



adeptus
ENVIRONMENTAL

LAND CONTAMINATION PHASE 2 INVESTIGATION

62 LONDON ROAD

**READING
RG1 1NH**

On behalf of:

Trinity Christian School

Report No.: A240901-R02A

Date: October 2024

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INTRODUCTION

1.1 Background

Adeptus was appointed by Trinity Christian School to undertake a Land Contamination Phase 2 Site Investigation at the site known as 62 London Road. The investigation is required in support of a planning application for redevelopment of the site and to further assess potentially significant contaminant linkages identified in an earlier phase 1 desk study by Adeptus.

Land contamination is a material consideration under the National Planning Policy Framework (2012). This means that local authorities must take the potential or actual presence of contamination into account when considering planning applications.

“Contamination” is defined in BS 10175:2011 as:

presence of a substance or agent, as a result of human activity, in, on or under land, which has the potential to cause harm or to cause pollution.

1.2 Scope and Objectives

The following scope of works has been undertaken:

- Review of desk study and preliminary risk assessment
- Design and implementation of suitable exploratory investigation
- Sample retrieval and laboratory chemical analysis
- Tier 1 quantitative risk assessment
- Update of the initial conceptual site model
- Factual and interpretive reporting

The objectives of the works were to:

- Obtain site specific soil chemical data
- Provide an assessment of risks to relevant receptors in line with the principles of Environment Agency publication Land Contamination Risk Management (LCRM) 11

1.3 Previous Reports & Supporting Information

Phase 1 Desk Study (Adeptus, September 2024) Ref: A240901-R02A.

A site plan is included as Appendix A.

Other sources of information utilised in producing this report are listed as Appendix B.

2. SITE DETAILS

This section provides an overview of the site location and preliminary risk assessment.

2.1 Location and Description

Table 2-1: Site Summary

Location	The site is situated south of London Road in a predominantly residential area east of Reading.
Area & Coordinates	0.14ha 472679 173037 (centred on, approx.)
Development Proposals	The building is an original period residence, recently used as offices and then a veterinary surgery. Proposals are for use as a school.

