



Tier 2 Contamination Investigation and Assessment

Advantage House, 87 Castle Street, Reading

25241-XPL-501 Rev. A
February 2026

Revision History

Rev.	Date	Purpose	Prepared	Checked	Approved
-	24.02.26	-	M Henderson MSc DIC BSc(Hons) FGS CGeol	M King MSci	M Henderson MSc DIC BSc(Hons) FGS CGeol
-	26.02.26	Data correction	M Henderson MSc DIC BSc(Hons) FGS CGeol	-	M Henderson MSc DIC BSc(Hons) FGS CGeol

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Executive Summary

Aspect	Summary
Introduction	This Tier 2 Contamination Investigation and Assessment report has been prepared for the client, The Lightbox (Reading) Ltd. The report is for a residential development, entailing the conversion of an existing commercial building.
Site description	The site comprised a 4-storey commercial building with outdoor parking. The site occupied a level platform below the level of Coley Place on the western boundary and above the level of the A329 slip road on the eastern boundary. An electricity substation, small aboveground fuel storage tank and emergency generator were on the western boundary.
Published geology and hydrogeology	Lambeth Group (silt and sand) is overlying the Seaford Chalk Formation. The Lambeth Group is a Secondary A aquifer and the Chalk is a Principal aquifer. The site is not within a groundwater Source Protection Zone (SPZ).
Hydrology	Holy Brook is 100m to the east and topographically downgradient of the site. The intervening A329 box cutting and local drainage network breaks any plausible connection with the watercourse.
Ground conditions	A surface layer of made ground (0.38->3.2m thick) and Lambeth Group soils (0.68-3.32m thick) were resting on chalk at depths of 2.92-3.7m. Groundwater was not proved within the depth of investigation (>5.0m).
Soil contamination	Concentrations of arsenic exceeded screening levels for residential development (without home produce) in made ground in boreholes, except DS1 on the western boundary and DS5 on the northern boundary. Asbestos was also present in made ground.
Ground gas and organic vapour	The site is CIRIA CS1 for ground gas and organic vapour screening levels were not exceeded. Protection measures are not required.
Risk estimation	Risks to human health are Low, provided the existing cover of building and macadam pavement remain intact. Risks to controlled waters (groundwater and surface water) are Very Low to Low.
Recommendations	If any part of the existing macadam pavement is removed and replaced with new planting then a clean cover layer will be required. For shared amenity, 450mm is often sufficient but with the presence of asbestos in the made ground consideration should be given to increasing this to 600mm and a woven geotextile separation layer introduced. Asbestos fibre concentrations in soil ranged between <0.001% and 0.019%. Consequently, protection measures are needed during excavation or groundworks in the near surface made ground across the existing car park area: - A Plan of Work should be prepared by the groundworks contractor satisfying the Control of Asbestos Regulations 2012 (CAR2012). - Excavation and groundworks should be non-licensed work and may proceed with EN149 type FFP3 disposable face masks with localised dust suppression and basic personal decontamination facilities.

1 Introduction

1.1 General

This Tier 2 contamination investigation and assessment report has been prepared by Xplor Environmental Ltd (Xplor) for the client, The Lightbox (Reading) Ltd.

1.2 Scope of Work

The terms of reference for the work were set out in the Xplor fee proposal reference 25241-XPL-101 revision A dated 16 December 2025 and was for a Tier 2 contamination investigation and assessment.

1.3 Technical Approach

The report has been prepared using data from a ground investigation, involving sampling from boreholes, laboratory testing and monitoring visits.

The process of assessment satisfies the Environment Agency guidance, Land Contamination Risk Management (LCRM, 2023) for a Tier 2 contamination risk assessment. A competent person has been involved in the preparation and checking of the report.

1.4 Future Development

The assessment is based on a residential development, entailing the conversion of an existing commercial building.

2 Site Information and Setting

2.1 Site Location

The site is located at Advantage House, 87 Castle Street, Reading, RG1 7SN.

The National Grid Reference for the site is 471110 173016. A location plan is presented as Figure 1.

2.2 Site Description

The site comprised a 4-storey vacant commercial building with outdoor parking. The site occupied a level platform below the level of Coley Place on the western boundary but above the level of the A329 slip road on the eastern boundary. Level changes were accommodated by retaining walls on the east, south and west boundaries.

An electricity substation, small aboveground fuel storage tank and emergency generator were on the western boundary.

2.3 Surrounding Land Use

The site is in an urban setting with the surrounding land uses as follows:

- North: A4155 Castle Street.
- East: A329 dual carriageway and slip road in a 40m wide box cutting.
- South: Cheriton Court apartments and terraced housing in Coley Place.
- West: Coley Place, flats and parking.

2.4 Geology

British Geological Survey (BGS) mapping at 1:10,000 scale indicates the site is directly underlain by a bedrock of Lambeth Group (silt and sand). The Seaford Chalk Formation outcrops in the adjacent A329 box cutting, which could indicate the Lambeth Group may be relatively thin at this location.

2.5 Hydrogeology

The Lambeth Group is a Secondary A aquifer and the underlying Chalk is a Principal aquifer. The site is not within a groundwater Source Protection Zone (SPZ).

The nearest active groundwater abstraction is 456m to the north and is for a commercial potable supply.

2.6 Hydrology

Holy Brook is 100m to the east and topographically downgradient of the site. The intervening A329 box cutting and surrounding local highway drainage network breaks any plausible connection between the site and watercourse.

There are no active surface water abstractions within 2km of the site.

2.7 Previous Reports

Xplor prepared a Tier 1 contamination assessment in June 2024 (document reference 24035-XPL-501 revision C02), based on a desk study and site walkover. The relevant findings of the report are summarised as follows:

- The present building was constructed in the 1980s. Prior to this it was developed with various commercial uses including garages for car and commercial vehicle sales, servicing and repairs.
- Sources of potential contamination were identified from the desk study and included:
 - Made ground from previous phases of construction and demolition.
 - Historic uses across the whole site including car and commercial vehicle garages, coal and coke factors, haulier, printers and photographers.
 - Historic aboveground storage tank (AST), possibly predating the existing generator and AST on the western boundary.
 - Existing fuel AST and emergency generator on the western boundary.
 - Existing electricity substation on the western boundary.
- There were considered to be potentially complete source-pathway-receptor linkages at the site and further investigation was recommended.

3 Ground Investigation

3.1 Site Work

Site work was carried out on 28 January 2026 and was as described in table 3.1.

Table 3.1 Summary of Exploratory Holes

Type	Location	Depth
Dynamic sampler boreholes	DS1 to DS5	0.72 – 5.0m

The exploratory hole logs are presented in Appendix A and their locations are shown on Figure 2.

3.2 Investigation Rationale

The investigation targeted the sources of potential contamination and development layout as described in table 3.2.

Table 3.2 Investigation Rationale

Location	Target
DS1	Downgradient of emergency generator, fuel tank and substation. Historical fuel tank at same location. Monitoring well installed.
DS2	Historical garage (1957-1971).
DS3	Historical garage (1957-1962). Monitoring well installed.
DS4	Historical garage (1957-1971). Downgradient of DS1 and monitoring well installed.
DS5	Historical garage (1957-1971).

3.3 Sampling

Soil samples were recovered from the exploratory holes and stored/transported in containers appropriate for the laboratory testing undertaken.

Sample depths are recorded on the exploratory hole logs.

3.4 Chemical Laboratory Analysis

Table 3.3 lists the chemical laboratory testing carried out. Chemical analysis was undertaken by UKAS-accredited i2 Analytical Ltd and the test results are provided in Appendix B.

Table 3.3 Chemical Analysis

<i>Test</i>	<i>Soil</i>
Xplor brownfield suite: metals, speciated polycyclic aromatic hydrocarbons, aliphatic/aromatic hydrocarbons, MTBE, BTEX, total/free cyanide and total phenols	5
TPHCWG, BTEX and MTBE (in addition to the above)	2
Volatile organic compounds (VOCs)	1
Polychlorinated biphenyls (PCBs)	1
Asbestos screening/identification	5
Asbestos quantification	4

3.5 Ground Gas Monitoring

Three return visits were made to site to record ground gases, organic vapour and water level in the installations in WS1, WS3 and WS4.

The results of monitoring are presented in Appendix C.

4 Ground and Groundwater Conditions

4.1 Ground Conditions

The following general strata sequence was encountered in the exploratory holes.

Table 4.1 Strata Sequence

Stratum	Depth, m		Thickness, m
	Top	Base	
Made ground/surfacing	0.0	0.38 - >3.2	0.38 - >3.2
Lambeth Group	0.38 - 0.75	1.4 – 3.7	0.68 – 3.32
Chalk	1.4 – 3.7	>5.0	>2.5

Features, structures or certain ground conditions may be present between exploratory hole locations, which are different to those encountered during the investigation.

4.1.1 Made Ground/Surfacing

Across the car park area, a surface layer of macadam, 40-50mm thick, was overlying made ground soils in all boreholes.

The made ground soils were typically of crushed materials, predominantly of slightly clayey or silty, sand, gravel and cobbles of brick, concrete, limestone, flint and occasionally chalk.

DS1 commenced with a 0.12m thick layer of coarse sandy clay before passing down into the aforementioned materials.

Made ground was thickest (>3.2m) in DS2 on the southern boundary, where there was historically a commercial garage building. A possible concrete slab was in the sidewall of DS2 between 0.1m and 0.5m below ground level (i.e. 400mm thick).

DS2 and DS3 were terminated made ground due to obstructions.

4.1.2 Lambeth Group

Beneath the made ground in DS1, DS4 and DS5 were variable layers of clay, silt and sand with fine to medium gravel of flint or chalk.

