FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH9**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **5.00m**
Filter Zone **-**
Date Installed **16 August 2012**

Diameter **-**
Cover Type **Flush lockable protective cover**
Ground Level **42.09 m OD**

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	00:00:00	1012	8.00	+0.01	-0.0	
13-Sep-2012	00:00:05					
13-Sep-2012	00:00:30					
13-Sep-2012	00:01:00					
13-Sep-2012	00:02:00					

Remarks

geotechnics

APPENDIX 7

Laboratory Test Results - Geotechnical

Classification and Strength

Symbol	**C - Clay**	**M - Silt**
	(0 - containing organic matter)	
	Plasticity	L - Low
		I - Intermediate
		H - High
		V - Very High
		E - Extremely High
Ip	Plasticity Index	
%	% Retained on 425 µm sieve, shown under Ip value	
w_L	Liquid Limit	
w_P	Plastic Limit	
NP	Non-Plastic	
NAT	Sample tested in natural state	
w	Moisture Content	
P_d	Particle Density	
Test	**Quick undrained triaxial tests**	
	SS	Single stage - 102mm diameter.
	S3	Single stage - set of 3 38mm diameter.
	MS	Multistage - 102mm diameter.
	D	Drained Test
	HV	Hand Vane
	PP	Pocket Penetrometer (kg/cm²)
	NST	Not suitable for test
γ_b	Bulk Density	
σ_3	Triaxial Cell Pressure	
$\sigma_1 - \sigma_3$	Deviator Stress	
##	Excessive Strain	
c_u	Undrained Cohesion	
c	Cohesion Intercept	
ϕ	Angle of Shearing Resistance	
Linear Shrink	Linear Shrinkage	

Consolidation

m_v	Coefficient of Volume Compressibility
c_{v50}	Coefficient of Consolidation - Log t
c_{v90}	Coefficient of Consolidation - $\sqrt{t}$

Rock

UF	Unacceptable Failure

Chemical Analysis

Acid Soluble	Total sulphate in specimen, expressed as SO_3 %, value in brackets expressed as SO_4 %
Water Soluble	Soluble sulphate in 2:1 water : soil extract, expressed as SO_3 g/l, value in brackets expressed as SO_4 g/l
In Water	Sulphate content of groundwater, expressed as SO_3 g/l, value in brackets expressed as SO_4 g/l
pH	pH value
Organic content	Organic content expressed as a percentage of dry weight
Chloride	Chloride Ion content expressed as a percentage of dry weight

MCV, Compaction, CBR

MCV	Moisture Condition Value at natural moisture content
MCC	Moisture Condition Calibration
CCV	Chalk Crushing Value

Compaction

Type	2.5	=	BS 2.5 kg Rammer
	4.5	=	BS 4.5 kg Rammer
	V	=	BS Vibrating Hammer
γ_b	Bulk Density		
γ_d	Dry Density		

CBR California Bearing Ratio

Type	2.5	=	Test on Specimen Recompacted using BS 2.5 kg Rammer
	4.5	=	As above but using BS 4.5 kg Rammer
	V	=	As above but using BS Vibrating Hammer
	M	=	Test on open drive mould specimen cut in field
	S	=	Soaked Specimen
Top	CBR at top of mould		
Bottom	CBR at bottom of mould		
ND	None Detected		

All tests performed in accordance with BS 1377 : Parts 1-9 : 1990 incorporating amendments where appropriate.