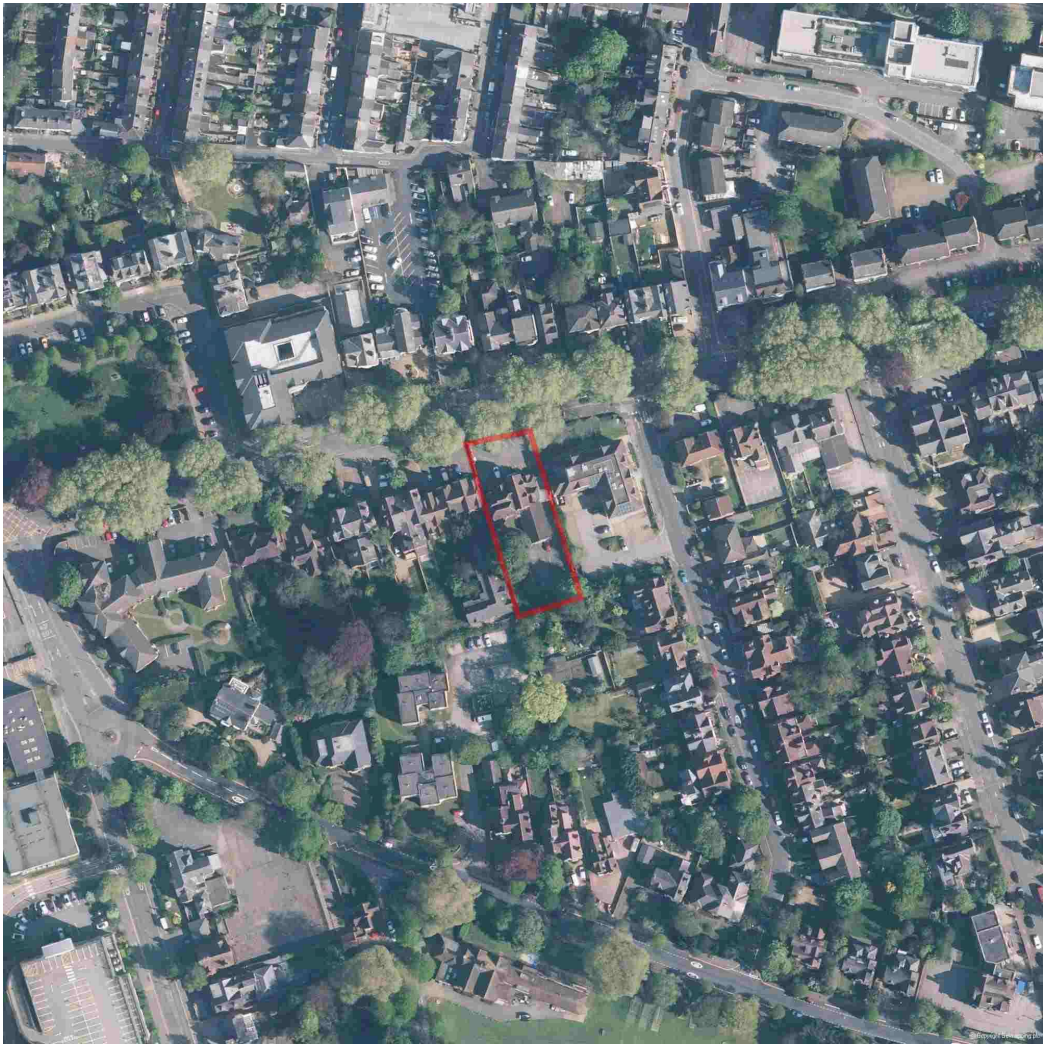


Figure 2-1: Site Location

2.2 Summary of Preliminary Risk Assessment

The risk assessment identified a number of potentially significant pollutant linkages and a moderate risk, suggesting that further assessment should be undertaken.

The original part of the current building is considered to have been built as a dwelling and dates to at least 1898, before which the site was undeveloped. Planning history confirms subsequent use as a veterinary surgery approved in 1992. These uses are not considered potentially significant.

Potential off-site sources include a former garage colony immediately south and an electricity substation within its curtilage. These are both in close proximity, and the garage roofs are likely to have consisted of asbestos containing material. Possible impacts on the site from these original features and the subsequent asbestos removal cannot be ruled out.

Use of the site as a school introduces the possibility of sensitive receptors such as children being exposed to contaminants in near surface soils should they be present. This is particularly likely in the case of accessing soft landscaped areas for play.

The site is in a sensitive groundwater location, but no potentially significant on-site sources have been identified.

3. PHASE 2 SITE INVESTIGATION

3.1 Fieldworks

An exploratory investigation has been designed based on the preliminary risk assessment. The scope of works undertaken was as listed below. Fieldworks were completed on 20/09/2024.

4No. hand pits were advanced to allow targeted sampling of near surface soils across the soft landscaped area in proximity to the building and potential offsite sources.

Sample depths given are the base of the vertical interval sampled, which is generally 0.1m (10cm), and target surface horizons and the base of any disturbed ground or top of natural strata.

Table 3-1: Fieldworks Summary

Location Reference* and Max Depth (mbgl)		Generalised Strata	Depth to Base of Stratum (mbgl)**	Samples/ PID Screening
HP1	0.6	Dark grey silty slightly gravelly fine to medium sand with rootlets. TOPSOIL.	0.3	HP1-0.1m
		MADE GROUND. Grey silty sand. Pocket of ash encountered from 0.3m to 0.5m, with single pieces of paper and plastic at base.	>0.6	HP1-0.5m
HP2	0.6	Dark grey silty fine to medium sand with rootlets. TOPSOIL.	0.3	HP2-0.2m
		Grey silty fine to medium SAND.	>0.6	HP2-0.6m
HP3	0.3	Dark grey silty fine to medium sand with rootlets. TOPSOIL.	>0.3	HP3-0.3m
HP4	0.3	Dark grey silty slightly gravelly fine to medium sand with rootlets. TOPSOIL.	>0.3	HP3-0.3m

Notes: * HP = Hand Pit; HP = Mechanically Excavated Trial Pit; WS = Windowless Sampler Borehole; BH = Cable Percussion Borehole | ** + Indicates base of stratum was not reached.

