

COMMENTS ON THE GAS MONITORING RESULTS

Gas monitoring was undertaken at the installation in borehole BH2 during a return monitoring visit on 17 January 2007 when the concentrations of gases (methane, carbon dioxide and oxygen) were measured. The results of the monitoring are presented as Appendix B and summarised in Table 1 below.

Table 1. Summary of Gas Monitoring Data

Determinand	No. of Locations	Value Detected (v/v)	Applicable Criteria (%)	No. Above Applicable Criteria
Oxygen	1	12.5-12.7	NS	NA
Carbon Dioxide	1	1.3	1.5 ¹	0/1
Methane	1	<0.1	1.0 ¹	0/1

¹ %v/v, Building Research Establishment Report, BR 212

NS No Standard

NA Not Applicable

Comparison of the monitoring results to the Building Research Establishment (BRE) guidance, BR 212, shows recorded concentrations of methane gas, at a level below the detection limit of the equipment used, to be within guidance threshold concentrations. Oxygen levels were at marginally below anticipated atmospheric concentrations in the installation. The carbon dioxide concentration did not exceed the 1.5% HSE short-term (10 minutes) occupational exposure limit; however it did exceed the HSE long-term exposure limit, set at 0.5% gas in air.

The results of the gas monitoring from the single visit give a Gas Screening Value (GSV) of 0.00131/hr and the concentrations of methane and carbon dioxide fall into a Characteristic Situation 1 based on the modified Wilson & Card classification from CIRIA C659 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (2006). Characteristic Situation 1 requires no special precautions.

COMMENTS ON THE CHEMICAL TEST RESULTS

The results of the laboratory chemical testing of selected soil samples, taken during the ground investigation have been compared with CLEA Soil Guideline Values (SGV) and Atkins Soil Screening Values (ASSV), which have been used as screening tools for use in the assessment of land affected by contamination.

CLEA Series Soil Guideline Values (SGV)

Toxicological data and Soil Guideline Values for arsenic, cadmium, chromium, lead, mercury, selenium, nickel, phenol, ethyl benzene and toluene have been provided in the CLEA series of contaminated land reports, by the Department for Environment, Food and Rural Affairs, DEFRA, and the Environment Agency, EA, March 2002 to November 2005. The respective Soil Guideline Values have been published in reports SGV1, SGV3 to SGV5, SGV7 to SGV10, SGV15 and SGV16 and have been derived according to standard land-uses and individual SGVs determined using CLR 7-10 *The Contaminated Land Exposure Assessment (CLEA) Model: Technical Basis and Algorithms*.

ATRISKSOIL Series Soil Screening Values (ASSV)

ATRISKSOIL is a database compiled by Atkins Limited, which provides Soil Screening Values (UK applicable), under licence to Ground Engineering, for common contaminants not currently covered by Soil Guideline Values. The Atkins Soil Screening Values for clarity have been referenced as ASSVs within the text of this report. The conceptual model, adopted by Atkins Limited, for the specified land uses is understood to be equally or more conservative than those incorporated in the CLEA model. The risk assessment tool is BP RISC 4.0 and it is recommended that the resulting ASSVs are used as relatively conservative screening values. Respective toxicology reports and technical details on the derivation of the ASSVs can be provided on request.

Assessment Summary

The following standard land uses form the basis of the assessment:

- Residential usage with home grown vegetables, representative of the most sensitive land usage such as private rear gardens.
- Residential usage without home grown vegetables representative of communal gardens or landscaped areas.
- Commercial and industrial usage representative of buildings and areas covered by hardstanding.

The intended purpose of the SGV and ASSV is as “intervention values” in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards, but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Tables 2, 3 and 4 below compare the results of the chemical analytical testing with the SGVs and ASSVs in relation to the above end uses. The specified usage is considered equivalent to commercial/industrial as the site will be covered with hardstanding and buildings. End uses described as residential with home grown vegetables and residential without home grown vegetables, representative of communal gardens or landscaped areas, are also included for comparison. The fraction of test results, which exceeds the specified values, is also provided.