LABORATORY RESULTS - Classification and Strength

Project BACTON LOW RISE, GOSPEL OAK, NORTH LONDON **Project No:** PC124991

Sample					Classification					Strength						
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m^3	σ_3 kN/m^2	$\sigma_1-\sigma_3$ kN/m^2	c_u kN/m^2	c_{Avg} kN/m^2
BH1	2.20-2.65 (2.20)	U	C68047	Brown slightly gravelly CLAY					23 23	MS	2.02 2.02	100 200	99 111	50 56	54
									23		2.02	400	111	55 ##	
BH1	8.20-8.65 (8.20)	UT	C68050	Brown grey fissured CLAY					30 30	MS	1.94 1.94	100 200	210 233	105 117	115
									30		1.94	400	247	123	
BH1	11.30-11.75 (11.30)	U	C68048	Brown grey fissured CLAY					28 28	MS	1.96 1.96	100 200	281 317	141 158	157
									28		1.96	400	341	171	
BH1	14.30-14.75 (14.30)	U	C68049	Brown grey fissured CLAY with occasional shell fragments					26 26	MS	1.98 1.98	100 200	193 231	97 115	115
									26		1.98	400	264	132	
BH1	21.20-21.65 (21.20)	U	C68145	Brown grey fissured CLAY					28 28	MS	1.92 1.92	100 200	179 241	90 121	125
									28		1.92	400	326	163	
BH1	27.40-27.85 (27.40)	UT	C68148	Brown grey fissured CLAY					26 26	MS	1.99 1.99	100 200	303 320	152 160	165
									26		1.99	400	364	182	
BH2	2.70-3.15 (2.70)	U	C68151	Brown mottled bluish grey slightly sandy CLAY					33 33	MS	1.90 1.90	100 200	109 111	55 55	55
									33		1.90	400	111	55	
BH2	5.70-6.15 (5.70)	U	C68152	Brown mottled bluish grey fissured CLAY					31 31	MS	1.90 1.90	100 200	185 193	93 96	96
									31		1.90	400	199	99	
BH3	2.70-3.15 (2.70)	U	C68051	Brown mottled bluish grey fissured CLAY					31 31	MS	1.95 1.95	100 200	143 143	72 72	72
									31		1.95	400			
BH4	2.70-3.15 (2.70)	U	C68164	Brown mottled bluish grey CLAY					34 34	MS	1.89 1.89	100 200	136 135	68 67	67
									34		1.89	400	135	67	
BH5	8.40-8.70 (8.40)	UT	C68060	Dark greyish brown fissured CLAY					30 30	MS	1.94 1.94	100 200	164 124	82 62	76
									30		1.94	400	166	83	
BH5	11.40-11.85 (11.40)	U	C68053	Dark greyish brown fissured CLAY					24 24	MS	2.00 2.00	100 200	258 323	129 161	156
									24		2.00	400	358	179	
BH5	17.50-17.80 (17.50)	UT	C68061	Dark greyish brown laminated fissured CLAY					27 27	MS	2.02 2.02	100 200	320 305	160 152	151
									27		2.02	400	281	141	
BH5	23.50-23.95 (23.50)	U	C68058	Greyish brown fissured CLAY (Strength possibly affected by fissuring in test specimen)					28 28	MS	1.90 1.90	100 200	166 163	83 81	87
									28		1.90	400	193	96	

Remarks Tests performed in accordance with BS 1377: 1990
NST - Not suitable for Test

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LABORATORY RESULTS - Classification and Strength

Project BACTON LOW RISE, GOSPEL OAK, NORTH LONDON **Project No:** PC124991

Sample					Classification					Strength					
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m^3	σ_3 kN/m^2	$\sigma_1-\sigma_3$ kN/m^2	c_u kN/m^2	c_{Avg} kN/m^2
BH5	29.50- 29.95 (29.50)	U	C68054	Greyish brown laminated fissured CLAY (Measured strength possibly affected by fissuring in test specimen and disturbance during sampling)					28 28 28	MS	1.88 1.68 1.68	100 200 400	81 8 11	41 4 5	17
BH6	2.70- 3.15 (2.70)	U	C68174	Brown mottled bluish grey CLAY					32 32 32	MS	1.89 1.89 1.89	100 200 400	163 164 164	82 82 82	82
BH7	2.80- 3.25 (2.80)	U	C68064	Brown mottled bluish grey fissured CLAY					32 32 32	MS	1.87 1.87 1.87	100 200 400	183 201 206	91 101 103	98
BH7	8.80- 9.25 (8.80)	UT	C68062	Dark greyish brown fissured CLAY					29 29 29	MS	1.98 1.98 1.98	100 200 400	216 220 223	108 110 112	110
BH7	11.80- 12.25 (11.80)	U	C68067	Dark greyish brown fissured CLAY					28 28 28	MS	1.99 1.99 1.99	100 200 400	253 274 288	127 137 144	136
BH7	18.00- 18.45 (18.00)	UT	C68063	Dark greyish brown fissured CLAY					28 28 28	MS	1.97 1.97 1.97	100 200 400	221 217 245	110 109 123	114
BH8	2.20- 2.65 (2.20)	U	C68070	Brown mottled bluish grey fissured CLAY					33 33 33	MS	1.88 1.88 1.88	100 200 400	89 117 123	44 59 62	55
BH8	5.30- 5.75 (5.30)	U	C68071	Dark greyish brown fissured CLAY					30 30 30	MS	1.87 1.87 1.87	100 200 400	156 177 190	78 88 95	87
BH9	2.70- 3.15 (2.70)	U	C68083	Orangish brown slightly sandy CLAY					35 35 35	MS	1.87 1.87 1.87	100 200 400	123 130 133	62 65 67	65
BH9	8.70- 9.15 (8.70)	U	C68082	Dark greyish brown fissured CLAY					29 29 29	MS	1.98 1.98 1.98	100 200 400	174 125 181	87 62 90	80
BH9	14.70- 15.15 (14.70)	U	C68081	Dark greyish brown fissured CLAY					29 29 29	MS	1.97 1.97 1.97	100 200 400	229 225 224	115 112 112	113
BH9	20.70- 21.15 (20.70)	U	C68079	Dark greyish brown fissured CLAY (Measured strength possibly affected by fissuring in test specimen)					26 26 26	MS	1.98 1.98 1.98	100 200 400	245 161 258	122 81 129 ##	111
BH9	26.70- 27.15 (26.70)	U	C68078	Dark greyish brown fissured CLAY (Measured strength possibly affected by fissuring in test specimen)					26 26 26	MS	1.84 1.84 1.84	100 200 400	173 252	87 126	107