4.1.3 Chalk

Chalk was proved in DS1, DS4 and DS5 at depths below 1.4-3.7m. It was a creamish white and white, structureless chalk clay or silt with some flint gravel (possibly reworked).

4.2 Groundwater Conditions

Groundwater was not present in the boreholes, either during the drilling or monitoring works.

4.3 Evidence of Potential Contamination

Apart from the presence of made ground, there was no other visible or olfactory evidence of contamination in any of the boreholes.

5 Assessment of Soil Chemical Data

This section presents a human health generic risk assessment to identify potential sources of soil contamination requiring further evaluation. The assessment involved a comparison of chemical laboratory test results to screening levels that were appropriate to the site and its future use.

5.1 Selection of Assessment Criteria

The soil screening values used in this assessment are the Suitable for Use Levels (S4ULs) published in 2015 by Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH). Category 4 Screening Levels (C4SL) have been used for lead, naphthalene and inorganic mercury. A full list of screening levels used is presented in Appendix D.

The future development will be residential with shared amenity for which the assessment criteria will be residential without home produce (RwoHP).

Screening levels are conservative and assume a soil organic matter (SOM) content of 1%.

5.2 Generic Screening for Human Health

Table 5.1 provides a summary of contaminant concentrations and their comparison to the adopted soil screening levels.

Table 5.1 Summary of Soil Contaminant Test Results

Contaminant	Unit	Screening level	Concentration range	Exceedances
Total cyanide	mg/kg	20	<1	-
Free cyanide	mg/kg	50	<1	-
Total phenols	mg/kg	440	<1	-
Arsenic	mg/kg	40	16 – 290	62 (DS2, 0.4m) 290 (DS3, 0.4m) 43 (DS4, 0.4m)
Cadmium	mg/kg	85	<0.2 – 1.7	-
Chromium	mg/kg	910	14 – 20	-
Copper	mg/kg	7100	10 – 23	-
Lead	mg/kg	310	14 – 240	-
Mercury	mg/kg	300	<0.3	-
Nickel	mg/kg	180	13 – 20	-
Selenium	mg/kg	430	<1	-
Zinc	mg/kg	40000	54 – 790	-
Naphthalene	mg/kg	15	<0.05 – 0.08	-
Acenaphthylene	mg/kg	2000	<0.05 – 0.09	-
Acenaphthene	mg/kg	3000	<0.05 – 0.79	-
Fluorene	mg/kg	2800	<0.05 – 0.33	-

Phenanthrene	mg/kg	1300	0.06 – 8.8	-
Anthracene	mg/kg	31000	<0.05 – 0.67	-
Fluoranthene	mg/kg	1500	0.06 – 5	-
Pyrene	mg/kg	3700	<0.05 – 3.5	-
Benzo[a]anthracene	mg/kg	11	<0.05 – 1.1	-
Chrysene	mg/kg	30	<0.05 – 1.1	-
Benzo[b]fluoranthene	mg/kg	3.9	<0.05 – 0.86	-
Benzo[k]fluoranthene	mg/kg	11	<0.05 – 0.3	-
Benzo[a]pyrene	mg/kg	3.2	<0.05 – 0.61	-
Indeno[1,2,3-c,d]pyrene	mg/kg	45	<0.05 – 0.36	-
Dibenz[a,h]anthracene	mg/kg	0.31	<0.05 – 0.09	-
Benzo[g,h,i]perylene	mg/kg	360	<0.05 – 0.4	-
TPH Aliphatic >EC5 - EC6	mg/kg	42	<0.01	-
TPH Aliphatic >EC6 - EC8	mg/kg	100	<0.01	-
TPH Aliphatic >EC8 - EC10	mg/kg	27	<0.01 – 0.057	-
TPH Aliphatic >EC10 - EC12	mg/kg	130	<1	-
TPH Aliphatic >EC12 - EC16	mg/kg	1100	<2 – 15	-
TPH Aliphatic >EC16 - EC21	mg/kg	65000	<8 – 29	-
TPH Aliphatic >EC21 - EC35	mg/kg	65000	<8 – 66	-
TPH Aromatic >EC5 - EC7	mg/kg	370	<0.01	-
TPH Aromatic >EC7 - EC8	mg/kg	860	<0.01	-
TPH Aromatic >EC8 - EC10	mg/kg	47	<0.01	-
TPH Aromatic >EC10 - EC12	mg/kg	250	<1	-
TPH Aromatic >EC12 - EC16	mg/kg	1800	<2 – 3.5	-
TPH Aliphatic >EC16 - EC21	mg/kg	1900	<10 – 11	-
TPH Aromatic >EC21 - EC35	mg/kg	1900	<10 – 33	-
MTBE	µg/kg	60	<5	-
Benzene	µg/kg	380	<5	-
Toluene	µg/kg	880000	<5	-
Ethylbenzene	µg/kg	83000	<5	-
p&m-Xylene	µg/kg	79000	<8	-
o-Xylene	µg/kg	88000	<5	-
VOCs	Measured concentrations of individual VOCs were below method detection limits			-

5.3 Asbestos

Asbestos fibres were reported in made ground samples at all locations, except DS5 on the northern boundary. Where asbestos was reported, the samples were submitted

for quantification by gravimetric analysis. A summary of the results is presented in Table 5.2.

Table 5.2 Summary of Asbestos Test Results

<i>Location</i>	<i>Depth (stratum)</i>	<i>Asbestos type detected</i>	<i>Condition</i>	<i>Quantification, %</i>
DS1	0.5m (made ground)	Chrysotile and crocidolite	Loose fibrous debris, asbestos cement	0.003
DS2	0.4m (made ground)	Chrysotile	Loose fibres	<0.001
DS3	0.4m (made ground)	Amosite and chrysotile	Sheeting/board debris, loose fibres	0.019
DS4	0.4m (made ground)	Chrysotile	Loose fibres	<0.001
DS5	0.4m (made ground)	Not detected	-	-

6 Assessment of Ground Gas and Organic Vapour

This section presents a generic risk assessment to identify potential sources of gas and organic vapour in the ground that could impact on human health (future residents).

6.1 Selection of Assessment Criteria

The potential for ground gas to impact on development has been assessed in line with British Standard BS8485:2015+A1:2019 and based on data from three monitoring wells and three visits.

Prior to assessment, the monitoring data was reviewed and was judged to be spatially comprehensive given the small size of site. The data was temporally limited however, on the basis that three sets of measurements were completed, which is less than the CIRIA guide of six visits. Two visits were during low atmospheric pressure (<1000mb).

6.2 Ground Gas Assessment

Due to the temporally limited data, Gas Screening Values (GSV) were calculated from the maximum gas concentrations multiplied by the maximum flow rate.

GSV from one monitoring visit are presented in Tables 6.1 and 6.2 together with the implied CIRIA Characteristic Situation (CS).

Table 6.1 Summary of Gas Monitoring (methane, CH₄)

Target	Maximum flow rate (l/h)	Maximum CH ₄ (%)	GSV CH ₄ (l/h)	Implied CS CH ₄
Made ground (DS1, DS3 and DS4)	0.1	<0.1	0.0001	CS1

Table 8.2 Summary of Gas Monitoring (carbon dioxide, CO₂)

Target	Maximum flow rate (l/h)	Maximum CO ₂ (%)	GSV CO ₂ (l/h)	Implied CS CO ₂
Made ground (DS1, DS3 and DS4)	0.1	1.3	0.0013	CS1

6.3 Vapour Intrusion Assessment

An assessment has been undertaken of the potential for indoor vapour intrusion from volatile organic compounds (VOCs) in soil. In the absence of published criteria, a set of vapour protection standards has been calculated using CLEA software version 1.071 and these are listed in Appendix E.

No volatile contaminants were above the vapour protection standards for residential land use.

During monitoring, levels of organic vapour were negligible (maximum 0.4ppm).

7 Contaminated Land Risk Assessment and Conceptual Site Model

7.1 Introduction

Risk assessment is a process by which the risks posed by hazards to receptors are estimated. In the context of this report, hazards relate to sources, or potential sources of contamination capable of causing harm (e.g. a contaminant concentration exceeding a screening level) and receptors are the entity that may be at risk of effects from the hazard and include human health, surface waters, groundwater, ecological systems, buildings and services. For a hazard to present a risk to a receptor they must be linked by an exposure pathway.

7.2 Conceptual Site Model

A conceptual site model (CSM) is presented based on an evaluation of the information and generic assessments described in the preceding chapters. The CSM describes the sources, pathways and receptors which form potentially significant pollutant linkages.

Table 7.1 Sources of Contamination Identified from Data Screening

Sources	Contaminant exceeding screening level
Made ground	Arsenic in DS2, DS3 and DS4
	Asbestos in DS1, DS2, DS3 and DS4

Table 7.2 Potential Exposure Pathways

Pathways	Description
Direct contact with soil or groundwater (dermal, ingestion or dust/fibre inhalation) – operational phase	Development will be residential apartments with limited amenity space. No private gardens are proposed.
Direct contact with soil or groundwater (dermal, ingestion or dust/fibre inhalation) – construction phase	Minor groundworks will be required for the construction of a new cycle store following the removal a generator, fuel tank and redundant cables.
Leaching from soil down to groundwater	The existing building and external hard surfacing will be retained. Consequently, there will be no areas of increased infiltration.
Migration in groundwater	Near surface soils are of relatively permeable deposits of granular made ground, Lambeth Group soils and chalk.
Migration in surface runoff	The existing drainage scheme on site will be retained.
Migration of ground gas and organic vapour	Near surface soils are of relatively permeable deposits of granular made ground, Lambeth Group soils and

<i>Pathways</i>	<i>Description</i>
	chalk.
Contact with new infrastructure and construction	No new construction is proposed.