Two samples of made ground, two samples of natural ground and two samples of groundwater were tested for the suite of contaminants discussed above.

**Table 2. Residential With Home Grown Vegetables
Comparison of Chemical Test Results with SGVs and ASSVs**

Determinand	Min Value Detected mg/kg	Max Value Detected mg/kg	Assessment Method	Standard Residential usage with plant uptake mg/kg			Fraction of samples exceeding SGV or ASSV		
				78 1% SOM	78 2.5% SOM	78 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
Arsenic	5.3	16	SGV	20			0/4		
Cadmium	<0.1	<0.1	SGV	1 (pH6)			0/4		
Chromium (Total)	10	19	SGV	130			0/4		
Lead	14	110	SGV	450			0/4		
Mercury	<0.1	0.29	SGV	8			0/4		
Selenium	<0.1	0.97	SGV	35			0/4		
Nickel	14	36	SGV	50			0/4		
Phenols	<0.3	<0.3	SGV	78 1% SOM	78 2.5% SOM	78 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
BaP	<0.1	0.2	ASSV	0.85			0/4		
Boron	<0.4	0.5	*	-			-/4		
Copper	11	60	ASSV	650			0/4		
Zinc	31	66	ASSV	130			0/4		
Free Cyanide	<0.5	<0.5	ASSV	34			0/4		
Sulphide	<0.5	<0.5	*	-			-/4		

SOM = Soil Organic Matter * = Soil Screening Value not derived

**Table 3. Residential Without Home Grown Vegetables
Comparison of Chemical Test Results with SGVs and ASSVs**

Determinand	Min Value Detected mg/kg	Max Value Detected mg/kg	Assessment Method	Standard Residential usage without plant uptake mg/kg			Fraction of samples exceeding SGV or ASSV		
				21,900 1% SOM	34,400 2.5% SOM	37,300 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
Arsenic	5.3	16	SGV	20			0/4		
Cadmium	<0.1	<0.1	SGV	30			0/4		
Chromium (Total)	10	19	SGV	200			0/4		
Lead	14	110	SGV	450			0/4		
Mercury	<0.1	0.29	SGV	15			0/4		
Selenium	<0.1	0.97	SGV	260			0/4		
Nickel	14	36	SGV	75			0/4		
Phenols	<0.3	<0.3	SGV	21,900 1% SOM	34,400 2.5% SOM	37,300 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
BaP	<0.1	0.2	ASSV	1.2			0/4		
Boron	<0.4	0.5	*	-			-/4		
Copper	11	60	ASSV	23,000			0/4		
Zinc	31	66	ASSV	19,000			0/4		
Free Cyanide	<0.5	<0.5	ASSV	34			0/4		
Sulphide	<0.5	<0.5	*	-			-/4		

SOM = Soil Organic Matter * = Soil Screening Value not derived

**Table 4. Standard Commercial / Light Industrial
Comparison of Chemical Test Results with SGVs and ASSVs**

Determinand	Min Value Detected mg/kg	Max Value Detected mg/kg	Assessment Method	Standard Commercial / Industrial Land-use mg/kg			Fraction of samples exceeding SGV or ASSV		
				21,900 1% SOM	43,000 2.5% SOM	78,100 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
Arsenic	5.3	16	SGV	500			0/4		
Cadmium	<0.1	<0.1	SGV	1400			0/4		
Chromium (Total)	10	19	SGV	5000			0/4		
Lead	14	110	SGV	750			0/4		
Mercury	<0.1	0.29	SGV	480			0/4		
Selenium	<0.1	0.97	SGV	8000			0/4		
Nickel	14	36	SGV	5000			0/4		
Phenols	<0.3	<0.3	SGV	21,900 1% SOM	43,000 2.5% SOM	78,100 5% SOM	0/2 1% SOM	0/1 2.5% SOM	0/1 5% SOM
BaP	<0.1	0.2	ASSV	29			0/4		
Boron	<0.4	0.5	*	-			-/4		
Copper	11	60	ASSV	740,000			0/4		
Zinc	31	66	ASSV	1,000,000			0/4		
Free Cyanide	<0.5	<0.5	ASSV	29			0/4		
Sulphide	<0.5	<0.5	*	-			-/4		

SOM = Soil Organic Matter * = Soil Screening Value not derived

There was no visual or olfactory evidence of hydrocarbon fuel contamination in any of the exploratory holes and the results of the chemical analytical testing of the samples of made ground and natural soils showed levels of poly-cyclic aromatic hydrocarbons (PAH) either below or very slightly above the detection limits of the equipment used.