Remarks AGS Tests performed in accordance with BS 1377: 1990
NST - Not suitable for Test

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LABORATORY RESULTS - Chemical Analysis

Project BACTON LOW RISE, GOSPEL OAK, NORTH LONDON **Project No:** PC124991

Sample					Sulphate			pH	Organic Content	Loss on Ignition	Chloride		
					In Soil						In Soil		
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Acid Soluble %	Water Soluble g/l	In Water g/l		%	%	Acid Soluble %	Water Soluble g/l	In Water g/l
BH1	3.90-4.35 (3.90-4.35)	D	C67263	Brown mottled grey fissured CLAY		2.119 (2.54)		7.72					
BH1	8.20-8.65 (8.20-8.65)	UT	C68050	Brown grey fissured CLAY		0.705 (0.85)		8.07					
BH1	11.30-11.75 (11.30-11.75)	U	C68048	Brown grey fissured CLAY		0.544 (0.65)		8.30					
BH1	14.30-14.75 (14.30-14.75)	U	C68049	Brown grey fissured CLAY with occasional shell fragments		0.494 (0.59)		8.53					
BH1	21.20-21.65 (21.20-21.65)	U	C68145	Brown grey fissured CLAY		0.425 (0.51)		8.38					
BH1	27.40-27.85 (27.40-27.85)	UT	C68148	Brown grey fissured CLAY		0.456 (0.55)		8.56					
BH3	4.20-4.65 (4.20-4.65)	D	C67042	Brown mottled bluish grey fissured CLAY		2.483 (2.98)		7.69					
BH3	7.20-7.65 (7.20-7.65)	D	C67039	Brown mottled bluish grey fissured CLAY		1.060 (1.27)		7.91					
BH3	10.20-10.65 (10.20-10.65)	D	C67318	Greyish brown fissured CLAY		0.666 (0.80)		8.14					
BH3	13.20-13.65 (13.20-13.65)	D	C67313	Dark grey fissured CLAY with occasional silt partings		0.820 (0.98)		8.07					

Remarks AGS Tests performed in accordance with BS 1377: Part 3: 1990
Sulphate reported as SO3, results in brackets reported as SO4

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LABORATORY RESULTS - Chemical Analysis

Project BACTON LOW RISE, GOSPEL OAK, NORTH LONDON **Project No:** PC124991

Sample					Sulphate			pH	Organic Content	Loss on Ignition	Chloride		
					In Soil						In Soil		
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Acid Soluble %	Water Soluble g/l	In Water g/l		%	%	Acid Soluble %	Water Soluble g/l	In Water g/l
BH3	16.20-16.65 (16.20-16.65)	D	C67314	Dark grey fissured CLAY		0.287 (0.34)		8.41					
BH3	19.20-19.65 (19.20-19.65)	D	C67311	Dark grey fissured CLAY		0.363 (0.44)		8.56					
BH5	3.90-4.35 (3.90-4.35)	D	C67120	Greyish brown mottled orange brown fissured CLAY		2.365 (2.84)		7.76					
BH5	6.90-7.35 (6.90-7.35)	D	C67106	Greyish brown fissured CLAY		2.225 (2.67)		7.98					
BH5	11.40-11.85 (11.40-11.85)	U	C68053	Dark greyish brown fissured CLAY		0.632 (0.76)		8.19					
BH5	17.50-17.80 (17.50-17.80)	UT	C68061	Dark greyish brown laminated fissured CLAY		0.441 (0.53)		8.60					
BH5	23.50-23.95 (23.50-23.95)	U	C68058	Greyish brown fissured CLAY (Strength possibly affected by fissuring in test specimen)		0.398 (0.48)		8.64					
BH5	29.50-29.95 (29.50-29.95)	U	C68054	Greyish brown laminated fissured CLAY (Measured strength possibly affected by fissuring in test specimen and disturbance during sampling)		0.696 (0.84)		8.29					
BH7	2.80-3.25 (2.80-3.25)	U	C68064	Brown mottled bluish grey fissured CLAY		1.627 (1.95)		7.84					
BH7	6.25 (6.25)	D	C67099	Dark greyish brown fissured CLAY		0.714 (0.86)		8.14					
BH7	8.80-9.25 (8.80-9.25)	UT	C68062	Dark greyish brown fissured CLAY		0.453 (0.54)		8.31					

Remarks AGS Tests performed in accordance with BS 1377: Part 3: 1990
Sulphate reported as SO3, results in brackets reported as SO4

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LABORATORY RESULTS - Chemical Analysis

