

Our Ref: AM/JK/JN1124 rev1
Your Ref:



25th June 2018

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For the attention of Katie Turvey

Dear Katie,

Re: 35a Broadhurst Gardens, Camden, London NW6 3QT
National Grid Reference: TQ 26193 84641
Geology: London Clay

1 Authority

Our authority for carrying out this work is contained in our Project Order Form, completed by Nicola Imrie of Circle East Ltd and dated 6th April 2018.

2 Background and Scope

The site is the subject of a Prior Approval application for a change of use from the current B1 business class to residential C3 class. A desk study was completed by Southern Testing in April (Ref: LDM/MS/J13567) which was submitted to the local authority for review. Following a review of the desk study, the London Borough of Camden, the local planning authority, requested that contaminated land planning conditions be applied to the site, relevant to a Medium Risk site, in the context of the proposed change of use. One of the major concerns was the proposal to create a garden and, therefore, a potential pollution linkage.

The conditions applied comprised an intrusive ground investigation and subsequent remediation, if needed. The location of the site is shown on the attached Figure 1.

Our proposals for the intrusive investigation were outlined in an email to Robert Lester, a Planning Officer at Camden council, dated 22nd May 2018. In summary, our proposals were for 3-5 trial holes, to around 1m, although deep enough to penetrate the natural London Clay, with testing for a general suite of contaminants. This scope was agreed in principle, with the only comment being a request for a risk assessment to assess the data, in an email from Nick Priddle (a Noise Officer at Camden Council) dated 29th May 2018.



3 Site and Development Proposals

The site comprises the lower floor (semi-basement) of a 3 storey Victorian residential building that has most recently been used as a recording studio (largely cleared and vacant at time of the site visit). Upper floors are residential (occupied). It is proposed to convert the space to a residential apartment. The subject site includes a small external garden to the rear of the property. This is mainly concrete hardstand with limited shrub verging and a wooden office outbuilding. Behind the office are two steel storage cupboards (stationary, packaging etc) and an air conditioning unit. Several metres beyond the brick wall of the southern site boundary is an electricity sub-station building. A series of photographs are attached.

4 Investigation Brief

In accordance with the Client's instructions, and our quotation, the following was included in our brief for this intrusive investigation:

- Window sampler boreholes together with sampling.
- Chemical laboratory testing.
- Interpretive Report.

5 Scope

This report presents our, exploratory hole logs and contamination test results and our interpretation of these data. As with any site there may be differences in soil conditions between exploratory hole positions.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The desk study was conducted and this report has been prepared for the sole internal use and reliance of Circle East Ltd and their appointed representatives. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

Geotechnical issues are not considered in this report. Soil waste characterisation also did not form part of our brief for this investigation

Recommendations contained in this report may not be appropriate to alternative development schemes. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

6 Desk Study

As discussed, a desk study for the site was completed by Southern Testing in April 2018 (ref LDM/MS/J13567), to which the reader is referred for full details.

In summary, the desk study concluded that the likelihood of contamination being present at the site or affecting the site was very low, based on the current layout. However, upon review, the London Borough of Camden requested that investigation and testing be undertaken.

7 Site Investigation

The agreed strategy adopted for the intrusive investigation comprised the following:

- 4 No 2m deep boreholes were drilled using hand help window sampling equipment.

Exploratory hole locations are shown in Figure 1 in Appendix A.

8 Weather Conditions

The fieldwork was carried out on 30.5.18, at which time the weather was generally warm and dry.

9 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of concrete or topsoil over shallow fill over clay subgrades. A summary is given below.

Depth	Soil Type	Description
GI-0.08/0.5m	Surface	Unreinforced concrete or topsoils (WS4).The topsoil was a double sequence of humic dark grey silty sand and clays with rootlets and rare bitumen gravel.
-0.28/0.6m	Sub-base	Loose crushed brick and mortar gravels and cobbles. Black ash and clinker lens at base in WS3.
-1.9m	Fill	Possibly reworked clays with sandy partings and possible brick fragments towards the base. [WS4 only]
-2.0m+	Clay	Firm brown silty CLAY with occasional subrounded flint gravel. Possible lithorelict mudstone structure towards base.