The end use of the site as a sports hall with associated buildings and hardstanding is considered equivalent to an end use described as commercial/industrial, which is usually considered representative of areas covered with buildings and/or hardstanding. The results of the chemical analytical testing of both the made ground and the natural soils on the site show that the made ground and the natural soils would be suitable for use within private residential garden areas, which is the most sensitive end use.

Comparison of Water Analysis with Inorganic Drinking Water Standards

One sample of groundwater was recovered from each of the boreholes during the ground investigation and both samples were analysed in the laboratory for a suite of common inorganic and organic potential contaminants primarily for characterisation purposes. The groundwater samples were taken from depths of 5.00m and 5.50m.

The primary assessment tool employed for the generic screening of samples for the protection of 'Controlled Waters' consists of the Statutory Instrument 2000 No.3184 'The Water Supply (Water Quality) Regulations 2000'. The fraction of test results that exceed these levels are summarised in Table 5 below.

Table 5. Comparison of Chemical Test Results with Water Supply Regulations

Determinant	Minimum Concentration	Maximum Concentration	The Water Supply (Water Quality) Regulations 1989-2000 Maximum Concentration/Value for Consumers Taps	Fraction of samples Exceeding Water Supply Regulation
Arsenic (total) µg/l	3.8	4.2	10 µg/l	0/2
Boron (Water Soluble) µg/l	250	270	1000 µg/l	0/2
Cadmium (total) µg/l	<0.5	<0.5	5.0 µg/l	0/2
Chromium (total) µg/l	41	42	50 µg/l	0/2
Copper (total) µg/l	<1	<1	2000µg/l	0/2
Cyanide (total) mg/l	<0.05	<0.05	0.05 mg/l	0/2
Lead (total) µg/l	<1	<1	25 µg/l	0/2
Mercury (total) µg/l	<0.5	<0.5	1.0 µg/l	0/2
Nickel (total) µg/l	<1	7.5	20 µg/l	0/2
pH value	7.3	7.4	6.5 minimum 10.0 maximum	0/2
Phenols mg/l	<0.03	<0.03	0.0005 mg/l	-/2
Selenium (total) µg/l	1.4	2.8	10 µg/l	0/2
Sulphate (soluble) mg/l	72	88	250mg/l	0/2
Sulphide mg/l	<0.05	<0.05	No limit	0/2
Zinc (total) µg/l	6.7	7.7	5000 µg/l	0/2
PAHs µg/l	<2	<2	0.10 µg/l	-/2

With regard to the quality of the groundwater recovered from boreholes BH1 and BH2 none of the inorganic elements and compounds tested were present at levels above the drinking water standard thresholds.

POSSIBLE EXPOSURE SCENARIOS DURING CONSTRUCTION PHASE OF REDEVELOPMENT WORKS

Anticipated exposure scenarios during the construction phase of the redevelopment works are discussed below.

The intrusive investigation may not have revealed the full extent of contamination on this site and appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

The made ground and natural ground present on the site to a depth of between 0.10m and 1.20m did not contain any elevated concentrations of any of the determinands tested for.

No significant quantities of putrescible matter were encountered by the exploratory holes. The results of the gas monitoring showed marginally elevated levels of carbon dioxide. The precautions outline below should therefore be followed to protect the workers.

General precautions would be required during any potential development of the site by workers who may come into contact with the soil during groundworks, following standard precautions presented by the Health and Safety Executive (The Blue Book).