Exploratory hole locations are marked on the plan in Appendix A

3.2 Testing

Samples were submitted for a range of chemical analyses comprising pH, soil organic matter (SOM), metals/metalloids, total and speciated polycyclic-aromatic hydrocarbons (PAHs) and asbestos identification.

Analytical work was undertaken by UKAS accredited laboratory. Results are summarised and discussed below, and the lab report is attached as Appendix C.

3.3 Ground Conditions

Made Ground

Made Ground was encountered in HP1 consisting of reworked soil with occasional plastic and paper packaging fragments, and a pocket of ash between 0.3 and 0.5m.

Soils

Topsoil and subsoil were encountered in all locations consisting of fine to medium sand. Made Ground in HP1 was overlain with topsoil and underlain with subsoil.

Superficial Deposits

Superficial deposits were not expected or encountered at the investigation depth.

Groundwater

Groundwater was not encountered in any of the hand pits.

4. CONTAMINATED LAND ASSESSMENT

4.1 Long Term Human Health Risk

A Tier 1 (generic) quantitative risk assessment has been undertaken by screening measured contaminant concentrations against reference values for chronic (long term) risk to human health known as generic assessment criteria (GAC).

Concentrations exceeding the relevant screening values are described as 'elevated' and indicate a requirement to further characterise or otherwise address health and environmental risks.

Currently GAC directly applicable to a school setting an exposure scenario have been derived in the UK.

The GAC considered most applicable but still conservative in terms of risk estimation and therefore used in this assessment are those for public open space residential (POSresi). The POSresi exposure scenario is based on typical usage of open space such as a green immediately adjacent to housing and therefore potentially accessed with greater frequency and duration than a park (or a school field).

The assessment is summarised in Table 4-1, and the source of GAC is indicated in the final column and footnotes to the table.

Table 4-1: Summary of Soil Analytical Results vs Tier 1 Screening Values

Determinand	GAC	Units	No. of Samples	No. of Exceedances	Exceedance Locations	Summary Statistics*			**
						Minimum	Maximum	Average	
Inorganics & Metals / Metalloids									
Asbestos	N/A	-	6	N.D.	-	-	-	-	***
Arsenic	79	mg/kg	6	-	-	13.0	19.0	16.0	1
Barium	1300	mg/kg	6	-	-	92.0	150.0	123.2	2
Beryllium	2.2	mg/kg	6	-	-	0.5	0.7	0.6	1
Boron	21000	mg/kg	6	-	-	0.8	3.8	2.3	1
Cadmium	120	mg/kg	6	-	-	< 0.2	< 0.2	< 0.2	1
Chromium	1500	mg/kg	6	-	-	14.0	22.0	17.8	1
Copper	12000	mg/kg	6	-	-	25.0	55.0	37.0	1