Project BACTON LOW RISE, GOSPEL OAK, NORTH LONDON **Project No:** PC124991

Sample					Sulphate			pH	Organic Content	Loss on Ignition	Chloride		
					In Soil						In Soil		
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Acid Soluble %	Water Soluble g/l	In Water g/l		%	%	Acid Soluble %	Water Soluble g/l	In Water g/l
BH7	11.80-12.25 (11.80-12.25)	U	C68067	Dark greyish brown fissured CLAY		0.711 (0.85)		8.31					
BH7	15.25 (15.25)	D	C67104	Dark greyish brown fissured CLAY		0.289 (0.35)		8.31					
BH7	18.00-18.45 (18.00-18.45)	UT	C68063	Dark greyish brown fissured CLAY		0.321 (0.39)		8.78					
BH9	4.20-4.65 (4.20-4.65)	D	C67050	Bluish grey mottled orange brown fissured CLAY		1.713 (2.06)		7.78					
BH9	8.70-9.15 (8.70-9.15)	U	C68082	Dark greyish brown fissured CLAY		0.767 (0.92)		8.26					
BH9	12.20 (12.20)	D	C67057	Dark greyish brown fissured CLAY		0.565 (0.68)		8.27					
BH9	14.70-15.15 (14.70-15.15)	U	C68081	Dark greyish brown fissured CLAY		0.350 (0.42)		8.76					
BH9	19.20-19.65 (19.20-19.65)	D	C67061	Dark greyish brown fissured CLAY		0.299 (0.36)		8.25					
BH9	21.20 (21.20)	D	C67062	Dark greyish brown fissured CLAY		0.491 (0.59)		8.36					
BH9	26.50 (26.50)	D	C67046	Light brown slightly clayey gravel of CLAYSTONE		0.246 (0.30)		8.26					

Remarks AGS Tests performed in accordance with BS 1377: Part 3: 1990
Sulphate reported as SO3, results in brackets reported as SO4

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APPENDIX 8

Laboratory Test Results - Contamination (Soil)

dets
Derwentside Environmental Testing Services

UKAS TESTING
2139

Certificate of Analysis

Date: 10/09/2012

Certificate Number: 12-68079

Client:	Geotechnics LTD 203 Torrington Avenue Tile Hill Coventry CV4 9AP
Our Reference:	12-68079
Client Reference:	PC124991
Contract Title:	Bacton Low Rise, Gospel Oak, North London
Description:	17 soil samples
Date Received:	30 August 2012
Date Started:	30 August 2012
Date Completed:	10 September 2012
Test Procedures:	Identified by prefix DETSn, details available upon request.
Notes:	Observations and interpretations are outside the scope of UKAS accreditation
Approved By:	Rob Brown, Business Manager

Information in Support of the Analytical Results

Analysis

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425um sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample.

Key

*	Denotes test not included in laboratory scope of accreditation
#	Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
$	Denotes tests completed by an approved subcontractor
I/S	Denotes insufficient sample to carry out test
U/S	Denotes that the sample is not suitable for testing

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month
Liquids - 2 weeks
Asbestos (test portion) - 6 months

Summary of Chemical Analysis
Soil Samples

Our Ref: 12-68079
Client Ref: PC124991
Contract Title: Bacton Low Rise, Gospel Oak, North London

			Lab No.	440995	440996	440997	440998
			Sample ID	BH2	BH2	BH2	BH4
			Depth	0.30	1.00	2.00	0.30
			Sample Ref				
			Sample Type				
			Sampling Date	20/08/2012	20/08/2012	20/08/2012	20/08/2012
			Sampling Time				
Test	**Units**	**DETSxx**	**LOD**				
Arsenic	mg/kg	DETS 042#	0.2	12	12	10	9.7
Cadmium	mg/kg	DETS 042#	0.1	0.2	0.4	0.5	0.5
Chromium	mg/kg	DETS 042#	0.15	24	30	52	53
Hexavalent Chromium	mg/kg	DETSC 2204*	1	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	DETS 042#	0.2	28	19	24	19
Lead	mg/kg	DETS 042#	0.3	130	180	20	15
Mercury	mg/kg	DETSC 2325#	0.05	0.18	0.23	< 0.05	< 0.05
Nickel	mg/kg	DETS 042#	1	17	19	43	26
Selenium	mg/kg	DETS 042#	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETS 042#	1	74	77	72	56
Boron (water soluble)	mg/kg	DETS 020#	0.2	1.5	1.6	0.7	0.5
Cyanide total	mg/kg	DETSC 2130#	0.1	0.1	0.2	< 0.1	< 0.1
Organic matter	%	DETSC 2002#	0.1	1.1	1.2	0.5	0.5
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	450	1100	400	180
pH		DETSC 2008#		11.5	9.6	9.0	9.1
Acenaphthene	mg/kg	DETSC 3301	0.1	0.1	0.3	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	0.5	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	0.3	1.9	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	0.9	6.3	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	1.0	5.9	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	0.8	4.6	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	0.5	2.6	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	0.7	3.9	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1	0.9	6.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	0.5	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1	2.2	16	< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1	0.1	0.4	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	0.8	3.7	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	1.2	5.7	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	2.0	13	< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6	12	71	< 1.6	< 1.6
EPH (C10-C40)	mg/kg	DETSC 3311#	10	67	290	< 10	< 10
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3	< 0.3	< 0.3	< 0.3	0.6