For the protection of these workers during groundworks the following is recommended:

- a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.
- b) Washing facilities should be made available to ground workers, so as to minimise the potential for inadvertent ingestion of soil.
- c) Suitable precautions, in line with current best practice, should be put in place to protect workers during the ground works.
- d) Workers should not spend long periods of time in deep trenches due to the possible build up of carbon dioxide and warning signs should be erected around such excavations.

Excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. The site plans, exploratory hole logs and certificates of chemical analysis should be sent to the Environment Agency or a suitably licensed waste disposal contractor for classification of the material prior to disposal off-site during any redevelopment works.

POSSIBLE EXPOSURE SCENARIOS RELATING TO FINAL DEVELOPMENT

The redevelopment is understood to comprise the construction of a sports hall with associated buildings. There are no plans for additional landscaping or planting on the site.

Anticipated exposure scenarios on completion of the development are discussed in the following sections, which also provide remedial solutions as applicable.

The results of the ground investigation have shown that the site is generally covered by up to 1.20m of made ground. The results of laboratory chemical testing of the made ground have identified no elevated levels of any of the determinands tested for. It is therefore considered that no remedial measures are necessary for site under the current scheme proposals.

The chemical analytical testing of the groundwater samples obtained showed no elevated concentrations of any elements or compounds tested for in relation to the drinking water standards derived from The Water Supply (Water Quality) Regulations 1989-2000; Maximum Concentration/Value for Consumers Taps.

During the site investigation no putresible matter was encountered and results of the gas monitoring discussed showed no elevated soil gases within the standpipe. The risk of soil gases affecting the final development is therefore judged to be low.

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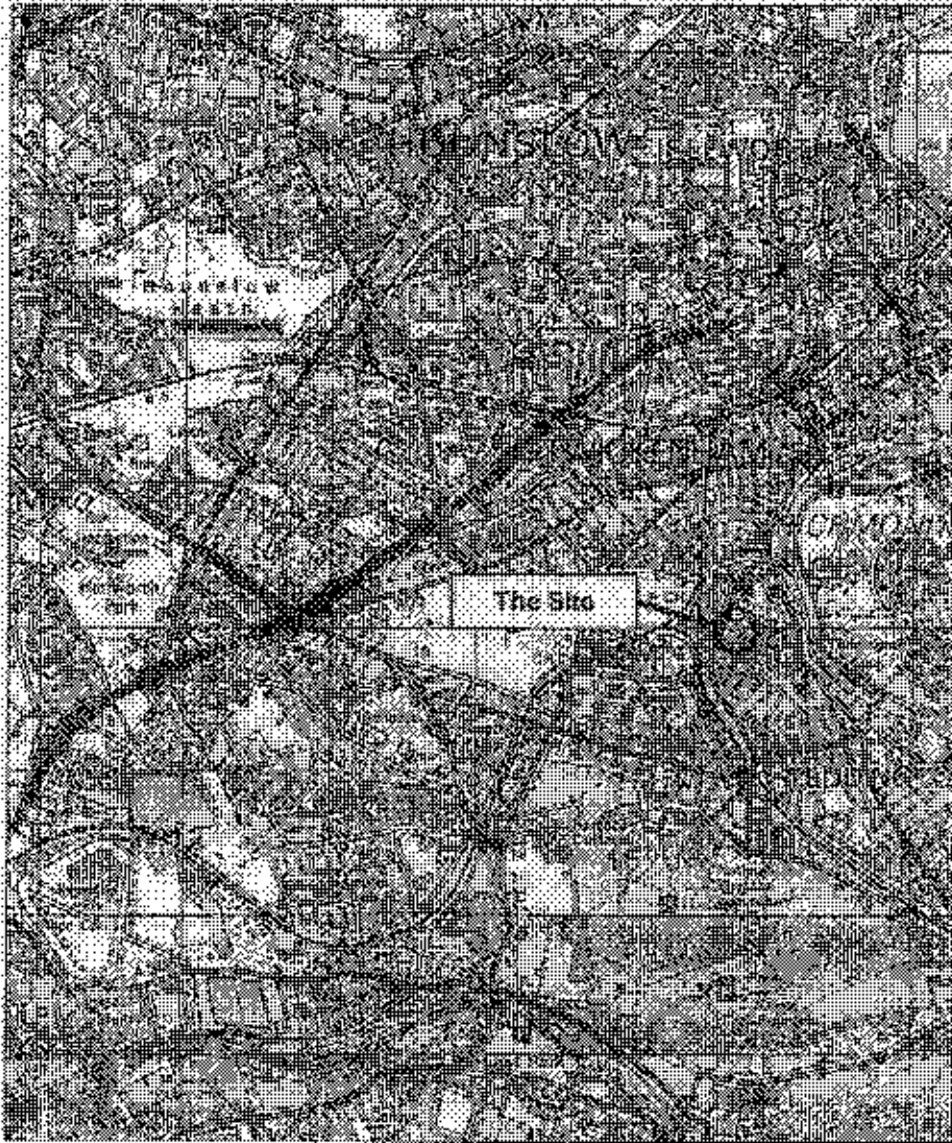
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Figures

