

BY FAX AND POST

8 March 2005

Your ref:

Our ref: J04105A/DN/1

Mr F Hurr
Radley Contracts Limited
Rowlandson House
289/293 Ballards Lane
Finchley
London
N12 8NP



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Dear Mr Hurr

Re: 139-143 YORK WAY, LONDON

Further to your instruction we have completed the additional fieldwork at the above site and present our findings as follows.

Introduction

Geotechnical and Environmental Associates (GEA) was previously been commissioned by Mason Navarro Partnership on behalf of Central European Commodities to carry out a desk study and ground investigation at the above site, report ref: J04105, dated August 2004. The investigation found the site had previously been subject to a potentially contaminative use and measured elevated concentrations of some metals in a single borehole. It was recommended that it would be prudent to carry out further works to investigate the presence of contamination across the site. This information is also required to satisfy the requirements of the NHBC.

This work has now been carried out and this letter presents the findings of the additional work and makes recommendations specific to the proposed development.

The conclusions and recommendations made in this letter are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the number of locations where the ground was sampled and the number of soil, gas or ground water samples tested and no liability can be accepted for conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate. No independent validation of third party information has been made by GEA.

Proposed Development

It is proposed to redevelop this site by the construction of a new seven storey residential and commercial building incorporating a basement car park and with a limited amount of communal gardens. This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

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Background Information

The previous site investigation comprised a single borehole constructed towards the centre of the southern half of the site. A substantial thickness of made ground was encountered which generally comprised clayey building debris to a depth of 3.9 m whereupon a weak concrete slab was encountered. It is thought that this made ground represents demolition rubble which has been used to fill a former basement. Selected samples of the made ground were submitted for laboratory contamination analyses and the results measured slightly elevated concentrations of lead and zinc to be present in the made ground at depths of 1.0 m and 2.0 m.

It is understood that a number of trial excavations were constructed alongside the party wall which forms the southern boundary and that fill materials were found to extend to depths of between 4.5 m and 5.5 m below the existing floor slab.

Additional Exploratory Work

Seven small diameter boreholes, labelled Borehole Nos 2 to 8, were advanced by means of a window sampler to a maximum depth of 4.5 m under the supervision of a geoenvironmental engineer from GEA. In each case, apart from Borehole Nos 3, 3a and 4, the sampler fully penetrated the made ground and confirmed the presence of natural soils. Borehole Nos 3, 3a and 4 were terminated within the made ground due to the presence of obstructions which prevented further penetration of the sampler.

At the time of this additional investigation, demolition of the existing buildings was in progress and the borehole locations were positioned in accessible areas subject to the demolition process. The locations of the boreholes are indicated on the attached plan.

Samples of the made ground were recovered from the boreholes and submitted for laboratory contamination analyses. The analytical suite of contamination testing was selected to identify a range of typical industrial contaminants for the purposes of general coverage. For this investigation the analytical suite included a range of metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide, and monohydric phenols.

Ground Conditions

The investigation has generally confirmed the findings of the initial investigation in that, beneath variable thicknesses of made ground, London Clay was encountered and was proved to the full depth of investigation.

Beneath a surface layer of concrete, made ground was encountered and generally comprised building debris in a sandy clayey gravel matrix. The made ground was found to extend to depths of between 1.3 m and 1.6 m in the boreholes located near to the western boundary. Towards the centre and York Way frontage, fill materials were found only to extend to depths of between 3.3 m and 3.7 m which are somewhat shallower than the depths reportedly found in your trial excavations. No indication of the concrete slab found at the base of the fill materials by the initial borehole was found in the recent boreholes.

In each case the fill materials was found to be underlain by stiff brown and grey fissured clay of the London Clay Formation

Ground water was not encountered during this investigation.

Soil Contamination

Selected samples of the made ground were submitted for laboratory contamination analyses. As in our previous report, the test results have been compared to an "uncontaminated value", where contaminant concentrations measured below this value are not deemed to require further consideration. The table below therefore sets out the range of values measured within six samples tested.

Determinant	Maximum concentration recorded (mg/kg)	Minimum concentration recorded (mg/kg)	Number of samples below detection limit	Normalised upper bound US ₉₅	Uncontaminated value
Arsenic	10	<10	4	10	20
Cadmium	<0.5	<0.5	6	0.5	8
Chromium	37	19	0	36	130
Lead	330	31	0	221	450
Mercury	0.7	<0.3	3	0.6	8
Selenium	0.9	<0.5	5	0.7	35
Copper	41	15	0	40	130
Nickel	29	16	0	24	50
Zinc	78	<10	1	56	300
Total Cyanide	<2	<2	6	2	25
Total Phenols	<3	<3	6	3	5
Polyaromatic Hydrocarbons	1400	<20	3	714	50
Sulphide	30	<10	5	20	250
Elemental Sulphur	<100	<100	6	100	5000
Total Petroleum Hydrocarbons	8400	<10	4	4227	500

Note: The use of the normalised upper bound for 95th percentile confidence aims to remove some of the uncertainty associated with calculation of an arithmetic sample mean of a relatively small number of samples. The US₉₅ value is the upper bound of the range within which it can be stated with 95% confidence that the true mean concentration of the data set will fall.