Lead	630	mg/ kg	6	-	-	130. 0	250. 0	185. 0	3
Mercury	16	mg/ kg	6	-	-	0.3	0.7	0.4	1
Nickel	230	mg/ kg	6	-	-	12.0	16.0	14.2	1
Selenium	1100	mg/ kg	6	-	-	< 1.0	< 1.0	< 1.0	1
Vanadium	2000	mg/ kg	6	-	-	24.0	32.0	28.7	1
Zinc	81000	mg/ kg	6	-	-	100. 0	250. 0	146. 7	1
Determinand	GAC	Units	No. of Samples	No. of Exceedances	Exceedance Locations	Summary Statistics*			**
						Minimum	Maximum	Average	
PAHs - at 2.5% SOM									
Naphthalene	4900	mg/ kg	6	-	-	< 0.05	0.0	< 0.05	1
Acenaphthylene	15000	mg/ kg	6	-	-	< 0.05	0.1	0.1	1
Acenaphthene	15000	mg/ kg	6	-	-	< 0.05	< 0.05	< 0.05	1
Fluorene	9900	mg/ kg	6	-	-	< 0.05	< 0.05	< 0.05	1
Phenanthrene	3100	mg/ kg	6	-	-	0.1	0.5	0.3	1
Anthracene	74000	mg/ kg	6	-	-	< 0.05	0.1	0.1	1
Fluoranthene	3100	mg/ kg	6	-	-	0.5	2.2	1.1	1
Pyrene	7400	mg/ kg	6	-	-	0.4	2.0	1.1	1
Benzo(a)anthracene	29	mg/ kg	6	-	-	0.3	1.4	0.7	1
Chrysene	57	mg/ kg	6	-	-	0.4	1.7	0.9	1

Benzo(b)fluoranthene	7.2	mg/kg	6	-	-	0.6	2.4	1.3	1
Benzo(k)fluoranthene	190	mg/kg	6	-	-	0.2	1.2	0.5	1
Benzo(a)pyrene	5.7	mg/kg	6	-	-	0.5	2.1	1.0	1
Indeno(1,2,3-cd)pyrene	82	mg/kg	6	-	-	0.3	1.2	0.6	1
Dibenz(a,h)anthracene	0.57	mg/kg	6	-	-	< 0.05	0.3	0.2	1
Benzo(ghi)perylene	640	mg/kg	6	-	-	0.3	1.5	0.7	1

Notes: * Summary statistics based on targeted sampling are provided for information only.

** Source of GAC: 1 = LQM / CIEH (2014) S4UL3785 | 2 = CL:AIRE (2009) Soil Generic Assessment Criteria for Human Health | 3 = Defra (2014) C4SL | 4 - As no UK derived GAC is available for Total Cyanide a screening value of 20mg/kg (Thiocyanate) has been used as an initial screening tool

*** For asbestos, the number of detections is shown and does not relate to any GAC. N.D = Not detected

TPH results are omitted from the table above for brevity but are presented in Appendix C.

The quantitative screening summarised in Table 4-3 indicates the following:

- No asbestos was detected in any samples
- None of the other determinands exceeded the relative screening criteria, with most being a small fraction of the same
- The highest measured values were dibenz(a,h)anthracene and lead at 0.47 and 0.4 times the respective guideline values
- A small number of the higher molecular weight TPH species were present above detection limits but none approached the guideline values

5 CONCLUSIONS

5.1 Summary

Adeptus was appointed by Trinity Christian School to undertake a Land Contamination Phase 2 Site Investigation at the site known as 62 London Road. The investigation is required in support of a planning application for redevelopment of the site and to further assess potentially significant contaminant linkages identified in an earlier phase 1 desk study by Adeptus.

The primary objective of the works was to provide a quantitative assessment of risks to relevant receptors in line with the principles of Environment Agency publication 'Land contamination risk management' (LCRM).

The original part of the current building is considered to have been built as a dwelling and dates to at least 1898, before which the site was undeveloped. Planning history confirms subsequent use as a veterinary surgery approved in 1992. These uses are not considered potentially significant.

Potential off-site sources include a former garage colony immediately south and an electricity substation within its curtilage. These are both in close proximity, and the garage roofs are likely to have consisted of asbestos containing material. Possible impacts on the site from these original features and the subsequent asbestos removal cannot be ruled out.

Use of the site as a school introduces the possibility of sensitive receptors such as children being exposed to contaminants in near surface soils should they be present. This is particularly likely in the case of accessing soft landscaped areas for play.

The site is in a sensitive groundwater location, but no potentially significant on-site sources have been identified.

A phase 2 investigation was undertaken consisting of 4No. hand pits advanced to circa 0.6m to allow targeted sampling and characterisation of near surface soils. Exploratory hole locations are marked on the plan in Appendix A.