9.1 Visual and Olfactory Evidence of Contamination

Evidence of possible contamination in the form of anthropogenic input was recorded at the location of WS3 (clinker lens) and WS4 (rare bitumen gravel in lower topsoil), although sub-base or Made Ground was encountered in each trial hole; this material can be impacted with a variety of general contaminants.

10 Groundwater Strikes

Water was not encountered within any of the exploratory holes, to a maximum depth of 2m.

11 Land Quality - Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model¹ provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH² S4UL's and CL:AIRE³ generic assessment criteria. In addition, in March 2014, DEFRA⁴ published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

The values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

11.1 Site Investigation – Soil

11.2 Sampling Regime

The number of sample locations was limited to the small garden area, as access was restricted by the presence of buildings and buried services.

¹ Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).

² The LQM/CIEH S4ULs for Human Health Risk Assessment. (2014).

³ The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2009).

⁴ SP1010 Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. DEFRA, 2014.

11.3 Testing

The potential for contamination by asbestos during the construction of the recording studio on-site was identified in the preliminary conceptual model and observations made on site and, therefore, the following tests were selected.

Test Suite	Number of Samples	Soil Tested
STC Suite 3	5	Made Ground, Topsoil, Natural
TPH CWG	1	Made Ground
PCBs	3	Made Ground, Topsoil, Natural

The test results are presented in full in Appendix B. A summary and discussion of the significance of the results and identified contamination sources is given below.

11.4 Test Results and Identified Contamination Sources

11.4.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix B. The screening values and source notes are presented in Table 1 "Tier 1 Screening Values" at the front of Appendix B.

Contaminants	Units	Population Mean/ Result			Residential with Homegrown Produce Consumption Tier 1 Screening Value
		MADE GROUND (3 samples)	TOPSOIL (1 sample)	NATURAL (1 sample)	
Arsenic (As)	mg/kg	70	28	14	37
Cadmium (Cd)	mg/kg	<0.2	0.4	<0.2	11
Total Chromium (Cr)	mg/kg	25-29	43	52	910
Hexavalent Chromium (CrVI)	mg/kg	4.0	<4.0	<4.0	6
Lead (Pb)	mg/kg	287	800	26	200
Mercury (Hg)	mg/kg	1.2	1.8	<0.3	7.6-11
Selenium (Se)	mg/kg	1.0	2.2	1.2	250
Nickel (Ni)	mg/kg	25	29	35	130
Copper (Cu)	mg/kg	77	110	22	2,400
Zinc (Zn)	mg/kg	330	610	61	3,700
Benzo[a]pyrene	mg/kg	0.37	1.6	<0.05	1.7-2.4
Naphthalene	mg/kg	0.43	0.15	<0.05	2.3-13
Acidity (pH value)	Units	10	7.9	8.2	-
Soil Organic Matter	%	4.6	5.3	0.5	-

Compared to the tier 1 screening values significantly elevated concentrations of Lead have been identified within both the made ground (287mg/kg) and topsoil (800mg/kg) samples analysed, with an elevated concentration of arsenic also reported in one of the made ground samples analysed (giving a mean of 70mg/kg). No other elevated concentrations of the determinants tested for were identified in the samples analysed.

11.5 Asbestos

No asbestos containing materials were detected in the samples analysed and none were observed in the exploratory holes. However, it should be noted that the exploratory holes are of small diameter, that the investigation was constrained by site usage and that the samples obtained may not reflect the full composition of the soils on the site. Therefore, there is always the potential for pockets of asbestos or for asbestos containing materials to be present, which have not been detected in the sampling (see discovery strategy).

11.6 Organic Contaminants

Although there was no evidence of significant fuel contamination observed in the boreholes, given the site history, petroleum hydrocarbons were considered a potential on-site contaminant. As a precaution, five samples from around the site were analysed for petroleum hydrocarbons, with detailed aliphatic and aromatic splits. All samples returned results below the human health screening values and no specific remediation is necessary in this regard.

The following table summarises the results of the analysis.