Table 7.3 Potential Contamination Receptors

<i>Receptors</i>	<i>Description</i>
Future site users	Future residents could be exposed to contaminated soils outdoors (amenity spaces) and ground gas/vapour indoors.
Neighbouring property	Residential properties are to the south (Cheriton Court) and west (Coley Place and Castle Street/Castle Hill).
Construction and maintenance workers	Minor groundworks will be required for the construction of a new cycle store following the removal a generator, fuel tank and redundant cables.
Surface water	Holy Brook is 100m to the east and topographically downgradient of the site.
Groundwater	Groundwater was not encountered within with the depth of investigation (>5.0m) but is expected to be at greater depth in the chalk.

7.3 Risk Estimation

Based on the sources, pathways and receptors identified above, Table 7.4 summarises all potentially complete contaminant linkages and identifies the level of risk from each.

In accordance with the adopted methodology, the estimation of risk reflects both the probability of an event occurring (likelihood) and the potential consequence (magnitude) of possible effects. Risk definitions are provided in Appendix F.

A very low or low overall risk implies remediation is unlikely to be required for development or will be limited. A moderate to high overall risk indicates remediation could be required.

Table 7.4 Risk Estimation

Sources	Pathway	Receptor	Probability	Justification	Magnitude	Justification	Overall risk
On site Made ground (all boreholes except DS5 on northern boundary) <u>Contaminants</u> Arsenic and asbestos (amosite, crocidolite and chrysotile) in soil	Direct contact with soil (dermal, ingestion or dust/fibre inhalation)	Future site users (residential)	Low	Development will be residential apartments with external areas capped with macadam pavement. Limited amenity space and no private gardens are proposed.	Medium	Arsenic exceeds assessment criteria. Asbestos containing material or loose fibres present in soil (percentage by weight <0.001-0.019%).	LOW
		Construction and maintenance workers	Likely	Minor groundworks will be required for the construction of a new cycle store following the removal a generator, fuel tank and redundant cables. Underground services are outside the application area and enter the building directly from Castle Street.	Mild	As above. Short term exposure during construction phase.	LOW
		Neighbouring property (residential)	Low	Existing site cover of building and macadam pavement will eliminate soil contaminants in windblow and runoff.	Mild	As above. Short term exposure during construction phase.	LOW
	Soil leaching down to groundwater	Groundwater (Chalk)	Low	The existing building, macadam pavement and drainage systems will be retained. Consequently, there will be no areas of increased infiltration.	Mild	Leachable or mobile contaminants unlikely to exceed assessment criteria.	LOW
	Migration in shallow groundwater		Unlikely	In boreholes, the unsaturated zone was >5m and near surface chalk was a structureless (low permeability) clay.	Mild	Leachable or mobile contaminants unlikely to exceed assessment criteria.	VERY LOW
	Migration in deep groundwater		Likely	Groundwater will be in the more permeable, fissured chalk at depth.	Mild	Leachable or mobile contaminants unlikely to exceed assessment criteria.	LOW
	Surface runoff	Holy Brook 100m east	Unlikely	Migration pathway is interrupted by the A329 box cutting and local highway drainage network.	Mild	Leachable or mobile contaminants unlikely to exceed assessment criteria.	VERY LOW
	Migration in groundwater						

<i>Sources</i>	<i>Pathway</i>	<i>Receptor</i>	<i>Probability</i>	<i>Justification</i>	<i>Magnitude</i>	<i>Justification</i>	<i>Overall risk</i>
	Migration in soil (organic vapour)	Future site users (residential)	Likely	In boreholes, the near surface made ground and Lambeth Group soils were permeable, granular deposits.	Minor	Hydrocarbons and VOCs did not exceed assessment criteria and organic vapour levels in monitoring wells were very low.	LOW
	Migration in soil (ground gas)	Future site users (residential)	Likely	In boreholes, the near surface made ground and Lambeth Group soils were permeable, granular deposits.	Minor	Ground gas regime is CIRIA CS1.	LOW

8 Remediation and Risk Management

This section provides outline guidance on reducing contamination risks for the construction and operational phases of development.

8.1 Human Health Protection for Development

8.1.1 Soil Contamination

There were concentrations of arsenic that exceeded screening levels for residential development (without home produce) in made ground in boreholes except DS1 on the western boundary and DS5 on the northern boundary. Asbestos was also present.

Provided the existing macadam pavement is retained (or replaced with an equivalent hard surface) then risks from soil contamination are Low and remediation is not required.

However, should new planted areas be introduced then a clean cover layer will be required. For communal amenity, 450mm is often sufficient but with the presence of asbestos in the made ground consideration should be given to increasing this to 600mm and the introduction a woven geotextile separation layer. This will necessitate excavation and disposal of some made ground unless raised planters can be used.

8.1.2 Ground Gas Contamination

The site is CIRIA CS1 and organic vapour screening levels were not exceeded, for which protection measures are not required.

8.2 Human Health Protection for Construction

8.2.1 Asbestos

The measured asbestos fibre concentrations in soil ranged between <0.001% and 0.019%. Consequently, the following measures should apply:

- A Plan of Work should be prepared by the groundworks contractor satisfying the Control of Asbestos Regulations 2012 (CAR2012).
- Any excavation/groundworks should be non-licensed work and may proceed with EN149 type FFP3 disposable face masks with localised dust suppression and basic personal decontamination facilities.

8.2.2 Standard Protection Measures

Construction and ground workers should adopt appropriate personal hygiene precautions in relation to potential contamination (even if not identified by the investigation). Personal protective equipment should be worn as required (e.g. gloves and safety glasses) and welfare facilities provided.

These precautions are industry standard and further guidance is in the HSE document HSG150 Health and Safety in Construction (2006).

8.3 Remediation Strategy

Based on the findings of this report, contamination requiring further remediation has not been identified. Consequently, any planning condition requiring the submission of a remediation strategy should fall away.

8.4 Soil Disposal

Waste soils that are to be disposed off-site should be classified in accordance with WM3 Guidance on the classification and assessment of waste (1st edition, version 1.2.GB 2021). The receiving landfill or soil treatment facility should be provided with a copy of the laboratory test results, including the results of any waste acceptance criteria (WAC) testing to confirm they can accept the waste.

9 Conclusions

The investigation encountered a surface layer of made ground (0.38->3.2m thick). These were underlain by Lambeth Group soils (0.68-3.32m thick), resting on chalk at depths of 2.92-3.7m.

Groundwater was not proved within the depth of investigation, which went to 5.0m below ground level.

The investigation found that concentrations of arsenic exceeded screening levels for residential development (without home produce) in made ground in in boreholes except DS1 on the western boundary and DS5 on the northern boundary. Asbestos fibres were present in the same samples.

Provided the existing macadam pavement is retained (or replaced with an equivalent hard surface) then risks from soil contamination are Low and remediation is not required. There is then no requirement for the submission of a remediation strategy document.

The site is CIRIA CS1 for ground gas and organic vapour screening levels were not exceeded, for which protection measures are not required.

The measured asbestos fibre concentrations in soil ranged between <0.001% and 0.019%. Certain protection measures will be necessary for excavation and groundworks during development and these are detailed in the report and summarised in the Recommendations, section 10.

There was no evidence of a contaminant release from the back-up generator, fuel tank or substation on the western boundary.

10 Recommendations

If any part of the existing macadam pavement is removed and replaced with new planted areas then a clean cover layer will be required. For shared amenity, 450mm is often sufficient but with the presence of asbestos in the made ground consideration should be given to increasing this to 600mm and the introduction a woven geotextile separation layer. This will necessitate excavation and disposal of some made ground unless raised planters are used.

The measured asbestos fibre concentrations in soil ranged between <0.001% and 0.019%. Consequently, the following measures should apply during excavation or groundworks in the near surface layer of made ground across the existing car park area:

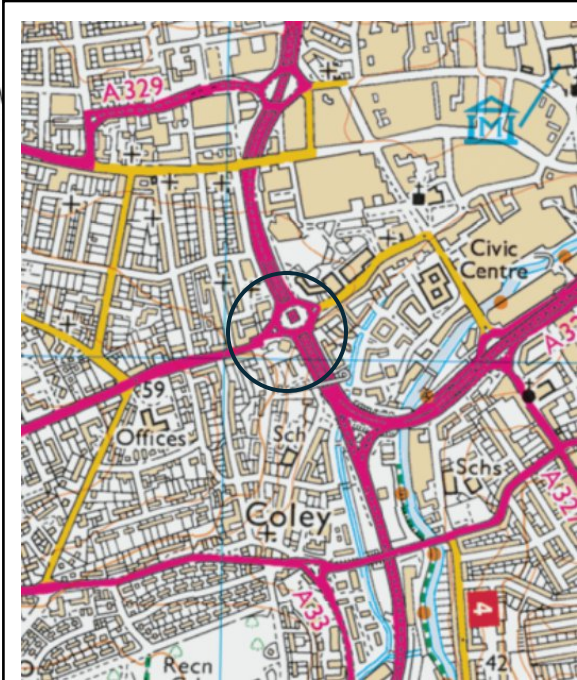
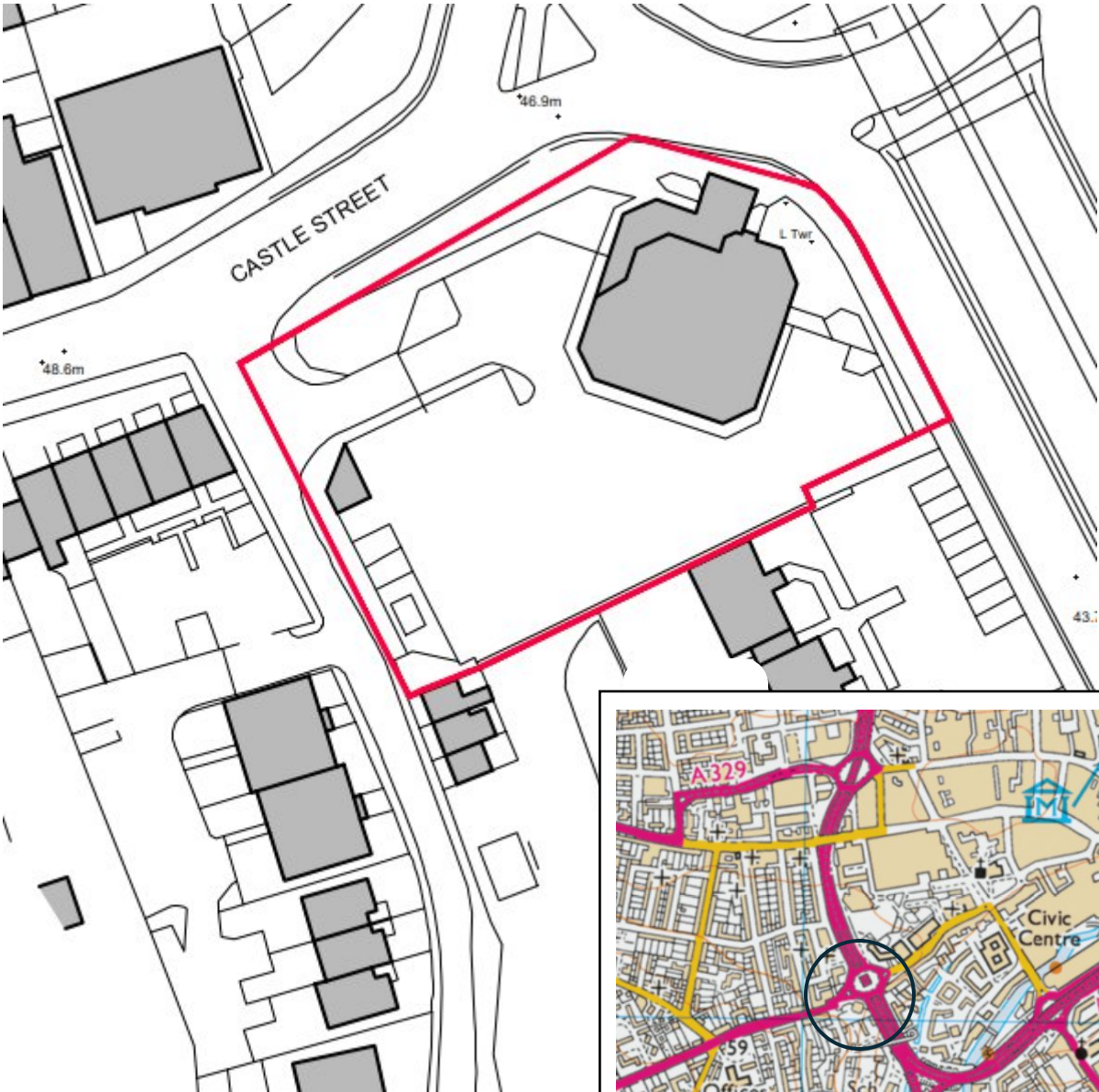
- A Plan of Work should be prepared by the groundworks contractor satisfying the Control of Asbestos Regulations 2012 (CAR2012).
- Excavation and groundworks should be non-licensed work and may proceed with EN149 type FFP3 disposable face masks with localised dust suppression and basic personal decontamination facilities.

If, during construction works, previously unknown contamination is found or suspected on site then a scheme of investigation and appropriate course of action should be agreed with the LPA.

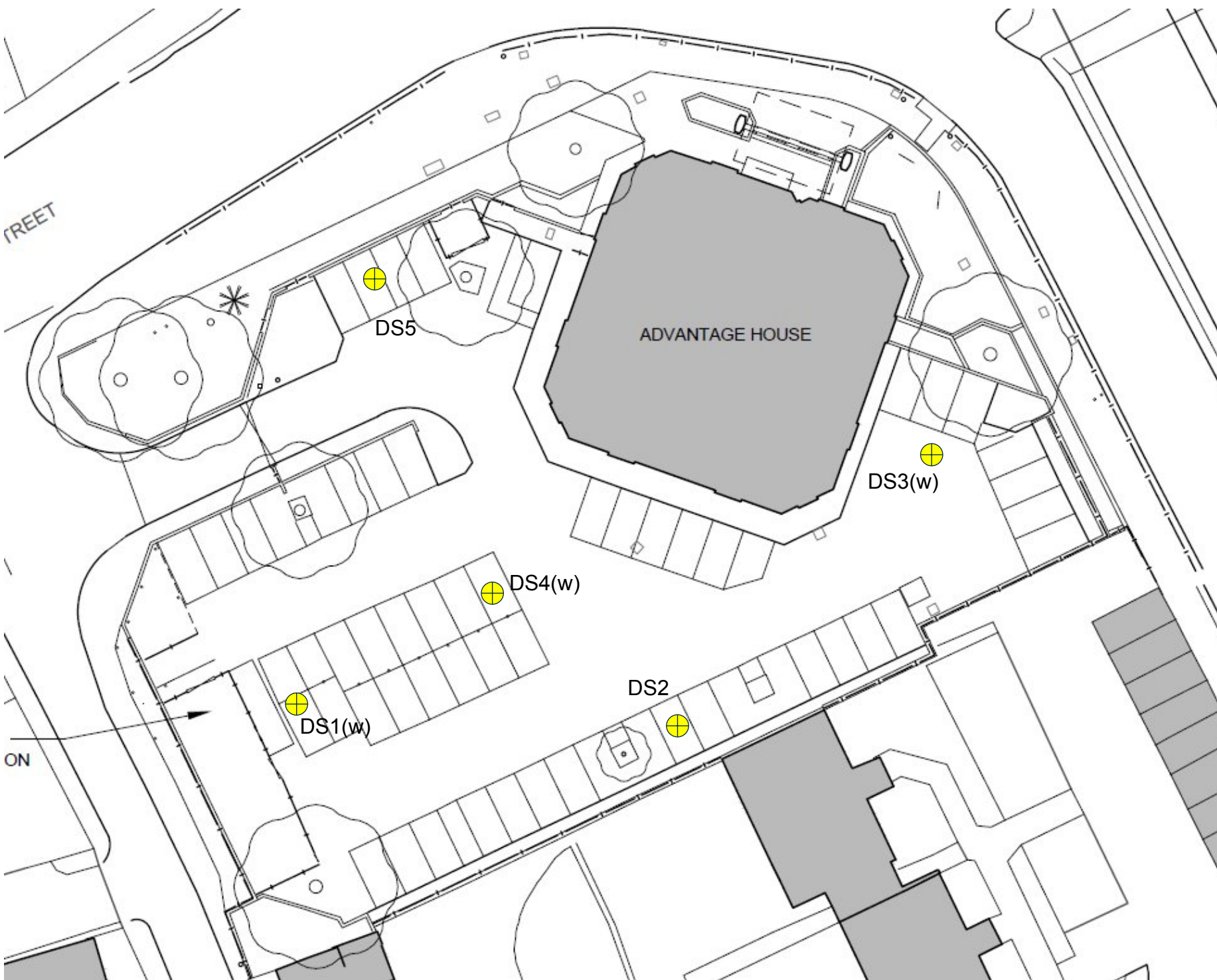
Figures

Figure 1 – Site Location Plan

Figure 2 – Exploratory Hole Location Plan



	CLIENT	PROJECT	TITLE	SCALE: NTS	JOB NR.: 25241	DATE: 23.02.26
	LIGHTBOX (READING) LTD	ADVANTAGE HOUSE, CASTLE STREET, READING	SITE LOCATION	PREPARED BY: MH	REVISION: C01	DRAWING NR. FIGURE 1



LEGEND

-  DYNAMIC SAMPLER BOREHOLE LOCATION
- (w) MONITORING INSTALLATION



CLIENT
LIGHTBOX (READING)
LTD

PROJECT
ADVANTAGE HOUSE, CASTLE
STREET, READING

TITLE
EXPLORATORY HOLE
LOCATION PLAN

SCALE: NTS
PREPARED BY:
MH

JOB NR.: 25241
REVISION: -

DATE: 23.02.26
DRAWING NR.
FIGURE 2



Appendix A – Exploratory Hole Logs



Dynamic Sampler

DS1
Sheet 1 of 1

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241	Start Date 2026-01-28	End Date	

Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd
----------------------------------	---------------------------------------	------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.50	ES			(0.04) 0.04 (0.08) 0.12		MACADAM
								Light brown, coarse sandy clay. [MADE GROUND]
						(0.37)		Light greyish brown, slightly clayey, slightly coarse sandy, gravel and cobbles. Gravel and cobbles were angular to subangular limestone. [MADE GROUND]
						0.49		Brown, clayey coarse sand and fine to coarse gravel. Gravel was subangular to subrounded limestone and brick. [MADE GROUND]
						(0.26)		Brown, very fine sandy CLAY with occasional medium to coarse gravel. Gravel was subrounded to rounded flint.
		0.80	ES			0.75		Brown, very fine sandy CLAY with occasional medium to coarse gravel. Gravel was subrounded to rounded flint.
						(0.55)		
						1.30		Orangish and yellowish brown, fine to medium SAND.
						(0.60)		
						1.90 (0.10) 2.00		Orange, fine sandy CLAY with light grey silt laminae and black specks.
		4.90	ES					Light grey SILT
						(0.92)		Band of orangish brown, medium sand. (2.55 - 2.57m)
						2.92		Creamish white and white, structureless CHALK.
						(2.08)		
End of Borehole at 5.00m								

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m DS	Logger M Henderson
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Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd		Contractor Borehole Surveys Ltd	



Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m DS	Logger M Henderson
---------	--	-----------------------



