



**17 Acacia Road
London
NW8 6AN**

Remediation Method
Statement

Mr Barry Townsley

September 2021

J19229 A
Rev 0



Report prepared by




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APPENDIX

1.0 INTRODUCTION

Consideration is being given to the remodelling of the existing house through the extension of the existing single level basement beneath the central eastern portion of the house to a lower level and the construction of a single-storey extension at ground level to the rear of the house.

A desk study and ground investigation report has previously been undertaken by GEA (report ref J19229 Report Issue 2, dated 03 December 2019).

The previous investigation indicated two samples of the made ground tested to be contain from elevated concentrations of lead.

This report sets out a formalised Remedial Method Statement and should be read in conjunction with the previous reports. The proposed development has been granted permission by City of Westminster Council (planning ref: 19/09542/FULL) and this report has been prepared to satisfy Condition 9, relating to a contaminated land remediation scheme. The wording of the condition is as follows:

G *You must carry out a detailed site investigation to find out if the building or land are contaminated with dangerous material, to assess the contamination that is present, and to find out if it could affect human health or the environment. This site investigation must meet the water, ecology and general requirements outlined in 'Contaminated Land Guidance for Developers submitting planning applications' - produced by Item No. Westminster City Council in January 2018. You must apply to us for approval of the following investigation reports. You must apply to us and receive our written approval for phases 1, 2 and 3 before any demolition or excavation work starts, and for phase 4 when the development has been completed but before it is occupied.*

- G** *Phase 1: Desktop study - full site history and environmental information from the public records.*
- G** *Phase 2: Site investigation - to assess the contamination and the possible effect it could have on human health, pollution and damage to property.*
- G** *Phase 3: Remediation strategy - details of this, including maintenance and monitoring to protect human health and prevent pollution.*

1.1 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigations carried out. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; no liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

2.0 THE SITE

The site is located within the City of Westminster, approximately 150 m east of St John's Wood London Underground station. It may additionally be located by National Grid Reference, 527010, 183500.

The site fronts onto Acacia Road to the northwest and is bounded by two-storey detached houses to the east and west, although No 15 Acacia Road was noted to have a single-storey extension, in use as a garage, which shares the party wall to the west. To the southeast, beyond the rear garden, the site abuts Robinsfield Infant School. A walkover of the site was carried out by a geotechnical engineer from GEA at the time of the fieldwork. The site is rectangular in shape and measures approximately 18 m east-west by 40 m north-south. It is occupied by a two-storey detached house with a loft conversion and a single level basement

beneath the western central portion of the house. A paved driveway is present at the front in addition to a large garden to the rear.

The house occupies the northern part of the site, with bushes and shrubs around the borders. A paved patio occupies the area adjacent to the rear of the house, beyond which is the rear garden, in the southern part of the site. The garden is mostly laid to artificial turf with numerous saplings, semi-mature and mature deciduous and coniferous trees in excess of 20 m in height, located along the perimeter.

The rear garden is approximately 1.00 m lower than ground level at the front of the house. The site is otherwise essentially level.

2.1 Background Information

The previous desk study indicated that the site has only been developed with houses since prior to 1872. The surrounding area also remained predominantly residential in use.

3.0 GROUND MODEL

The desk study findings do not indicate the site to have a contaminative history as it has only been developed with residential properties. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows:

- Ⓒ below a moderate thickness of made ground, Head Deposits are present over the London Clay, which extends to the maximum depth of the investigation, of 8.00 m (35.90 m OD);
- Ⓒ the made ground generally comprises light orange-brown silty sandy gravelly clay with occasional brick, concrete, clinker, flint gravel and rare rootlets and extends to at least 1.30 m (42.60 m OD);

