> homegrown produce (mg/kg, unless otherwise stated)			Allotment (mg/kg, unless otherwise stated)			Commercial / Industrial (mg/kg, unless otherwise stated)			Public Open Space near Residential (mg/kg, unless otherwise stated)			Public Open Space - Park (mg/kg, unless otherwise stated)			Source
	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
SOM																			
Chlorophenols (excluding pentachlorophenol)	0.87 (g)	2	4.5	94	150	210	0.13 (g)	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100	LQM (2014)
Pentachlorophenol	0.22	0.52	1.2	27 (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)
Hexachlorobutadiene	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 5

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
High likelihood (Hi)	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) <i>Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden.</i></p> <p>B) <i>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</i></p>
Likely (Li)	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) <i>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.</i></p> <p>B) <i>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.</i></p>
Low likelihood (Lw)	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) <i>Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space.</i></p> <p>B) <i>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.</i></p>
Unlikely (UI)	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) <i>Elevated concentrations of toxic contaminants are present below hardstanding.</i></p> <p>B) <i>Light industrial unit <10 yrs old containing a double skinned UST with annual integrity testing results available.</i></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
Severe (Sv)	<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>
Medium (Md)	<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>
Mild (MI)	<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>
Minor (Mr)	<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

Very high risk (VH)	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.
High risk (H)	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.
Moderate risk (M)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (L)	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.
Very low risk (VL)	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.