Dynamic Sampler

DS1
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
DS				1:25
Project Name	Project No.		Start Date	End Date
ADVANTAGE HOUSE, READING	25241		2026-01-28	
Client	Consultant	Contractor		
LIGHTBOX (READING) LTD	Xplor Environmental Ltd	Borehole Surveys Ltd		



Remarks	Method, Plant, Stability, Dimensions	Logger
	0.00 - 5.00m DS	M Henderson

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd		Contractor Borehole Surveys Ltd	



Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m DS	Logger M Henderson
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Dynamic Sampler

DS2
Sheet 1 of 1

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241	Start Date 2026-01-28	End Date	

Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd
----------------------------------	---------------------------------------	------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.40	ES			(0.05) 0.05		MACADAM Light brown, slightly silty, fine to medium sand with fine to coarse gravel and cobbles. Gravel and cobbles were angular to subangular brick and concrete. [MADE GROUND] <i>Concrete in south face of hand pit (possible slab). (0.10 - 0.55m)</i>	0.5
						(3.15)			1.0
									1.5
									2.0
									2.5
									3.0
						3.20		<i>End of Borehole at 3.20m</i>	3.5
									4.0
									4.5
									5.0

Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 3.20m DS	Logger M Henderson
---	---	-----------------------



Dynamic Sampler

DS2
PHOTO PAGE

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd		Contractor Borehole Surveys Ltd	



Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 3.20m DS	Logger M Henderson
---	---	-----------------------

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd		Contractor Borehole Surveys Ltd	



Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 3.20m DS	Logger M Henderson
---	---	-----------------------



Dynamic Sampler

DS3
Sheet 1 of 1

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date

Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd
----------------------------------	---------------------------------------	------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.40	ES			(0.05) 0.05		MACADAM	
						(0.67)		Light orangish brown, slightly silty, medium to coarse sand with fine to coarse gravel and cobbles. Gravel and cobbles were angular to subangular, brick, concrete and limestone. [MADE GROUND]	
						0.72			
End of Borehole at 0.72m									



Dynamic Sampler

DS4
Sheet 1 of 1

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date

Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd
----------------------------------	---------------------------------------	------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata			
		Depth (m)	Type/ Ref	Results			Legend	Description		
		0.40	ES			(0.05) 0.05		MACADAM	0.5	
						(0.31)		Sand, gravel and cobbles of brick and concrete. [MADE GROUND]		
						0.36		Brown, clayey, medium sand and fine to medium gravel. Gravel was angular to subangular, brick and flint. [MADE GROUND]		
						(0.36)				
		0.80	ES			0.72		Light brown, clayey SILT with occasional medium gravel. Gravel was subangular to subrounded flint.	1.0	
						(0.40)				
						1.12		Light brown, medium sand with occasional fine to medium gravel. Gravel was subrounded flint.		
						(0.28)				
						1.40		Cream, structureless CHALK with fine to medium gravel. Gravel was subangular to subrounded chalk. Occasional pockets of light, orangish brown, medium sand.	1.5	
								Slightly fractured. (2.30 - 2.80m)		
						(2.50)				
						3.90				
								End of Borehole at 3.90m	4.0	
									4.5	
									5.0	

Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 3.90m DS	Logger M Henderson
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Dynamic Sampler

DS4
PHOTO PAGE

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd		



Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 3.90m DS	Logger M Henderson
---	---	-----------------------



Dynamic Sampler

DS5
Sheet 1 of 1

Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date

Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd	Contractor Borehole Surveys Ltd
----------------------------------	---------------------------------------	------------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.40	ES			(0.05) 0.05		MACADAM	
						(0.33)		Brown clayey fine sand and gravel. Gravel was fine to coarse, angular to subrounded limestone and chalk. Cobbles of limestone. [MADE GROUND]	
						0.38		Dark brown, slightly clayey, silty, fine SAND with occasional fine gravel. Gravel was subangular chalk.	
						(1.02)			
						1.40		Orangish brown, silty, fine SAND.	
						(0.46)			
						1.86		Brown, slightly clayey, very silty, fine SAND.	
						(1.84)			
						3.70		Creamish white, structureless CHALK with some angular flint gravel.	
						(1.30)		No recovery (4.00 - 4.70m)	
						5.00		End of Borehole at 5.00m	

Remarks Terminated due to obstruction.	Method, Plant, Stability, Dimensions 0.00 - 5.00m DS	Logger M Henderson
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Hole Type DS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name ADVANTAGE HOUSE, READING	Project No. 25241		Start Date 2026-01-28	End Date
Client LIGHTBOX (READING) LTD	Consultant Xplor Environmental Ltd		Contractor Borehole Surveys Ltd	



Remarks
Terminated due to obstruction.

Method, Plant, Stability, Dimensions
0.00 - 5.00m DS

Logger
M Henderson

Appendix B – Chemical Laboratory Test Results

Xplor Environmental
34 Church Lane
Girton
Cambridge
CB3 0JP

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

t:
e: markh@xploreenvironmental.co.uk

t: 01923 225404
f: 01923 237404
e: info-i2analytical@normecgroup.com

Analytical Report Number : 26-005051

Replaces Analytical Report Number: 26-005051, issue no. 1
Additional analysis undertaken.

Asbestos Quantification added to samples 818384, 818387, 818387 and 818389 as per client's request

Project / Site name:	Castle Street Reading	Samples received on:	02/02/2026
Your job number:	25241	Samples instructed on/ Analysis started on:	02/02/2026
Your order number:	25241	Analysis completed by:	20/02/2026
Report Issue Number:	2	Report issued on:	20/02/2026
Samples Analysed:	7 soil samples		



Signed:

Claire Bancroft
Customer Service and Accounts Support
For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number	818384	818385	818386	818387	818388
Sample Reference	DS1	DS1	DS1	DS2	DS3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.50	0.80	4.90	0.40	0.40
Date Sampled	28/01/2026	28/01/2026	28/01/2026	28/01/2026	28/01/2026
Time Taken	0930	0940	1000	1100	1130
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	27.3	14.6	< 0.1	29.1	23.7
Moisture Content	%	0.01	NONE	11	11	23	10	9.3
Total mass of sample received	kg	0.1	NONE	1.8	1.6	0.2	1.4	1.5

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	-	-	Detected	Detected
Asbestos Analyst ID	N/A	N/A	N/A	OGR	-	-	OGR	OGR
Analysis completed	N/A	N/A	N/A	11/02/2026	-	-	11/02/2026	11/02/2026
Actinolite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Not-detected
Amosite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Detected
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Not-detected
Chrysotile detected	Type	N/A	ISO 17025	Detected	-	-	Detected	Detected
Crocidolite detected	Type	N/A	ISO 17025	Detected	-	-	Not-detected	Not-detected
Tremolite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Not-detected

Asbestos % by hand picking/weighing	%	0.001	ISO 17025	0.003	-	-	< 0.001	0.019
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Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibrous Debris, Asbestos Cement	-	-	Loose Fibres	Sheeting/Board Debris, Loose Fibres
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General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.08	-	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.09	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.29	-	-	0.79	0.2
Fluorene	mg/kg	0.05	MCERTS	0.33	-	-	0.25	0.12
Phenanthrene	mg/kg	0.05	MCERTS	1.8	-	-	8.8	2.8
Anthracene	mg/kg	0.05	MCERTS	0.49	-	-	0.67	0.19
Fluoranthene	mg/kg	0.05	MCERTS	1.9	-	-	5	1.6
Pyrene	mg/kg	0.05	MCERTS	1.4	-	-	3.5	1.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.67	-	-	1.1	0.37
Chrysene	mg/kg	0.05	MCERTS	0.74	-	-	1.1	0.41
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.86	-	-	0.71	0.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.3	-	-	0.28	0.13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.61	-	-	0.45	0.21
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.36	-	-	0.17	0.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.09	-	-	0.06	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.4	-	-	0.18	0.12

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	10.2	-	-	23.1	7.68
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Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number	818384				818385	818386	818387	818388
Sample Reference	DS1				DS1	DS1	DS2	DS3
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A				N/A	N/A	N/A	N/A
Depth (m)	0.50				0.80	4.90	0.40	0.40
Date Sampled	28/01/2026				28/01/2026	28/01/2026	28/01/2026	28/01/2026
Time Taken	0930				0940	1000	1100	1130
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	-	-	62	290
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	-	-	0.6	1.7
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	-	-	17	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	-	-	12	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	81	-	-	170	240
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	-	-	15	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	-	-	270	790

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	15	3.5	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	29	8.6	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	66	26	< 8.0	28	31
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	110	38	< 10	28	31

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	3.5	< 2.0	< 2.0	3.2	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	10	< 10	< 10	11	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	19	< 10	< 10	33	22
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	33	< 10	< 10	48	22

VOCs

Chloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Chloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Bromomethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	-	-	-
Trichlorofluoromethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,1-Dichloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-Dichloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	-	-	-	-
Chloroform	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2-Dichloroethane	µg/kg	7	MCERTS	< 7.0	-	-	-	-
1,1-Dichloropropene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number				818384	818385	818386	818387	818388
Sample Reference				DS1	DS1	DS1	DS2	DS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50	0.80	4.90	0.40	0.40
Date Sampled				28/01/2026	28/01/2026	28/01/2026	28/01/2026	28/01/2026
Time Taken				0930	0940	1000	1100	1130
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Carbontetrachloride	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2-Dichloropropane	µg/kg	6	MCERTS	< 6.0	-	-	-	-
Trichloroethene	µg/kg	10	MCERTS	< 10	-	-	-	-
Dibromomethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Bromodichloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	< 10	-	-	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	6	MCERTS	< 6.0	-	-	-	-
1,3-Dichloropropane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Dibromochloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Tetrachloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2-Dibromoethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Chlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Styrene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Bromoform	µg/kg	5	MCERTS	< 5.0	-	-	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	-	-	-	-
Bromobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
n-Propylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
2-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
4-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
tert-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
sec-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
p-Isopropyltoluene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	< 8.0	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
Hexachlorobutadiene	µg/kg	5	MCERTS	< 5.0	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-	-