Summary of Chemical Analysis
Soil Samples

Our Ref: 12-68079
Client Ref: PC124991
Contract Title: Bacton Low Rise, Gospel Oak, North London

			Lab No.	440999	441000	441001	441002
			Sample ID	BH4	BH6	BH6	BH1
			Depth	1.00	0.30	1.00	1.00
			Sample Ref				
			Sample Type				
			Sampling Date	20/08/2012	20/08/2012	20/08/2012	20/08/2012
			Sampling Time				
Test	**Units**	**DETSxx**	**LOD**				
Arsenic	mg/kg	DETS 042#	0.2	8.3	12	9.6	11
Cadmium	mg/kg	DETS 042#	0.1	0.4	0.4	0.5	0.4
Chromium	mg/kg	DETS 042#	0.15	35	31	46	32
Hexavalent Chromium	mg/kg	DETSC 2204*	1	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	DETS 042#	0.2	15	19	25	35
Lead	mg/kg	DETS 042#	0.3	10	84	18	140
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	0.05	< 0.05	0.67
Nickel	mg/kg	DETS 042#	1	27	28	43	21
Selenium	mg/kg	DETS 042#	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETS 042#	1	42	89	70	61
Boron (water soluble)	mg/kg	DETS 020#	0.2	0.7	0.8	0.9	2.1
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	0.2
Organic matter	%	DETSC 2002#	0.1	0.3	0.6	0.4	3.6
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	150	200	140	57
pH		DETSC 2008#		9.7	11.3	9.3	8.6
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	0.3	< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	0.2	< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	< 10	< 10
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref: 12-68079
Client Ref: PC124991
Contract Title: Bacton Low Rise, Gospel Oak, North London

			Lab No.	441003	441004	441005	441006
			Sample ID	BH1	BH5	BH5	BH7
			Depth	2.00	0.30	0.90	0.30
			Sample Ref				
			Sample Type				
			Sampling Date	20/08/2012	20/08/2012	20/08/2012	20/08/2012
			Sampling Time				
Test	**Units**	**DETSxx**	**LOD**				
Arsenic	mg/kg	DETS 042#	0.2	7.9	20	11	13
Cadmium	mg/kg	DETS 042#	0.1	0.6	0.3	0.3	0.1
Chromium	mg/kg	DETS 042#	0.15	48	34	45	21
Hexavalent Chromium	mg/kg	DETSC 2204*	1	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	DETS 042#	0.2	22	88	31	51
Lead	mg/kg	DETS 042#	0.3	15	400	100	640
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	0.39	0.53	0.19
Nickel	mg/kg	DETS 042#	1	35	26	20	18
Selenium	mg/kg	DETS 042#	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETS 042#	1	63	180	69	86
Boron (water soluble)	mg/kg	DETS 020#	0.2	0.7	1.8	1.0	1.6
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	0.2	< 0.1
Organic matter	%	DETSC 2002#	0.1	0.4	2.2	2.9	3.4
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	240	140	37	180
pH		DETSC 2008#		8.9	9.5	8.8	10.7
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	0.3	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	0.2	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	0.2	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	0.3	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	0.4	< 0.1	0.1
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	0.3	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	0.4	< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6	< 1.6	2.4	< 1.6	< 1.6
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	< 10	< 10
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref: 12-68079
Client Ref: PC124991
Contract Title: Bacton Low Rise, Gospel Oak, North London