Elevated concentrations of PAH and TPH were measured in a single sample recovered from a depth of 2.5 m in Borehole No 7. If the results of testing from this particular sample are omitted from the statistical analysis, the resultant normalised upper bound US₉₅ values for PAH and TPH do not exceed the uncontaminated values. On this basis the elevated result is considered to be a statistical outlier and not representative of the general site wide conditions which do not generally warrant concern. No evidence of significant hydrocarbon contamination was observed in any of the fill materials inspected and the source of the PAH and TPH in the sample from Borehole No 7 cannot be readily explained although is most probably associated with debris containing some form of bitumen and not indicative of significant hydrocarbon contamination.

Contamination Risk Assessment

One of the requirements of the Environment Act (1995) is that local authorities carry out inspections of their area with a view to identifying sites that may be contaminated. When assessing whether a site is contaminated the local authority will attempt to establish the presence of a 'pollution linkage'. A pollution linkage requires there to be a source of contamination, a sensitive receptor that can be adversely affected by the contamination and a pathway via which contamination can reach the target.

The investigations have revealed that parts of the site are underlain by significant thicknesses of made ground. Generally, the results of chemical analyses have indicated that these materials do not warrant concern in respect of contamination issues. However, potentially contaminant concentrations of both metals and hydrocarbons have been determined within some of the deeper fill materials towards the centre of the site and therefore these may be considered to represent a possible source of contamination. The proposed development will incorporate a basement which will result in the removal of the majority of these materials. Nevertheless, the proposed residential development will create potential contaminant pathways where a communal garden is proposed.

On the basis of the above the potential pollution linkages at this site in relation to the proposed development can be summarised as follows;

SOURCE	RECEPTOR	PATHWAY	LIKELIHOOD OF OCCURRENCE
Organic and metallic contamination in near-surface soil	ground water	none	negligible
	site workers during construction	ingestion of contaminated soil or dust, skin contact, inhalation	low
	end users	ingestion of contaminated soil or dust or vegetation, skin contact, inhalation in areas of soft landscaping	low
	vegetation	uptake via soil, ground water or vapour	very low

As stated in our previous report, the made ground at this site is unlikely to be suitable for retention in landscaped areas for aesthetic reasons. As the proposed development will not include areas of domestic gardens, there will not be prolonged exposure of end users to any potential contaminants. It is therefore considered that below areas of soft cover a suitable thickness of cover will be required to provide suitable growing conditions. As the thickness is not required to protect end users the advice of the landscape architect should be sought in this respect, but for preliminary guidance we can note that a total thickness of between 300 mm and 600 mm of clean topsoil and subsoil may be required. Certificates should be provided for soil imported onto site. No other remedial works are considered necessary for the safe development of this site.

Site workers should be made aware of the possible presence of contamination and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE¹ and CIRIA² and the requirements of the Local Authority Environmental Health Officer. If any suspicious substances are encountered during site work, these should be assessed by a geoenvironmental engineer.

Waste Disposal

Any spoil arising from excavations associated with the proposed basement excavation will need to be disposed of to a licensed tip. Under the European Waste Directive landfills are due to be classified as accepting inert, non-hazardous or hazardous wastes in accordance with Waste Acceptance Criteria (WAC) based upon the results of CEN method bulk leaching tests or percolation tests. It is anticipated that the made ground from this site is likely to be classified as a 'non-hazardous waste' whilst the uncontaminated natural soils may be classified as an 'inert waste'. The elevated concentrations of hydrocarbons indicated in the sample recovered from Borehole No 7 may attract a more onerous classification but it is important to note the significance of these results in the context of the waste as a whole.

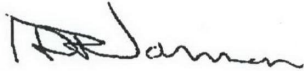
The implementation of the WAC has been delayed until 16 July 2005 in the UK and during the interim period a site specific approach is being adopted. It is thus necessary to contact the local waste regulation department of the Environment Agency (EA) to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material.

1 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land*
HMSO

2 *A guide for safe working on contaminated sites*, Report 132, Construction Industry Research and Information Association

We trust that the above and enclosed satisfies your requirements and if we can be of any further assistance with this project please do not hesitate to contact us.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

A handwritten signature in black ink, appearing to read "D. Norman". The signature is written in a cursive style with a large initial "D" and a long horizontal stroke.