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	0.017	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	0.003	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	0.002	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number				818384	818385	818386	818387	818388
Sample Reference				DS1	DS1	DS1	DS2	DS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50	0.80	4.90	0.40	0.40
Date Sampled				28/01/2026	28/01/2026	28/01/2026	28/01/2026	28/01/2026
Time Taken				0930	0940	1000	1100	1130
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		
Total PCBs				mg/kg	0.007	MCERTS	0.021	-
								-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number	818389	818390
Sample Reference	DS4	DS5
Sample Number	None Supplied	None Supplied
Water Matrix	N/A	N/A
Depth (m)	0.40	0.40
Date Sampled	28/01/2026	28/01/2026
Time Taken	1340	1440
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection
		Test Accreditation Status

Stone Content	%	0.1	NONE	25.9	10.4
Moisture Content	%	0.01	NONE	13	11
Total mass of sample received	kg	0.1	NONE	1.6	1.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SPU	SPU
Analysis completed	N/A	N/A	N/A	11/02/2026	11/02/2026
Actinolite detected	Type	N/A	ISO 17025	Not-detected	-
Amosite detected	Type	N/A	ISO 17025	Not-detected	-
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	-
Chrysotile detected	Type	N/A	ISO 17025	Detected	-
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	-
Tremolite detected	Type	N/A	ISO 17025	Not-detected	-

Asbestos % by hand picking/weighing	%	0.001	ISO 17025	< 0.001	-
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Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibres	-
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General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.14	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.16	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.4	0.06
Anthracene	mg/kg	0.05	MCERTS	0.23	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.2	0.06
Pyrene	mg/kg	0.05	MCERTS	0.86	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.46	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.44	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.49	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.27	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.37	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.21	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.25	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	6.4	< 0.80
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Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number	818389	818390
Sample Reference	DS4	DS5
Sample Number	None Supplied	None Supplied
Water Matrix	N/A	N/A
Depth (m)	0.40	0.40
Date Sampled	28/01/2026	28/01/2026
Time Taken	1340	1440
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection
		Test Accreditation Status

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	43	16
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	10
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	54

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	0.057	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	4.6	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	15	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	56	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	76	< 10

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	27	< 10
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	27	< 10

VOCs

Chloromethane	µg/kg	5	MCERTS	-	-
Chloroethane	µg/kg	5	MCERTS	-	-
Bromomethane	µg/kg	5	MCERTS	-	-
Vinyl Chloride	µg/kg	5	NONE	-	-
Trichlorofluoromethane	µg/kg	5	MCERTS	-	-
1,1-Dichloroethene	µg/kg	5	MCERTS	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	-	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0
1,1-Dichloroethane	µg/kg	5	MCERTS	-	-
2,2-Dichloropropane	µg/kg	5	NONE	-	-
Chloroform	µg/kg	5	MCERTS	-	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	-	-
1,2-Dichloroethane	µg/kg	7	MCERTS	-	-
1,1-Dichloropropene	µg/kg	5	MCERTS	-	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number				818389	818390
Sample Reference				DS4	DS5
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.40	0.40
Date Sampled				28/01/2026	28/01/2026
Time Taken				1340	1440
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		
Carbontetrachloride	µg/kg	5	MCERTS	-	-
1,2-Dichloropropane	µg/kg	6	MCERTS	-	-
Trichloroethene	µg/kg	10	MCERTS	-	-
Dibromomethane	µg/kg	5	MCERTS	-	-
Bromodichloromethane	µg/kg	5	MCERTS	-	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	-	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	6	MCERTS	-	-
1,3-Dichloropropane	µg/kg	5	MCERTS	-	-
Dibromochloromethane	µg/kg	5	MCERTS	-	-
Tetrachloroethene	µg/kg	5	MCERTS	-	-
1,2-Dibromoethane	µg/kg	5	MCERTS	-	-
Chlorobenzene	µg/kg	5	MCERTS	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
Styrene	µg/kg	5	MCERTS	-	-
Bromoform	µg/kg	5	MCERTS	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	MCERTS	-	-
1,1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-	-
Bromobenzene	µg/kg	5	MCERTS	-	-
n-Propylbenzene	µg/kg	5	MCERTS	-	-
2-Chlorotoluene	µg/kg	5	MCERTS	-	-
4-Chlorotoluene	µg/kg	5	MCERTS	-	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	-	-
tert-Butylbenzene	µg/kg	5	MCERTS	-	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	-	-
sec-Butylbenzene	µg/kg	5	MCERTS	-	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	-	-
p-Isopropyltoluene	µg/kg	5	MCERTS	-	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	-	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	-	-
Butylbenzene	µg/kg	5	MCERTS	-	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	-	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	-	-
Hexachlorobutadiene	µg/kg	5	MCERTS	-	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	-	-

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-

Analytical Report Number: 26-005051
Project / Site name: Castle Street Reading
Your Order No: 25241

Lab Sample Number				818389	818390
Sample Reference				DS4	DS5
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.40	0.40
Date Sampled				28/01/2026	28/01/2026
Time Taken				1340	1440
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Total PCBs	mg/kg	0.007	MCERTS	-	-
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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Analytical Report Number: **26-005051**
Project / Site name: **Castle Street Reading**
Your Order No: **25241**

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample	Analysis completed	Analyst ID
818384	DS1	0.50-	253	Loose Fibrous Debris, Asbestos Cement	Chrysotile & Crocidolite	0.003	0.003	19/02/2026	PDO
818387	DS2	0.40-	218	Loose Fibres	Chrysotile	< 0.001	< 0.001	19/02/2026	PDO
818388	DS3	0.40-	251	Sheeting/Board Debris, Loose Fibres	Amosite & Chrysotile	0.019	0.019	19/02/2026	PDO
818389	DS4	0.40-	269	Loose Fibres	Chrysotile	< 0.001	< 0.001	20/02/2026	SPU

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

Analytical Report Number : 26-005051

Project / Site name: Castle Street Reading

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
818384	DS1	None Supplied	0.5	Brown clay and sand with gravel and stones
818385	DS1	None Supplied	0.8	Brown clay and sand with gravel and stones
818386	DS1	None Supplied	4.9	Beige clay and sand with gravel and chalk
818387	DS2	None Supplied	0.4	Brown sand with gravel and stones
818388	DS3	None Supplied	0.4	Brown clay and sand with gravel and stones
818389	DS4	None Supplied	0.4	Brown clay and sand with gravel and stones
818390	DS5	None Supplied	0.4	Brown clay and sand with gravel and stones

Analytical Report Number : 26-005051
Project / Site name: Castle Street Reading

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references	HSE Report No: 83/1996, HSG 248 (2021), HSG 264 (2012) & SCA Blue Book (draft)	A006B	D	ISO 17025
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS

Analytical Report Number : 26-005051
Project / Site name: Castle Street Reading

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

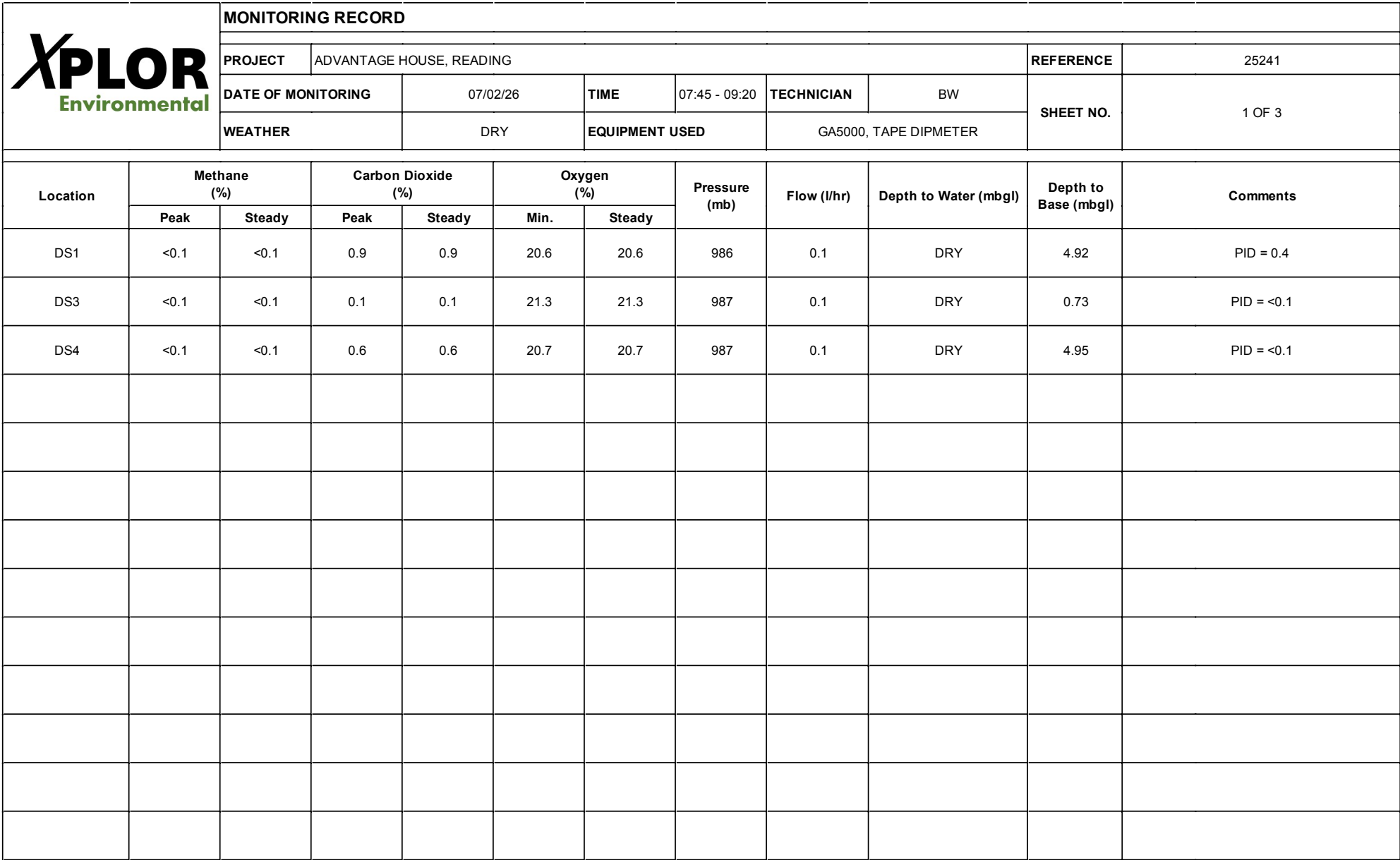
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