Samples were tested for the following range of contaminants: organic matter (SOM), CLEA metals suite, PAH (USEPA-16), TPH(CWG) and asbestos ID.

A Tier 1 (generic) quantitative risk assessment has been undertaken by screening measured contaminant concentrations against reference values for chronic (long term) risk to human health known as generic assessment criteria (GAC). The GAC considered most applicable but still conservative in terms of risk estimation and therefore used in this assessment are those for public open space residential (POSresi).

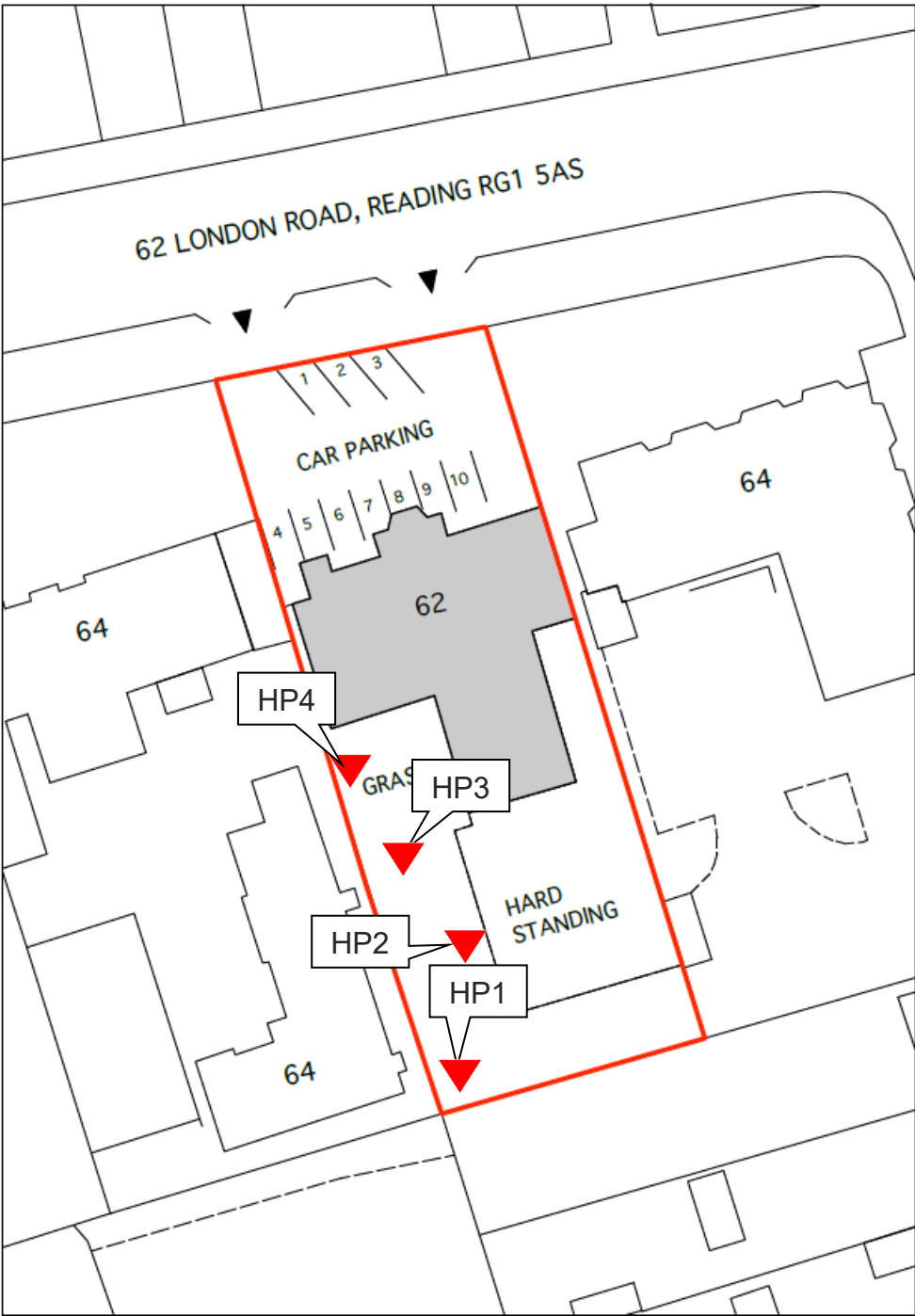
In summary, no asbestos and elevated levels of other contaminants were detected. The site is considered to present a low risk to human health and the environment under the proposed use.