- Ⓒ Head Deposits initially comprise soft becoming firm light orange-brown extremely mottled grey silty slightly sandy gravelly clay to 3.70 m (40.20 m OD), becoming light yellow-brown silty sandy very gravelly clay to a depth of 4.10 m (39.80 m OD);
- Ⓒ the London Clay consists of firm light brown occasionally mottled grey becoming light brown silty clay with occasional carbonaceous material and lenses of fine silt pockets and extends to the maximum depth investigated at 8.00 m (35.90 m OD);
- Ⓒ groundwater has been measured at depths of 1.20 m (42.70 m OD) and 1.30 m (42.60 m OD) and is likely to be perched groundwater from within the Head Deposits;
- Ⓒ elevated concentrations of lead have been measured within two samples of the made ground with respect to a residential end use with plant uptake; and
- Ⓒ asbestos was not detected in the four samples screened.

4.0 CONCEPTUAL MODEL

The investigation has indicated elevated concentrations of lead in the made ground, although the contamination is considered to be a result of result of background airborne pollution, particularly from the historical use of lead within vehicle exhaust emissions and also possibly bomb damage during the war, and therefore not specific to the site and not in a soluble state. The table below sets out the risk pathways that could potentially be present following the redevelopment of the site, which will have a residential with plant uptake end use. This Conceptual model is based upon the findings of the ground model developed in the light of the investigation findings and highlights areas where remedial work should be considered.

SOURCE	RECEPTOR	PATHWAY	COMMENT
Made ground – elevated concentrations of metal	End users	Direct contact, accidental ingestion or inhalation of soil or soil-derived dust	Beneath the building and hardstanding there is no pathway for contamination to reach end users. Only in the retained garden will there be a potential pathway although the garden is entirely laid to artificial lawn and no new areas of soft landscaping will be created as part of the proposals such that the risk to end users will not be any higher than currently present. In addition, the majority of the contaminated made ground will be disposed of off-site as part of the basement excavation and thus eliminate the potential risk.
	Ground workers and future site workers	Ingestion of contaminated soil or dust, through skin contact or inhalation although in acute dose the risk posed by the concentrations present is considered to be small	Skin contact with the soil will be minimized through the use of PPE and washing facilities will be provided. A watching brief should be maintained and if during construction works, and if unidentified contamination is encountered, further consultation will be required.
	Groundwater	Percolation and leaching of surface run-off in areas of soft landscaping and permeable paving	The elevated concentrations identified in the soil are unlikely to be in a soluble form and therefore leaching of contaminants is unlikely. In any case, the majority of the made ground will be removed as part of the basement excavation and the site is underlain by a Secondary 'A' aquifer over Unproductive Stratum and is not within a Source Protection Zone, such that groundwater is not considered to be a sensitive receptor.
	Adjacent sites	Mobilisation of contaminants to underlying aquifer via leaching	
Radon	End users	Inhalation of gas	The site is located within an extensive 'non-affected' area comprising almost the entire London Basin, the risk from radon gas is particularly low, due to an absence of any potential sources of measurable quantities of radon gas, e.g., uranium ores, phosphate rock, shales, igneous and metamorphic rocks such as granite, gneiss, and schist, and to a lesser degree, sedimentary rocks such as limestone; with the site and surrounding area instead underlain by a significant thickness of London Clay.

5.0 REMEDIAL OBJECTIVES

Based on the above risk assessment the following remedial objectives have been established for this development;

- protection of ground workers and future site workers who may be exposed to the soil.

6.0 REMEDIAL RECOMMENDATIONS

To address the remedial objectives above, the remedial measures will include;

- the adoption of appropriate working practices to minimise dust generation and minimise site workers' contact with the soil to protect adjacent end users and site workers.

The details of these remedial measures are set out below in the Verification Plan:

7.0 VERIFICATION PLAN

This section sets out how the remedial measures will be achieved and validated.

7.1 Site Workers

Site workers will be made aware of the potential for contamination in the soils and a programme of working will be identified to protect workers handling any soil. The method of site working will be in accordance with guidelines set out by HSE and CIRIA. Washing facilities will be provided and site workers will be encouraged to wash prior to eating and to use appropriate PPE when on site to minimise skin contact with the soil.