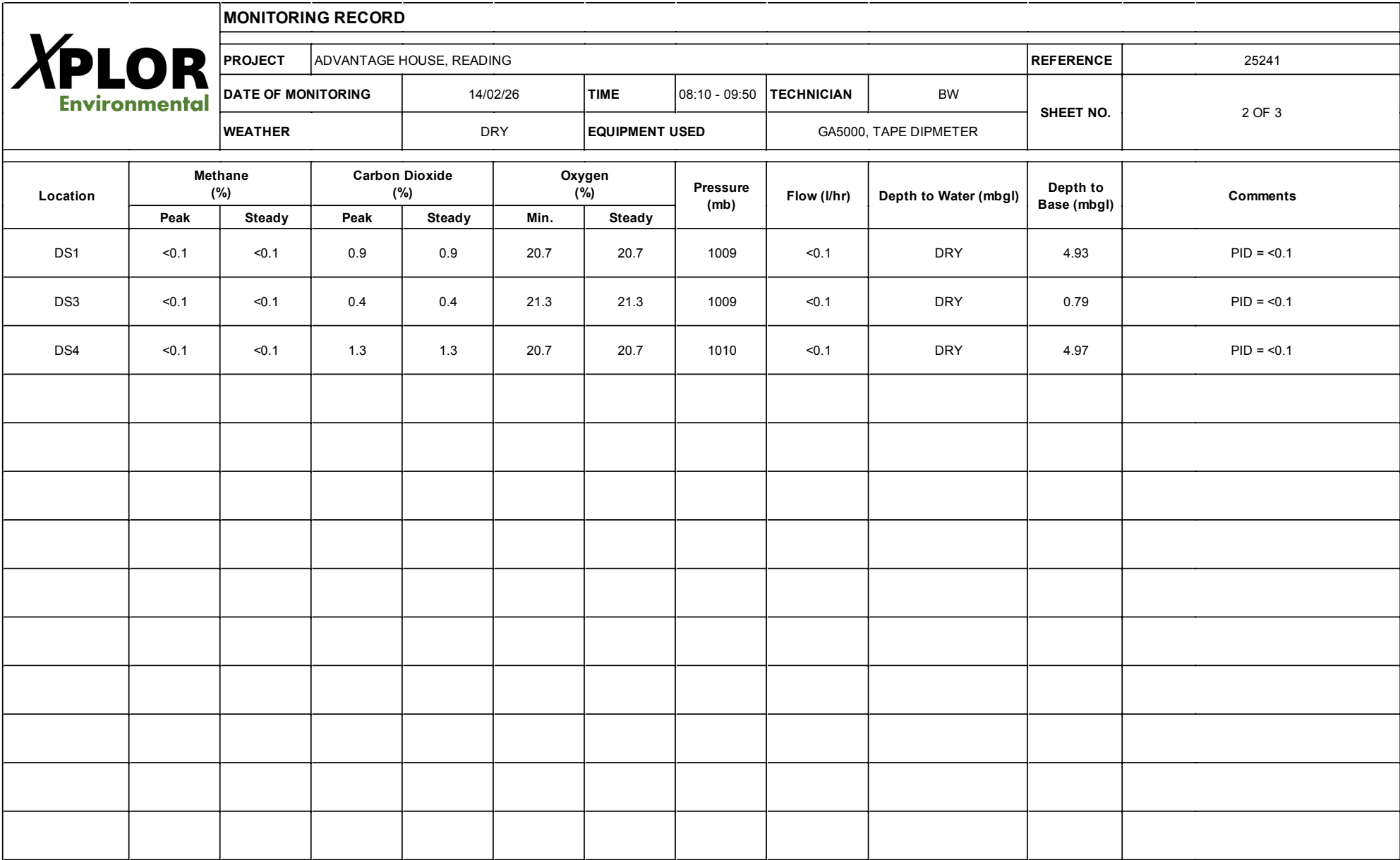
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

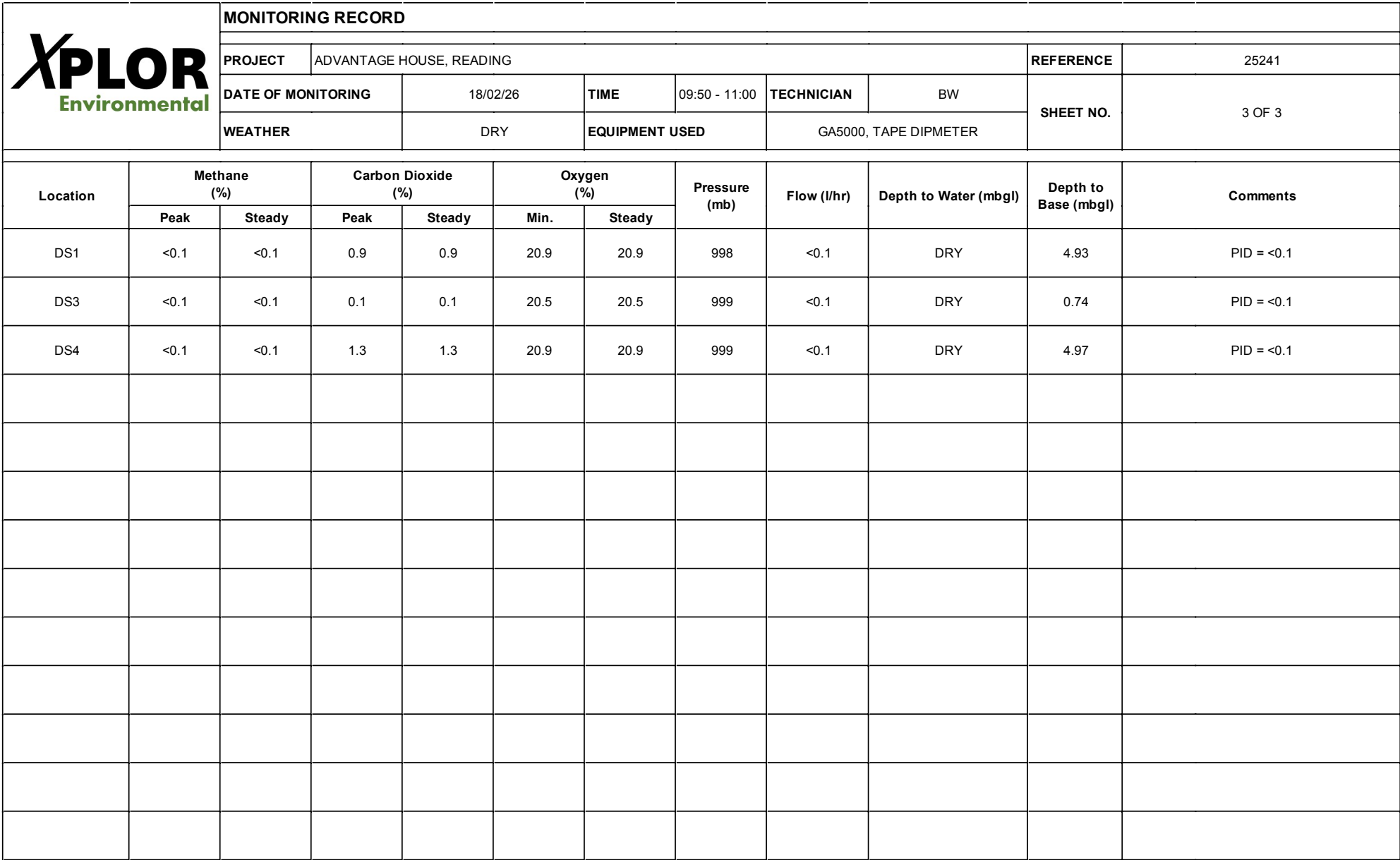
Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Appendix C – Ground Gas Monitoring Data









Appendix D – Soil Screening Levels

Soil Screening Levels

The following generic screening levels are used in the report for assessing risks to human health from contaminants in soil. All screening levels are for 1% SOM.