N.B.: This summary forms part of the overall risk assessment and should be read in conjunction with the main report and supporting information.

5.2 Recommendations

Adeptus considers that no further action is required.

APPENDIX A – SITE PLAN & EXPLORATORY HOLE LOCATIONS



APPENDIX B – SUPPORTING INFORMATION

The following information and data sources are utilised in compiling this report:

Phase 1 Desk Study (Adeptus, September 2024) Ref: A240901-R02A.

This report is based on information available at the time of writing and is subject to the limitations set out in Appendix D.

APPENDIX C – LABORATORY CERTIFICATE - SOIL RESULTS

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Watford,
Herts,
WD18 8YS

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

Analytical Report Number : 24-043759

Project / Site name:	A240901-R02 62 London Road, Reading, RG1	Samples received on:	23/09/2024
Your job number:		Samples instructed on/ Analysis started on:	23/09/2024
Your order number:		Analysis completed by:	02/10/2024
Report Issue Number:	1	Report issued on:	02/10/2024
Samples Analysed:	6 soil samples		

Signed:



Trevor Hill
Customer Service Advisor
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

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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: 24-043759

Project / Site name: A240901-R02 62 London Road, Reading, RG1

Lab Sample Number				325534	325535	325536	325537	325538
Sample Reference				HP1A	HP1B	HP2A	HP2B	HP3A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.10	0.40	0.10
Date Sampled				20/09/2024	20/09/2024	20/09/2024	20/09/2024	20/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	8	7.3	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	19	11	16	9.9
Total mass of sample received	kg	0.1	NONE	0.7	0.2	0.7	0.4	0.6

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PKU	MWI	PKU	MWI	PKU

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.2	6.8	7.9	7.3	6.8
Organic Matter (automated)	%	0.1	MCERTS	5.2	4.7	4.5	3.1	6.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.1	0.13	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.39	0.5	0.09	0.23	0.16
Anthracene	mg/kg	0.05	MCERTS	0.11	0.13	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.5	2.2	0.47	0.92	0.65
Pyrene	mg/kg	0.05	MCERTS	1.4	2	0.42	0.9	0.63
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.97	1.4	0.28	0.47	0.38
Chrysene	mg/kg	0.05	MCERTS	1.3	1.7	0.37	0.53	0.44
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.1	2.4	0.6	0.93	0.67
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.61	1.2	0.19	0.36	0.25
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	2.1	0.47	0.78	0.55
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.8	1.2	0.29	0.41	0.33
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.19	0.27	0.06	0.12	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.85	1.5	0.32	0.64	0.34

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	11.8	16.8	3.56	6.29	4.4
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	19	18	17	13
Barium (aqua regia extractable)	mg/kg	1	MCERTS	92	140	150	140	97
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.54	0.67	0.69	0.69	0.66
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	2.8	1.6	1.8	3.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	16	22	17	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	28	50	38	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	190	200	250	140
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.3	0.4	0.7	0.5	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	16	15	15	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	26	31	31	32	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	140	150	130	100

Analytical Report Number: 24-043759

Project / Site name: A240901-R02 62 London Road, Reading, RG1

Lab Sample Number				325534	325535	325536	325537	325538
Sample Reference				HP1A	HP1B	HP2A	HP2B	HP3A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.10	0.40	0.10
Date Sampled				20/09/2024	20/09/2024	20/09/2024	20/09/2024	20/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	-	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	13	< 8.0	< 8.0	-	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	13	< 10	< 10	-	-