			Lab No.	441007	441008	441009	441010
			Sample ID	BH7	BH3	BH9	BH8
			Depth	1.00	1.00	0.30	0.30
			Sample Ref				
			Sample Type				
			Sampling Date	20/08/2012	20/08/2012	20/08/2012	20/08/2012
			Sampling Time				
Test	**Units**	**DETSxx**	**LOD**				
Arsenic	mg/kg	DETS 042#	0.2	11	9.7	10	14
Cadmium	mg/kg	DETS 042#	0.1	0.1	0.2	0.2	0.3
Chromium	mg/kg	DETS 042#	0.15	19	30	18	22
Hexavalent Chromium	mg/kg	DETSC 2204*	1	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	DETS 042#	0.2	24	17	28	35
Lead	mg/kg	DETS 042#	0.3	160	33	240	770
Mercury	mg/kg	DETSC 2325#	0.05	0.13	0.14	0.14	0.24
Nickel	mg/kg	DETS 042#	1	15	22	16	18
Selenium	mg/kg	DETS 042#	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETS 042#	1	200	54	150	190
Boron (water soluble)	mg/kg	DETS 020#	0.2	1.3	1.4	1.6	1.5
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	%	DETSC 2002#	0.1	0.8	0.6	0.7	0.9
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	320	110	240	720
pH		DETSC 2008#		10.5	9.3	11.3	11.0
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	0.1	< 0.1	< 0.1	0.3
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	0.1	0.3
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	0.1	< 0.1	< 0.1	0.2
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	0.2
Chrysene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	< 0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	0.3	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1	0.5	< 0.1	0.1	0.6
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	0.3	< 0.1	0.4	0.4
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	0.3	< 0.1	0.2	0.4
PAH	mg/kg	DETSC 3301	1.6	2.4	< 1.6	< 1.6	3.2
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	31	17	68
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref: 12-68079
Client Ref: PC124991
Contract Title: Bacton Low Rise, Gospel Oak, North London

			Lab No.	441011
			Sample ID	BH8
			Depth	1.00
			Sample Ref	
			Sample Type	
			Sampling Date	20/08/2012
			Sampling Time	
Test	**Units**	**DETSxx**	**LOD**	
Arsenic	mg/kg	DETS 042#	0.2	13
Cadmium	mg/kg	DETS 042#	0.1	0.8
Chromium	mg/kg	DETS 042#	0.15	50
Hexavalent Chromium	mg/kg	DETSC 2204*	1	< 1.0
Copper	mg/kg	DETS 042#	0.2	43
Lead	mg/kg	DETS 042#	0.3	230
Mercury	mg/kg	DETSC 2325#	0.05	0.13
Nickel	mg/kg	DETS 042#	1	37
Selenium	mg/kg	DETS 042#	0.5	1.2
Zinc	mg/kg	DETS 042#	1	150
Boron (water soluble)	mg/kg	DETS 020#	0.2	3.7
Cyanide total	mg/kg	DETSC 2130#	0.1	0.1
Organic matter	%	DETSC 2002#	0.1	2.0
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	620
pH		DETSC 2008#		9.7
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	0.2
Fluoranthene	mg/kg	DETSC 3301	0.1	0.3
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	0.2
PAH	mg/kg	DETSC 3301	1.6	< 1.6
EPH (C10-C40)	mg/kg	DETSC 3311#	10	58
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3	< 0.3

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test	Deviating due to inappropriate container for test
440995	BH2 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
440996	BH2 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
440997	BH2 2.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
440998	BH4 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
440999	BH4 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441000	BH6 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441001	BH6 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441002	BH1 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441003	BH1 2.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441004	BH5 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441005	BH5 0.90 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441006	BH7 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		
441007	BH7 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre		

441008	BH3 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre
441009	BH9 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre
441010	BH8 0.30 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre
441011	BH8 1.00 SOIL	20/08/2012	Glass Jar 250ml or less, Glass Vial, Plastic Tub 1 litre

APPENDIX 9

Investigation Techniques and General Notes

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a backacting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.20 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of insitu test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for backfilling. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, insitu Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in more dense strata. Small disturbed samples are obtained throughout.

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used. Where open hole rotary drilling is employed, descriptions of strata result from examination at surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained. Small scale plant can be used for auger drilling to limited depths where access is constrained.

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This has now been superseded by the use of a thin-walled plastic liner within a sampler which has a solid wall. Diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Window Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, insitu test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dipmeter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

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9. *Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.*

10. *Any unavoidable variations from specified procedures are identified in the report.*

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12. *All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.*

13. *Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.*

14. *Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.*

15. *The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882 (2007). Specific testing would be necessary where such definition is a requirement.*

16. *Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.*

17. *Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.*

18. *Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004:1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.*

19. *Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.*

20. *The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.*

ANNEX C
GAS MONITORING RESULTS (ROUND 2)

FIELDWORK **-** *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH1**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**10.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 10.00m**	Ground Level	**42.45 m OD**
Date Installed	**17 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	**00:00:00**	**1.61**					**<1**	**<1**	
13-Sep-2012	**00:00:05**		**<0.1**	**<2**	**<0.1**	**20.6**			
13-Sep-2012	**00:00:30**		**<0.1**	**<2**	**0.2**	**20.2**			
13-Sep-2012	**00:01:00**		**<0.1**	**<2**	**0.2**	**20.2**			
3-Oct-2012	**00:00:00**	**1.47**					**<1**	**<1**	
3-Oct-2012	**00:00:05**		**<0.1**	**<2**	**<0.1**	**20.6**			
3-Oct-2012	**00:00:30**		**<0.1**	**<2**	**0.2**	**20.3**			
3-Oct-2012	**00:01:00**		**<0.1**	**<2**	**0.2**	**20.3**			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH1**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**10.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 10.00m**	Ground Level	**42.45 m OD**
Date Installed	**17 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.80**	**+1.37**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
3-Oct-2012	**00:00:00**	**998**	**10.00**	**+0.25**	**-0.0**	
3-Oct-2012	**00:00:05**			**+0.07**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:01:00**					