Hydrocarbon substance or Fraction	Measured Concentration in mg/kg ($\mu\text{g}/\text{kg}$)						
	WS1 0.20	WS2 0.25	WS3 0.50	WS3 0.70	WS4 0.30	WS4 0.75	WS4 1.80
BTEX							
Benzene	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
Ethylbenzene	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
Xylenes	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
MTBE	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
Aliphatics							
EC5-EC6	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC6-EC8	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC8-EC10	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC10-EC12	< 1.0	< 1.0	< 1.0	-	< 1.0	< 1.0	< 1.0
>EC12-EC16	< 2.0	2.2	4.9	-	< 2.0	< 2.0	< 2.0
>EC16-EC35	50	28	20	-	31	< 8	< 8
Aromatics							
EC5-EC7 (Benzene)	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC7-EC8 (Toluene)	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC8-EC10	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001
>EC10-EC12	< 1.0	< 1.0	1.4	-	1.3	< 1.0	< 1.0
>EC12-EC16	< 2.0	< 2.0	6.7	-	4.5	< 2.0	< 2.0
>EC16-EC21	< 10	< 10	< 10	-	20	< 10	< 10
>EC21-EC35	31	< 10	16	-	74	< 10	< 10

* Aliphatic and Aromatic compounds

Although some minor petroleum hydrocarbon impact was reported, the concentrations were all below the corresponding screening values (LOM/|CIEH S4ULs residential land use 1%SOM). This concurs with the visual and olfactory evidence.

11.7 PCBs

Testing for PCBs were undertaken within soil samples from exploratory holes WS3 at 0.50 m and 0.70 m bgl and from WS4 at 0.30 m bgl. An off-site sub-station was reported in the desk study, which represents a potential point source of PCB's.

All results were below the laboratory limit of detection (< 0.001 mg/kg) for the two samples analysed.

11.8 Summary of Identified Contamination

Significantly elevated concentrations of Arsenic and Lead have been identified in the made ground and topsoil analysed. No elevated concentrations of the other determinants tested for were reported in the soils analysed.

11.9 Risk Evaluation

The object of the risk evaluation is to assess the pollution linkages for specific contaminant groups considered in the conceptual model, identify any unacceptable risks and, therefore establish whether there is a need for further investigation and/or remedial action.

The risks are considered in the context of the specific development proposals for the site and, therefore, the conclusions may not be appropriate for alternative schemes.

11.10 Revised Conceptual Model

The preliminary site model has been refined in light of the findings of this investigation and is summarised below.

<i>Metals</i>	<i>Petroleum Hydrocarbons</i>	<i>PAHs</i>	<i>PCBs</i>	<i>Asbestos</i>	PATHWAYS	RECEPTORS
Y	N	N	N	N	Ingestion and inhalation of contaminated soil and dust	Human Health
Y	N	N	N	N	Dermal contact with contaminated soil and dust	
n/a	N	N	N	n/a	Inhalation of vapours or gases	
P	N	N	N	n/a	Uptake into edible fruit and vegetables	
n/a	n/a	n/a	n/a	n/a	Surface water run-off into surface water features	Water Environment
n/a	n/a	n/a	n/a	n/a	Migration through ground into surface water or groundwater	
n/a	n/a	n/a	n/a	n/a	Off-site migration of contaminated groundwater	
P	N	N	N	n/a	Vegetation on site growing in contaminated soil	Flora and Fauna
N	N	N	N	n/a	Aquatic life in affected waters	
Y	N	N	N	n/a	Contact with contaminated soil	Building materials/ buried services
n/a	N	n/a	n/a	n/a	Fire or explosion	

Key:

- Y Pollutant linkage likely
- N Pollutant linkage not likely
- P Pollutant linkage possible
- n/a Pathway not applicable to contaminant

11.11 Relevant Pollutant Linkages

A number of Relevant Pollutant Linkages for which remedial action will be required have been identified in the revised conceptual model, as follows.

Contaminant/Source	Pathways	Receptors
Lead and Arsenic in Made Ground & Lead in Topsoil	Soil/dust Ingestion/inhalation	Site/ Construction workers Future residents Flora & Fauna Building materials/ buried services
	Soil/dust Dermal exposure	
	Plant uptake	
	Vegetation growing on site	
	Contact with contaminated soil	
	Fire or explosion	

Potential pollutant linkages have been identified for Lead and Arsenic in the made ground and topsoil. Remediation work is likely to be warranted in order to remove the source of potential contamination to future site users. At this stage, we would recommend the removal of the topsoil and some of the made ground in the proposed garden area and replacement with 600 mm of certified clean subsoil and topsoil.

11.12 Discussion and Conclusions

In an effort to remove the source of potential contamination for future site users it is recommended that the topsoil and some of the made ground be removed and replaced with 600 mm of certified clean subsoil and topsoil, although the specific remediation details need to be agreed with Camden Council.