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-	-
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	-	-
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	-	-
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-	-
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	-	-
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	47	29	12	-	-
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	47	29	12	-	-

VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-	-
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-	-

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

Analytical Report Number: 24-043759

Project / Site name: A240901-R02 62 London Road, Reading, RG1

Lab Sample Number				325539
Sample Reference				HP4A
Sample Number				None Supplied
Depth (m)				0.10
Date Sampled				20/09/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	13
Total mass of sample received	kg	0.1	NONE	0.7

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PKU

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.6
Organic Matter (automated)	%	0.1	MCERTS	11

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.08
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.3
Anthracene	mg/kg	0.05	MCERTS	0.09
Fluoranthene	mg/kg	0.05	MCERTS	1.1
Pyrene	mg/kg	0.05	MCERTS	1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.57
Chrysene	mg/kg	0.05	MCERTS	0.77
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.41
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.91
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.56
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.14
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.58

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	7.79
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	120
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.52
Boron (water soluble)	mg/kg	0.2	MCERTS	3.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55
Lead (aqua regia extractable)	mg/kg	1	MCERTS	200
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	250

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Lab Sample Number				325539
Sample Reference				HP4A
Sample Number				None Supplied
Depth (m)				0.10
Date Sampled				20/09/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-

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

VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-
Benzene	µg/kg	5	MCERTS	-
Toluene	µg/kg	5	MCERTS	-
Ethylbenzene	µg/kg	5	MCERTS	-
p & m-Xylene	µg/kg	5	MCERTS	-
o-Xylene	µg/kg	5	MCERTS	-

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

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* 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 *
325534	HP1A	None Supplied	0.1	Brown loam with stones and vegetation
325535	HP1B	None Supplied	0.5	Brown loam with stones and vegetation
325536	HP2A	None Supplied	0.1	Brown loam with gravel and vegetation
325537	HP2B	None Supplied	0.4	Brown loam with gravel and vegetation
325538	HP3A	None Supplied	0.1	Brown loam with gravel and vegetation
325539	HP4A	None Supplied	0.1	Brown loam with gravel and vegetation

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Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	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
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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	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/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

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 30°C.

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.

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Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

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

The result for sum should be interpreted with caution

APPENDIX D - LIMITATIONS

This report was prepared by Adeptus for the use of the client, named on page 1. The report has been prepared specifically on the basis of the end use as defined by the client. Any change of end use would necessitate review of this report and its findings. Use of or reliance on this report by any third party is not permitted without our express written agreement, and where this is given, will be subject to our terms and conditions.

We have prepared this report in our professional capacity using reasonable skill, care and diligence. The assessments, conclusions and recommendations within this report pertain to the study site (the extents of which are in Figure 1, below) and the immediate area in continuity with the Site. They are based on the established historical uses, information available at the time of writing and the proposed use of the Site. Where any information supplied by the client or other sources have been utilised, it has been assumed that the information is correct. No responsibility can be accepted by Adeptus for inaccuracies in data supplied by any other party.

Any plans, diagrams, cross sections or images are for illustrative purposes only and should be checked for accuracy on-site. In the event of changes to the proposed end use of the Site, the report may require updating to reflect such changes. Although reference may be made to archaeological, ecological or geotechnical issues, invasive species, flood risk and the presence of asbestos containing materials (ACMs), this report does not constitute an archaeological assessment, ecological assessment, geotechnical assessment, invasive species survey, flood risk assessment or asbestos survey and liability for any claim caused by arising out of or in any way involving asbestos is excluded.

New information relating to environmental matters can come to light after the report has been prepared and changes in conditions and regulatory requirements may occur in future. Either of those factors may change the conclusions presented in our report. If development does not take place within the expected timescales, consideration should be given to reviewing this assessment to confirm that no changes to the site or relevant legislation have taken place. No part of this report is intended to provide legal advice or opinion of any nature.