Remarks

geotechnics

Form 003/1

FIELDWORK **-** *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH2**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**10.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 10.00m**	Ground Level	**43.45 m OD**
Date Installed	**20 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	00:00:00	9.55					<1	<1	
13-Sep-2012	00:00:05		<0.1	<2	<0.1	20.6			
13-Sep-2012	00:00:30		<0.1	<2	3.8	15.1			
13-Sep-2012	00:01:00		<0.1	<2	3.8	14.6			
13-Sep-2012	00:02:00		<0.1	<2	3.8	14.6			
3-Oct-2012	00:00:00	8.49					<1	<1	
3-Oct-2012	00:00:05		<0.1	<2	<0.1	20.6			
3-Oct-2012	00:00:30		<0.1	<2	4.5	12.3			
3-Oct-2012	00:01:00		<0.1	<2	4.5	12.1			
3-Oct-2012	00:02:00		<0.1	<2	4.5	12.1			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**
Borehole **BH2**
Sheet No. **1 (2 of 2)**

Client **ROLTON GROUP**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**10.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 10.00m**	Ground Level	**43.45 m OD**
Date Installed	**20 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1013**	**9.10**	**+2.91**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
13-Sep-2012	**00:02:00**					
3-Oct-2012	**00:00:00**	**998**	**10.00**	**+4.37**	**+0.3**	
3-Oct-2012	**00:00:05**			**+0.72**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:01:00**					
3-Oct-2012	**00:02:00**					

Remarks

geotechnics

FIELDWORK **-** *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH3**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 5.00m**	Ground Level	**43.78 m OD**
Date Installed	**17 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	00:00:00	3.92					<1	<1	
13-Sep-2012	00:00:05		<0.1	<2	<0.1	20.6			
13-Sep-2012	00:00:30		<0.1	<2	0.9	18.1			
13-Sep-2012	00:01:00		<0.1	<2	0.6	18.8			
13-Sep-2012	00:02:00		<0.1	<2	0.4	19.5			
13-Sep-2012	00:03:00		<0.1	<2	0.4	19.5			
3-Oct-2012	00:00:00	3.30					<1	<1	
3-Oct-2012	00:00:05		<0.1	<2	1.3	17.2			
3-Oct-2012	00:00:30		<0.1	<2	0.9	18.1			
3-Oct-2012	00:02:00		<0.1	<2	0.4	19.7			
3-Oct-2012	00:03:00		<0.1	<2	0.3	20.2			
3-Oct-2012	00:04:00		<0.1	<2	0.3	20.2			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH3**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**1.00 - 5.00m**	Ground Level	**43.78 m OD**
Date Installed	**17 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.20**	**+0.04**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
13-Sep-2012	**00:02:00**					
13-Sep-2012	**00:03:00**					
3-Oct-2012	**00:00:00**	**997**	**9.80**	**+1.67**	**-0.0**	
3-Oct-2012	**00:00:05**			**-0.97**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:02:00**					
3-Oct-2012	**00:03:00**					
3-Oct-2012	**00:04:00**					

Remarks

geotechnics

FIELDWORK **-** *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH4**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**41.65 m OD**
Date Installed	**21 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	00:00:00	DRY					<1	<1	
13-Sep-2012	00:00:05		<0.1	<2	<0.1	20.6			
13-Sep-2012	00:00:30		<0.1	<2	1.1	19.1			
13-Sep-2012	00:01:00		<0.1	<2	1.1	19.1			
3-Oct-2012	00:00:00	DRY					<1	<1	
3-Oct-2012	00:00:05		<0.1	<2	<0.1	20.6			
3-Oct-2012	00:00:30		<0.1	<2	0.7	18.7			
3-Oct-2012	00:01:00		<0.1	<2	0.4	19.5			
3-Oct-2012	00:02:00		<0.1	<2	0.3	20.1			
3-Oct-2012	00:03:00		<0.1	<2	0.3	20.1			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH4**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**41.65 m OD**
Date Installed	**21 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.70**	**+3.53**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
3-Oct-2012	**00:00:00**	**997**	**9.50**	**+2.11**	**-0.0**	
3-Oct-2012	**00:00:05**			**+0.05**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:01:00**					
3-Oct-2012	**00:02:00**					
3-Oct-2012	**00:03:00**					