Figure 1. Site Location Plan



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Project : St. Mary's College, Waldegrave Road, Twickenham

Client : St. Mary's College

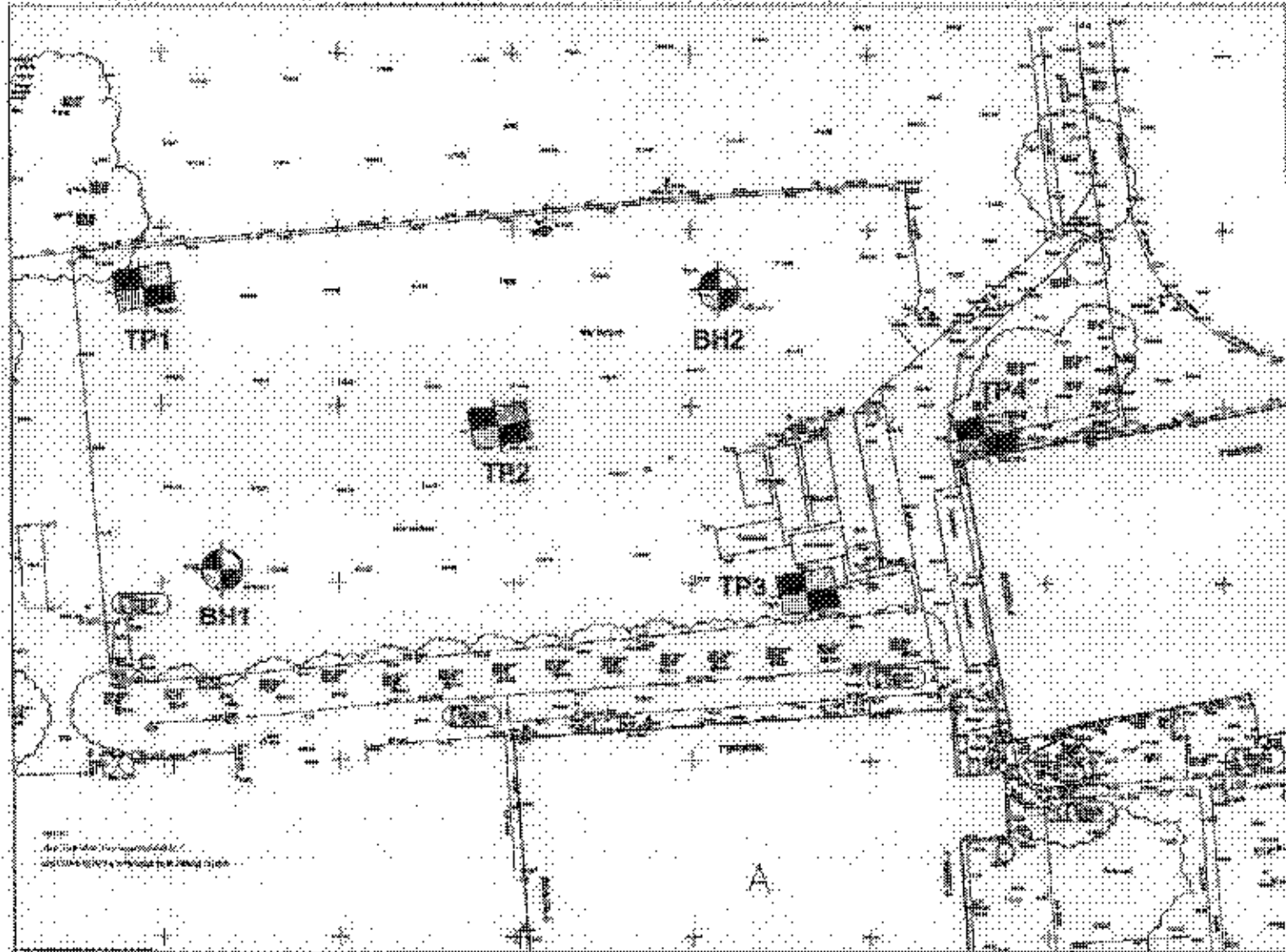
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Project No.