Contaminant	Units	Source	Residential with home produce	Residential without home produce	Commercial	Public open space (residential)	Public open space (park)
Cyanide (free)	mg/kg	RIVM	20	20	30	-	-
Cyanide (total)	mg/kg	RIVM	50	50	500	-	-
Boron	mg/kg	S4UL	290	11,000	240,000	21,000	46,000
Arsenic	mg/kg	S4UL	37	40	640	79	170
Cadmium	mg/kg	S4UL	11	85	190	120	532
Chromium (total)	mg/kg	S4UL	910	910	8,600	1,500	33,000
Copper	mg/kg	S4UL	2,400	7,100	68,000	12,000	44,000
Mercury (inorganic)	mg/kg	C4SL	200	300	5,100	610	1,300
Nickel	mg/kg	S4UL	180	180	980	230	3,400
Lead	mg/kg	C4SL	200	310	2,330	630	1,300
Selenium	mg/kg	S4UL	250	430	12,000	1,100	1,800
Zinc	mg/kg	S4UL	3,700	40,000	730,000	81,000	170,000
Chromium (hex.)	mg/kg	S4UL	6	6	33	7.7	220
TPH Aliphatic >C5-C6	mg/kg	S4UL	42	42	3,200	570,000	95,000
TPH Aliphatic >C6-C8	mg/kg	S4UL	100	100	7,800	600,000	150,000
TPH Aliphatic >C8-C10	mg/kg	S4UL	27	27	2,000	13,000	14,000
TPH Aliphatic >C10-C12	mg/kg	S4UL	130	130	9,700	13,000	21,000
TPH Aliphatic >C12-C16	mg/kg	S4UL	1,100	1,100	59,000	13,000	25,000
TPH Aliphatic >C16-C21	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aliphatic >C21-C35	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aromatic >C5-C7	mg/kg	S4UL	70	370	26,000	56,000	76,000
TPH Aromatic >C7-C8	mg/kg	S4UL	130	860	56,000	56,000	87,000
TPH Aromatic >C8-C10	mg/kg	S4UL	34	47	3,500	5,000	7,200
TPH Aromatic >C10-C12	mg/kg	S4UL	74	250	16,000	5,000	9,200
TPH Aromatic >C12-C16	mg/kg	S4UL	140	1,800	36,000	5,100	10,000
TPH Aromatic >C16-C21	mg/kg	S4UL	260	1,900	28,000	3,800	7,600
TPH Aromatic >C21-C35	mg/kg	S4UL	1,100	1,900	28,000	3,800	7,800
Naphthalene	mg/kg	C4SL	15	15	1,600	11,000	800
Acenaphthylene	mg/kg	S4UL	170	2,900	83,000	15,000	29,000
Acenaphthene	mg/kg	S4UL	210	3,000	84,000	15,000	29,000
Fluorene	mg/kg	S4UL	170	2,800	63,000	9,900	20,000
Phenanthrene	mg/kg	S4UL	95	1,300	22,000	3,100	6,200
Anthracene	mg/kg	S4UL	2,400	31,000	520,000	74,000	150,000
Fluoranthene	mg/kg	S4UL	280	1,500	23,000	3,100	6,300

<i>Contaminant</i>	<i>Units</i>	<i>Source</i>	<i>Residential with home produce</i>	<i>Residential without home produce</i>	<i>Commercial</i>	<i>Public open space (residential)</i>	<i>Public open space (park)</i>
Pyrene	mg/kg	S4UL	620	3,700	54,000	7,400	15,000
Benzo[a]anthracene	mg/kg	S4UL	7.2	11	170	29	49
Chrysene	mg/kg	S4UL	15	30	350	57	93
Benzo[b]fluoranthene	mg/kg	S4UL	2.6	3.9	44	7.1	13
Benzo[k]fluoranthene	mg/kg	S4UL	77	11	1,200	190	370
Benzo[a]pyrene	mg/kg	S4UL	2.2	3.2	35	5.7	11
Indeno[1,2,3-c,d]pyrene	mg/kg	S4UL	27	45	500	82	150
Dibenz[a,h]anthracene	mg/kg	S4UL	0.24	0.31	3.5	0.57	1.1
Benzo[g,h,i]perylene	mg/kg	S4UL	320	360	3,900	640	1,400
Phenols (total)	mg/kg	S4UL	120	440	440	440	440
MTBE	µg/kg	RSK	60	60	7500	-	-
Benzene	µg/kg	S4UL	87	380	27,000	72,000	90,000
Toluene	µg/kg	S4UL	130,000	880,000	56,000,000	56,000,000	87,000,000
Ethylbenzene	µg/kg	S4UL	47,000	83,000	5,700,000	24,000,000	17,000,000
m & p-xylene	µg/kg	S4UL	56,000	79,000	5,900,000	41,000,000	17,000,000
o-xylene	µg/kg	S4UL	60,000	88,000	660,000	41,000,000	17,000,000

Appendix E – Vapour Intrusion Protection Standards

Vapour Intrusion Protection Standards

The following Protection Standards are used in the report for the assessment of human health risks from organic vapour intrusion into buildings (indoor inhalation).

Volatile substance ^[1]	Protection Standard in soil (mg/kg) ^[2]		Protection Standard in groundwater (µg/l) ^[3]	
	Residential	Commercial	Residential	Commercial
TPH Aliphatic >C5-C6	161	19,600 ^[4]	1,900	190,000 ^[5]
TPH Aliphatic >C6-C8	529	64,400 ^[4]	1,500	150,000 ^[5]
TPH Aliphatic >C8-C10	156	19,000 ^[4]	57	5,700 ^[5]
TPH Aliphatic >C10-C12	793 ^[4]	96,600 ^[4]	37	3,600 ^[5]
TPH Aromatic >C5-C7	1.48	173	210,000	20,000,000 ^[5]
TPH Aromatic >C7-C8	4,570 ^[4]	517,000 ^[4]	220,000	21,000,000 ^[5]
TPH Aromatic >C8-C10	553	67,400 ^[4]	1,900	190,000 ^[5]
TPH Aromatic >C10-C12	3,050 ^[4]	373,000 ^[4]	6,800	660,000 ^[5]
Naphthalene	13.2	1,720 ^[4]	220	23,000 ^[5]

1. The selected VOCs have the potential to create a vapour intrusion risk and are defined as a volatile substance with 12 carbon atoms or less.
2. Protection standards for soil were derived using CLEA software version 1.071 (2015) and calculated for the indoor inhalation pathway only and default soil and building data.
3. Protection standards for groundwater are the GACgwvap published by the Society of Brownfield Risk Assessment publication, Development of generic assessment criteria for assessing vapour risks to human health from volatile contaminants in groundwater (SoBRA, 2017).
4. Soil protection standard exceeds soil saturation limit and vapour risks from NAPL should be considered in addition.
5. GACgwvap exceeds aqueous solubility and vapour risks from NAPL should be considered in addition.
6. For VOCs not listed above, they should either be calculated as above or refer to the SoBRA guidance.

Appendix F – Defining Risk

Risk Evaluation

Risk evaluation is qualitative and is developed from the model provided in CIRIA C552 *Contaminated Land Risk Assessment – a guide to good practice* (DETR 2001). It involves classifying risk in terms of the probability of occurrence x magnitude of the potential consequence of occurrence. The risk rating is used to determine what action, if any, is needed to further investigate that risk and/or remediate to reduce risk to an acceptable level.

Classification of Probability

Classification	Definition
High	There is a pollution linkage and an event appears very likely in the short term and almost inevitable in the long term or there is actual evidence at the receptor of harm or pollution.
Likely	There is a pollution 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 in the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is not certain that even over a longer period such event would take place and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur in the very long term.

Classification of Consequence

Classification	Definition	Examples
Severe	- Short-term (acute) risk to human health likely to result in significant harm. - Short-term (acute) risk of pollution of sensitive water resource. - Short-term (acute) risk to an ecosystem, or organism forming part of an ecosystem.	Unusually high concentration of toxic substance on the surface of a garden. Major release into controlled waters. EA Category 1 pollution incident. Closure of an abstraction point. Explosion, causing building collapse (and death if occupied).
Medium	- Chronic damage to human health likely to result in significant harm. - Pollution of sensitive water resource. - Significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentration of contaminant from site exceeds generic or site-specific assessment criteria for human health or water supply pipes. Presence of asbestos. Leaching of contaminants from a site to a principal or secondary A aquifer. Concentration exceeds DWS in Inner Source Protection Zone (SPZ1) or EQS adjacent to water resource. EA Category 2+ pollution incident. Death of a species or loss of habitat within an area of national importance.
Mild	- Exposure is unlikely to result in significant harm to human health. - Pollution of non-sensitive water resource. - Damage to sensitive buildings, structures and services or the environment.	Concentration of contaminant from site below generic or site-specific assessment criteria. Pollution of secondary (B or undifferentiated) aquifer. EA Category 3 pollution incident. Damage to a building rendering it unsafe to occupy. Death of a species or loss of habitat within an area of local importance.

Classification	Definition	Examples
Minor	- Harm (but not significant harm) resulting in a financial loss or expenditure to resolve. - Non-permanent human health effects. - Easily repairable damage to buildings, structures and services	Pollution of unproductive strata. Loss of plants in garden or landscape areas.

Risk Estimation

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Low risk
	Low	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Low risk	Very low risk	Very low risk
	No linkage	No risk			

Description of the Estimated Risks and Likely Action Required

Risk	Action
Very high	There is a high probability that severe harm could arise or there is evidence that severe harm is currently happening. This risk, if realised, is likely to result in substantial liability. - Urgent investigation required. - Remediation required for the site in its existing state and for development.
High	Harm is likely to arise. Realisation of the risk is likely to present a significant liability. - Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term. - Remediation required for development.
Moderate	A potential linkage is identifiable. However, it is either relatively unlikely that harm would be severe or, if any harm were to occur, it is more likely that the harm would be relatively mild. - Investigation required to quantify the risk and determine potential liability. - Remediation required for development.
Low	It is possible that harm could arise but it is likely that this harm, if realised, would at worst normally be mild. - Investigation is not normally required but could be useful to confirm findings. - Remediation unlikely to be required or will be limited.
Very low	There is a low possibility that harm could arise. In the event of such harm being realised it is not likely to be severe. Site is not capable of being determined under Part 2a. No further action recommended.