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a discovery strategy will be adopted to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner, as follows:

- A close watch will be maintained during all demolition and excavation works.
- In the event that unexpected or malodorous soils or liquids are encountered, excavation work shall cease in the affected area.
- The affected area shall be made safe and fenced off to prevent unauthorised access.
- The Site Manager shall notify *Southern Testing Laboratories* of the discovery, who will attend site to inspect the suspect materials, provide advice and take samples as necessary. Within *Southern Testing Laboratories*, Joe Kelly shall be the first point of contact.
- The Site Manager shall notify Camden Borough Council of the discovery. Within Camden Council, Nick Priddle shall be the first point of contact.

Any suspect excavated soil will be stockpiled separately on polythene sheeting, covered, and tested before being removed.

The remediation strategy should be agreed with the regulatory authorities prior to commencement of any remedial works.

11.13 General Guidance

Allowance should be made for experienced verification of any remedial works.

It may be that specific local requirements apply to this site, of which we are not aware at this time.

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

Some soils will require removal from site and disposal to suitably licensed landfills. Different guidelines and charges will apply to different waste classification. As waste producers, the Developer holds responsibilities under the various governing regulations. The chemical analyses appended to this report should be forwarded to tip operators for their own assessment, to confirm classification of the soils for offsite disposal, and whether they can accept the material. Waste Acceptance Criteria (WAC) testing may be requested for confirmation of the material's classification.

All hazardous and non-hazardous soils leaving site will need to be pre-treated. Waste minimisation by selective excavation is a recognised form of pre-treatment.

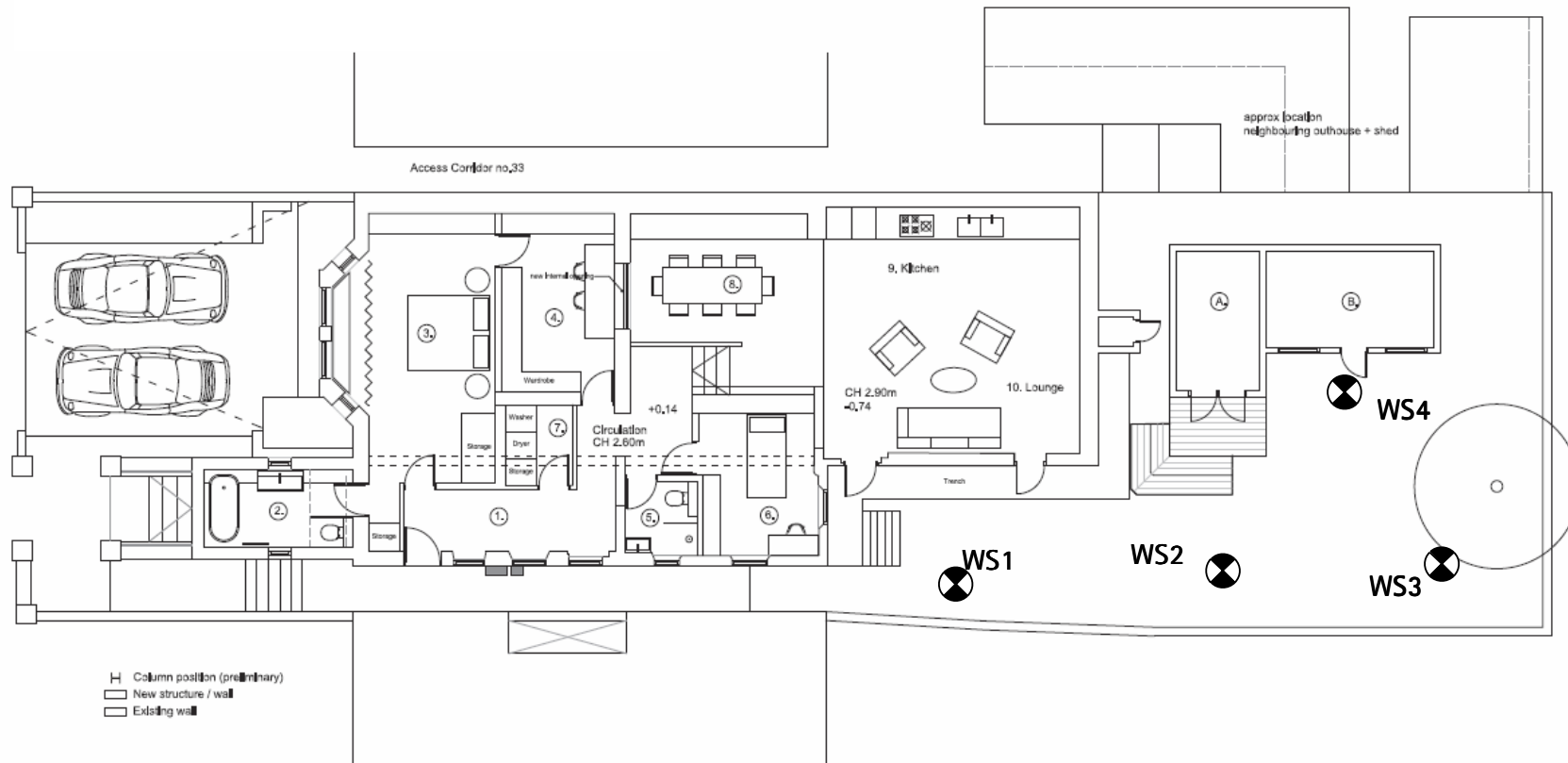
If you have any queries or we can be of further assistance, please do not hesitate to contact us.