David Norman

Encs



The Hertfordshire Business Centre
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Site
139-143 York Way, London, N7

Number
BH 2

Excavation Method
Drive-in Window Sampler

Dimensions
86mm to 1.00m
75mm to 2.00m

Ground Level (mOD)

Client
Radley Contracts Limited

Job Number
J04105A

Location

Dates
10/02/2005

Engineer
Mason Navarro Partnership

Sheet
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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.80-1.00	D1				(0.40)	Concrete		
					0.40	Made Ground (firm brown silty sandy gravelly clay with brick, concrete and slate fragments)		
					(1.20)			
					1.60	Firm brown and grey mottled silty sandy CLAY		
					(0.40)	Complete at 2.00m		
					2.00			

Remarks
Ground water not encountered

Scale (approx)
1:50

Logged By
dn

Figure No.
J04105.BH 2



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Site
139-143 York Way, London, N7

Number
BH 3

Excavation Method
Drive-in Window Sampler

Dimensions
86mm to 0.50m

Ground Level (mOD)

Client
Radley Contracts Limited

Job
Number
J04105A

Location

Dates
10/02/2005

Engineer
Mason Navaro Partnership

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Concrete		
					0.30	Made ground (loose brick rubble)		
					0.40			
					0.50	Concrete		
					(0.10)	Complete at 0.50m		

Remarks
Borehole terminated at 0.5 m due to concrete
Ground water not encountered

Scale (approx)
1:50
Logged By
dn

Figure No.
J04105.BH 3



The Hertfordshire Business Centre
Alexander Road
London Colney
Herts. AL2 1JG

Site
139-143 York Way, London, N7

Number
BH 3A

Excavation Method
Drive-in Window Sampler

Dimensions
86mm to 0.50m

Ground Level (mOD)

Client
Radley Contracts Limited

Job
Number
J04105A

Location

Dates
10/02/2005

Engineer
Mason Navarro Partnership

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Concrete		
					0.30	Made Ground (loose brick and concrete rubble)		
					0.40			
					0.50	Concrete		
					(0.10)	Complete at 0.50m		

Remarks
Ground water not encountered
Borehole terminated at 0.5 m due to concrete

Scale (approx)
1:50
Logged By
dn

Figure No.
J04105.BH 3A



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London Colney
Herts. AL2 1JG

Site
139-143 York Way, London, N7

Number
BH 4

Excavation Method Drive-in Window Sampler	Dimensions 86mm to 1.00m 75mm to 2.00m	Ground Level (mOD)	Client Radley Contracts Limited	Job Number J04105A
	Location	Dates 10/02/2005	Engineer Mason Navarro Partnership	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.60-0.80	D1				0.40	Concrete		
1.50-1.70	D2				1.60	Made Ground (firm brown silty sandy gravelly clay with brick, concrete and slate fragments)		
					2.00	Complete at 2.00m		

Remarks Ground water not encountered Borehole terminated at 2.0 m due to brick obstruction	Scale (approx) 1:50	Logged By dn
	Figure No. J04105.BH 4	



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Herts, AL2 1JG

Site
139-143 York Way, London, N7

Number
BH 5

Excavation Method Drive-in Window Sampler	Dimensions 86mm to 1.00m 75mm to 2.00m	Ground Level (mOD)	Client Radley Contracts Limited	Job Number J04105A
	Location	Dates 10/02/2005	Engineer Mason Navarro Partnership	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
2.00-2.20	D1				0.25	Concrete		
					0.25	Made Ground (loose brick and concrete rubble in a sandy gravel matrix)		
4.00-4.20	D2				3.70	Stiff brown slightly fissured silty CLAY		
					4.50	Complete at 4.50m		

Remarks Ground water not encountered	Scale (approx)	Logged By
	1:50	dn
	Figure No. J04105.BH 5	



The Hertfordshire Business Centre
Alexander Road
London Colney
Herts, AL2 1JG

Site
139-143 York Way, London, N7

Number
BH 6

Excavation Method
Drive-in Window Sampler

Dimensions
86mm to 1.00m
75mm to 2.00m

Ground Level (mOD)

Client
Radley Contracts Limited

Job Number
J04105A

Location

Dates
10/02/2005

Engineer
Mason Navarro Partnership

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.80-1.00	D1				0.35	Concrete		
					0.35	Made Ground (firm brown silty sandy gravelly clay with brick, concrete and slate fragments)		
					0.95			
					1.30	Firm becoming stiff brown and grey mottled slightly fissured silty CLAY		
					2.00	Complete at 2.00m		

Remarks
Ground water not encountered

Scale (approx)	Logged By
1:50	dn
Figure No. J04105.BH 6	

Site : 139 - 143 York Way, London, N7

Client : Radley Contracts Limited

Engineer : Mason Navarro Partnership

Job Number
J04105 A

Sheet
1 / 1