Remarks

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FIELDWORK *- Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH5**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**44.75 m OD**
Date Installed	**14 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	**00:00:00**	**4.66**					**<1**	**<1**	
13-Sep-2012	**00:00:05**		**<0.1**	**<2**	**<0.1**	**20.6**			
13-Sep-2012	**00:00:30**		**<0.1**	**<2**	**2.0**	**19.2**			
13-Sep-2012	**00:01:00**		**<0.1**	**<2**	**2.0**	**19.2**			
3-Oct-2012	**00:00:00**	**4.35**					**<1**	**<1**	
3-Oct-2012	**00:00:05**		**<0.1**	**<2**	**<0.1**	**20.6**			
3-Oct-2012	**00:00:30**		**<0.1**	**<2**	**3.6**	**17.6**			
30-Oct-2012	**00:01:00**		**<0.1**	**<2**	**3.6**	**17.6**			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH5**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**44.75 m OD**
Date Installed	**14 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.00**	**+0.34**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
3-Oct-2012	**00:00:00**	**997**	**9.60**	**+2.16**	**+0.1**	
3-Oct-2012	**00:00:05**			**+0.07**	**-0.0**	
3-Oct-2012	**00:00:30**					
30-Oct-2012	**00:01:00**					

Remarks

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FIELDWORK **-** *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH7**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**42.10 m OD**
Date Installed	**15 August 2012**		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	00:00:00	1.59							
13-Sep-2012	00:00:05		<0.1	<2	<0.1	20.6	<1	<1	
13-Sep-2012	00:00:30		<0.1	<2	1.0	17.1	<1	188	
13-Sep-2012	00:01:00		<0.1	<2	1.0	16.9	<1	320	
13-Sep-2012	00:02:00		<0.1	<2	1.0	16.9	<1	379	
13-Sep-2012	00:03:00		<0.1	<2	1.0	16.9	<1	383	
13-Sep-2012	00:04:00		<0.1	<2	0.9	17.1	<1	373	
13-Sep-2012	00:05:00		<0.1	<2	0.9	17.1	<1	352	
3-Oct-2012	00:00:00	1.25					<1	<1	
3-Oct-2012	00:00:05		<0.1	<2	<0.1	20.6			
3-Oct-2012	00:00:30		<0.1	<2	2.5	16.1			
3-Oct-2012	00:01:00		<0.1	<2	1.2	17.8			
3-Oct-2012	00:02:00		<0.1	<2	0.1	20.3			
3-Oct-2012	00:03:00		<0.1	<2	0.1	20.3			

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH7**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**2.00 - 5.00m**	Ground Level	**42.10 m OD**
Date Installed	**15 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.10**	**+3.31**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
13-Sep-2012	**00:02:00**					
13-Sep-2012	**00:03:00**					
13-Sep-2012	**00:04:00**					
13-Sep-2012	**00:05:00**					
3-Oct-2012	**00:00:00**	**999**	**10.50**	**+3.97**	**+0.4**	
3-Oct-2012	**00:00:05**			**+0.69**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:01:00**					
3-Oct-2012	**00:02:00**					
3-Oct-2012	**00:03:00**					

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH9**

Client **ROLTON GROUP**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **5.00m**
Filter Zone **-**
Date Installed **16 August 2012**

Diameter **-**
Cover Type **Flush lockable protective cover**
Ground Level **42.09 m OD**

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Remarks
13-Sep-2012	00:00:00	4.76					<1	<1	
13-Sep-2012	00:00:05		<0.1	<2	<0.1	20.6			
13-Sep-2012	00:00:30		<0.1	<2	0.2	20.3			
13-Sep-2012	00:01:00		<0.1	<2	0.2	20.1			
13-Sep-2012	00:02:00		<0.1	<2	0.2	20.1			
3-Oct-2012	00:00:00	4.48					<1	<1	
3-Oct-2012	00:00:05		<0.1	<2	<0.1	20.6			
3-Oct-2012	00:00:30		<0.1	<2	0.1	20.4			
3-Oct-2012	00:01:00		<0.1	<2	0.1	20.4			

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **BACTON LOW RISE, GOSPEL OAK, NORTH LONDON**

Project No **PC124991**

Borehole **BH9**

Client **ROLTON GROUP**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**-**
Depth to Base	**5.00m**	Cover Type	**Flush lockable protective cover**
Filter Zone	**-**	Ground Level	**42.09 m OD**
Date Installed	**16 August 2012**		

Date	Time	Barometric Pressure (mBars)	Air Temp. (DegC)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
13-Sep-2012	**00:00:00**	**1012**	**8.00**	**+0.01**	**-0.0**	
13-Sep-2012	**00:00:05**					
13-Sep-2012	**00:00:30**					
13-Sep-2012	**00:01:00**					
13-Sep-2012	**00:02:00**					
3-Oct-2012	**00:00:00**	**997**	**9.70**	**-0.04**	**-0.0**	
3-Oct-2012	**00:00:05**			**-0.04**	**-0.0**	
3-Oct-2012	**00:00:30**					
3-Oct-2012	**00:01:00**					

Remarks

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ANNEX D
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