Yours faithfully,



Andrew Moffatt BSc MSc FGS
For and on behalf of
Southern Testing Laboratories Limited
Email: amoffatt@stconsult.co.uk

Appendix A: Site Plans & Logs
Appendix B: Chemical Laboratory Results



NB: Positions of Boreholes and/or Trial Pits are only indicative unless dimensioned

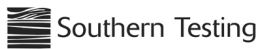
Site: 35a Broadhurst Gardens, Camden

STL: JN1124

Fig No: 1

Date: 30.5.18

Fieldwork location plan.

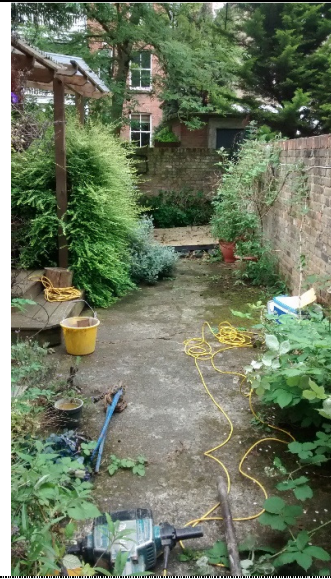


Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU





WS1



View South from WS1



WS2



WS3



SE boundary



WS4



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Analytical Report Number : 18-87275

Project / Site name:	35a Broadhurst Gardens, Camden, London NW6	Samples received on:	31/05/2018
Your job number:	JN1124	Samples instructed on:	31/05/2018
Your order number:		Analysis completed by:	07/06/2018
Report Issue Number:	1	Report issued on:	07/06/2018
Samples Analysed:	7 soil samples		

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

Lab Sample Number				971500	971501	971502	971503	971504
Sample Reference				WS1	WS2	WS3	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.25	0.50	0.70	0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	15	16	17	16
Total mass of sample received	kg	0.001	NONE	0.41	0.75	0.52	0.55	0.66

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	10.7	11.0	8.4	-	7.9
Organic Matter	%	0.1	MCERTS	0.8	1.0	12	-	5.3

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.2	-	0.15
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.09	< 0.05	1.3	-	1.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.18	-	0.24
Fluoranthene	mg/kg	0.05	MCERTS	0.18	< 0.05	2.0	-	3.1
Pyrene	mg/kg	0.05	MCERTS	0.16	< 0.05	1.8	-	2.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.08	< 0.05	1.1	-	1.6
Chrysene	mg/kg	0.05	MCERTS	0.08	< 0.05	1.1	-	1.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3	-	2.2
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.63	-	0.90
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.0	-	1.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.61	-	0.90
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.13	-	0.20
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.82	-	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	13.2	-	17.5
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	17	180	-	28
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	-	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	-	< 4.0
Chromium (III)	mg/kg	1	NONE	29	27	25	-	43
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	27	25	-	43
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	34	170	-	110
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	300	150	-	800
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0	2.3	-	1.8
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	20	36	-	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.0	-	2.2
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	140	140	-	610