There will be no stockpiling of soil on the site. If any areas of made ground are left exposed for long periods measures will be required to prevent dust generation.

7.2 Unknown Contamination

Prior to the commencement of ground works a site induction meeting will be held, attended by the developer and site workers, where the appointed geoenvironmental engineer will brief the workers on the history of the site and the nature of any contaminated soils they may encounter. This information will be included in the Discovery Strategy which will also be displayed in the site office, along with the contact names and numbers of the geoenvironmental engineers, so that contact can easily be made if any suspicious substances are encountered. If, during development, contamination not previously identified is found to be present at the site, the Council will be informed immediately and no further development (unless otherwise agreed in writing by the Council) will be carried out until a report indicating the nature of the contamination and how it is to be dealt with is submitted to, and agreed in writing by, the Council. A copy of the discovery strategy is included in the attached appendix.

In the event that contamination is not encountered, a statement to this effect by a suitably qualified and experienced individual will be provided.

7.3 Reporting

On completion of the remedial works, a report will be prepared documenting the satisfactory undertaking of the remediation proposals and of any duty of care under the waste management legislation, together with an assessment of the suitability of the soils remaining beneath the site in respect of the proposed residential development. The report will include written and photographic records of the site inspections carried out, together with the results of the validation analyses and will present an assessment of the condition of the remediated site with respect to the end use.

DISCOVERY STRATEGY - GROUNDWORK PHASE CONTAMINATED GROUND

Project name: 17 Acacia Road, London, NW8 6AN

Project Ref: J19229A

Date: 03/09/2021

Project engineer: Lina Seoudi

Supervising engineer: Steve Branch

This Discovery Strategy is a requirement of planning consent and must be complied with fully.

1.0 INTRODUCTION

The site is to be redeveloped through the extension of the existing single level basement beneath the central eastern portion of the house to a lower level and the construction of a single-storey extension at ground level to the rear of the house.

A Discovery Strategy is to be implemented during the construction phase of the programme. Its purpose is to define the process to be undertaken on site in the event that previously unidentified pockets of contamination or suspicious objects are discovered during the redevelopment of the site. It is intended to be understood and followed by all on-site workers and for all new site workers to be made aware of the procedure.

2.0 HOW TO IDENTIFY POTENTIAL CONTAMINATED MATERIAL

- Looks oily and has an oily odour.
- Solvent, organic type of odour.
- Man-made materials in fill such as paint cans, car parts, glass fragments.
- Contains fragments of white asbestos sheeting, lagging or insulation, coal/coke clinker.
- Subsurface concrete / metal structures including buried tanks.
- (Examples only – this list is not exhaustive. If in any doubt, ask).

3.0 PROCEDURE

On the discovery of any suspicious pockets of material during the redevelopment the following procedure should be followed:

- Stop Work
- Site personnel to immediately inform the Site Manager. Do not investigate it yourself.
- The Site Manager will initially decide if the material is potentially contaminated and will inform GEA. The area will be cordoned off and work will cease in the vicinity.
- GEA will attend site to sample material for laboratory testing and will attempt to quantify the volume. The Local Authority Environmental Health Officer will then be notified that potentially contaminated material has been discovered and will be forwarded laboratory data and a remedial strategy for their approval in the event that the material is to be classified as contaminated.
- Work may only recommence once written approval has been received from the Local planning Authority.