Analytical Report Number: 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

Lab Sample Number	971500			971501			971502			971503			971504		
Sample Reference	WS1			WS2			WS3			WS3			WS4		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.20			0.25			0.50			0.70			0.30		
Date Sampled	Deviating			Deviating			Deviating			Deviating			Deviating		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics

Compound	Units	Limit of detection	Accreditation Status	971500	971501	971502	971503	971504
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic > EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic > EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic > EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic > EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH-CWG - Aliphatic > EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.2	4.9	-	< 2.0
TPH-CWG - Aliphatic > EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	-	< 8.0
TPH-CWG - Aliphatic > EC21 - EC35	mg/kg	8	MCERTS	50	28	20	-	31
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	56	34	29	-	34

TPH-CWG - Aromatic > EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic > EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic > EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic > EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.4	-	1.3
TPH-CWG - Aromatic > EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	6.7	-	4.5
TPH-CWG - Aromatic > EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	-	20
TPH-CWG - Aromatic > EC21 - EC35	mg/kg	10	MCERTS	31	< 10	16	-	74
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	40	< 10	31	-	100

PCBs by GC-MS

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

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	< 0.007	< 0.007	< 0.007
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Analytical Report Number: 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

Lab Sample Number				971505	971506			
Sample Reference				WS4	WS4			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.75	1.80			
Date Sampled				Deviating	Deviating			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	18	12			
Total mass of sample received	kg	0.001	NONE	0.59	0.58			

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected			
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.2			
Organic Matter	%	0.1	MCERTS	-	0.5			

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	14			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0			
Chromium (III)	mg/kg	1	NONE	-	52			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	52			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	22			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	26			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	35			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	1.2			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	61			

Analytical Report Number: 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

Lab Sample Number				971505	971506			
Sample Reference				WS4	WS4			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.75	1.80			
Date Sampled				Deviating	Deviating			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

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	-	-			

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-			
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Analytical Report Number : 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

* 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 *
971500	WS1	None Supplied	0.20	Light brown sandy clay with rubble.
971501	WS2	None Supplied	0.25	Light brown sandy clay with rubble and brick.
971502	WS3	None Supplied	0.50	Black gravelly loam with coal.
971503	WS3	None Supplied	0.70	Brown clay and loam with vegetation.
971504	WS4	None Supplied	0.30	Brown clay and loam with vegetation.
971505	WS4	None Supplied	0.75	Brown clay.
971506	WS4	None Supplied	1.80	Brown clay with gravel.

Analytical Report Number : 18-87275

Project / Site name: 35a Broadhurst Gardens, Camden, London NW6

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

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 disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	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.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests"	L009-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS1		S	18-87275	971500	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS1		S	18-87275	971500	ab	Speciated EPA-16 PAHs in soil	L064-PL	b
WS1		S	18-87275	971500	ab	TPHCWG (Soil)	L088/76-PL	b
WS2		S	18-87275	971501	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS2		S	18-87275	971501	ab	Speciated EPA-16 PAHs in soil	L064-PL	b
WS2		S	18-87275	971501	ab	TPHCWG (Soil)	L088/76-PL	b
WS3		S	18-87275	971502	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS3		S	18-87275	971502	ab	PCB's By GC-MS in soil	L027-PL	b
WS3		S	18-87275	971502	ab	Speciated EPA-16 PAHs in soil	L064-PL	b
WS3		S	18-87275	971502	ab	TPHCWG (Soil)	L088/76-PL	b
WS3		S	18-87275	971503	ab	PCB's By GC-MS in soil	L027-PL	b
WS4		S	18-87275	971504	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS4		S	18-87275	971504	ab	PCB's By GC-MS in soil	L027-PL	b
WS4		S	18-87275	971504	ab	Speciated EPA-16 PAHs in soil	L064-PL	b
WS4		S	18-87275	971504	ab	TPHCWG (Soil)	L088/76-PL	b
WS4		S	18-87275	971505	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS4		S	18-87275	971505	ab	TPHCWG (Soil)	L088/76-PL	b
WS4		S	18-87275	971506	ab	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS4		S	18-87275	971506	ab	Speciated EPA-16 PAHs in soil	L064-PL	b
WS4		S	18-87275	971506	ab	TPHCWG (Soil)	L088/76-PL	b