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Site	17 Acacia Road, London NW8 6AN	Job Number J19229
Client	Mr Barry Townsley	
Engineer	Engineers HRW	Sheet 1 / 1

Proposed End Use Residential with plant uptake

Soil Organic Matter content % 2.5

Contaminant	Screening Value mg/kg	Data Source
Metals		
Arsenic	37	C4SL
Cadmium	22	C4SL
Chromium (III)	910	S4UL
Chromium (VI)	21	C4SL
Copper	2,400	S4UL
Lead	200	C4SL
Elemental Mercury	1.2	S4UL
Inorganic Mercury	40	S4UL
Nickel	130	S4UL
Selenium	350	SGV
Zinc	3,700	S4UL
Anions		
Soluble Sulphate	500 mg/l	Structures
Sulphide	50	Structures
Chloride	400	Structures
Others		
Organic Carbon (%)	6	Methanogenic potential
Total Cyanide	140	WRAS
Total Mono Phenols	290	SGV
PAH		
Naphthalene	5.60	S4UL
Acenaphthylene	420	S4UL
Acenaphthene	510	S4UL
Fluorene	400	S4UL
Phenanthrene	220	S4UL
Anthracene	5,400	S4UL
Fluoranthene	560	S4UL
Pyrene	1,200	S4UL
Benzo(a)anthracene	11.0	S4UL
Chrysene	22	S4UL
Benzo(b)fluoranthene	3.3	S4UL
Benzo(k)fluoranthene	93.0	S4UL
Benzo(a)pyrene	4.40	C4SL
Indeno(1 2 3 cd)pyrene	36.0	S4UL
Dibenz(a h)anthracene	0.28	S4UL
Benzo (g h i)perylene	340	S4UL
Total PAH Screen	62.9	B(a)P / 0.15

Contaminant	Screening Value mg/kg	Data Source
Hydrocarbons		
Banded TPH (8-10)	128	Calc1
Banded TPH (10-12)	277	Calc1
Banded TPH (12-16)	508	Calc1
Banded TPH (16-21)	831	Calc1
Banded TPH (21-35)	2308	Calc1
Benzene	0.34	C4SL
Toluene	320	SGV
Ethyl Benzene	180	SGV
Xylene	120	SGV
Aliphatic C5-C6	78	S4UL
Aliphatic C6-C8	230	S4UL
Aliphatic C8-C10	65	S4UL
Aliphatic C10-C12	330	S4UL
Aliphatic C12-C16	2400	S4UL
Aliphatic C16-C35	92,000	S4UL
Aromatic C6-C7	See Benzene	S4UL
Aromatic C7-C8	See Toluene	S4UL
Aromatic C8-C10	83	S4UL
Aromatic C10-C12	180	S4UL
Aromatic C12-C16	330	S4UL
Aromatic C16-C21	540	S4UL
Aromatic C21-C35	1500	S4UL
PRO (C ₅ -C ₁₀)	776	Calc2
DRO (C ₁₂ -C ₂₈)	95,270	Calc2
Lube Oil (C ₂₈ -C ₄₄)	93,500	Calc2
TPH	750	Trigger to consider specciated testing
Chlorinated Solvents		
1,1,1 trichloroethane (TCA)	18	S4UL
tetrachloroethane (PCA)	2.8	S4UL
tetrachloroethene (PCE)	0.39	S4UL
trichloroethene (TCE)	0.034	S4UL
1,2-dichloroethane (DCA)	0.011	S4UL
vinyl chloride (Chloroethene)	0.00087	S4UL
tetrachloromethane (Carbon tetra)	0.056	S4UL
trichloromethane (Chloroform)	1.7	S4UL

Notes

Concentrations measured below these screening values may be considered to represent 'uncontaminated conditions' which pose a 'LOW' risk to human health. Concentrations measured in excess of these values indicate a potential risk which require further, site specific risk assessment.

C4SL - Defra Category 4 Screening value based on Low Level of Toxicological Risk

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009 - where not superseded by C4SL

S4UL - LQM/CIEH Suitable for use Level (2015) based on 'minimal' level of risk

Calc1 - sum of thresholds for Ali & Aro fractions - assuming a 35% Aro:65% Ali ratio as is commonly encountered in the soil

Calc2 - sum of nearest available carbon range specified including BTEX for PRO fraction

Total PAH based on B(a)P / 0.15 - GEA experience indicates that Benzo(a) pyrene rarely exceeds 15% of the total PAH concentration