C10532


Figure 2. Exploratory Hole Location Plan




SCALE (m)

0 5 10 15 20

KEY

 Borehole Locations
BH1-2

 Trial Pit Locations
TP1-4

Project : St. Mary's College, Waldegrave Road, Twickenham
Client : St. Mary's College

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Exploratory Hole Logs

GROUND ENGINEERING Geo-Environmental Specialists 01733 566566			Site: ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM				BOREHOLE BH1		
			Date: 03/01/07		Hole Size: 150mm dia to 12.00m		Ground Level: 10.82m O.D.		
Samples and In-situ Tests			(Date) Casing	Description of Strata	Legend	Depth m	O.D. Level m		
Depth m	Type	Blows							
0.00-0.15	B1		1.50	MADE GROUND - Dark brown, gravelly SAND. Gravel of angular to sub-angular ash, clinker and flint		0.15	10.67		
0.20-0.70	B2								
0.80-1.20	B3		3.00	MADE GROUND - Dark, orange brown gravelly SAND with rare flint cobbles. Gravel of angular to sub-rounded brick, ash and flint		0.80	10.02		
1.20-1.70	B4	N27							
1.35-1.65	C		5.00	Medium dense, orange brown slightly gravelly, slightly clayey SAND with rare soft, orange brown clay lenses. Gravel of sub-angular flint and quartzite (KEMPTON PARK GRAVEL)		1.20	9.62		
1.80-2.30	B5								
1.95-2.08	C	51*	3.00	(KEMPTON PARK GRAVEL)		1.70	9.12		
3.00-3.50	B6								
3.15-3.45	C	N29	4.00	Medium dense, orange brown, very sandy GRAVEL. Gravel of sub-angular to sub-rounded flint and quartzite. Becoming slightly gravelly sand below 6.20m depth		4.00	6.82		
4.00-4.50	B7								
4.15-4.45	C	N20	5.00	(KEMPTON PARK GRAVEL)		5.00			
5.00-5.50	B8								
5.00	W1		6.00	Firm, dark brown slightly gravelly CLAY with rare flint cobbles. Gravel of flint (REWORKED LONDON CLAY)		6.40	4.42		
5.15-5.45	C	N17							
6.20-6.40	B9		7.00	Firm, becoming stiff and fissured below 8.45m depth, dark brown CLAY with silt partings		7.00	3.82		
6.35-6.65	C								
6.40-6.70	B10		7.00	(LONDON CLAY)		8.45			
7.00-7.50	B11								
7.00(Failed)	U1	40	7.00	(LONDON CLAY)		9.00			
8.00-8.45	U2	38							
8.45	D1		7.00	(LONDON CLAY)		9.45			
9.00-9.45	U3	47							
9.45	D2		7.00	(LONDON CLAY)		10.00	0.82		
10.00-10.45	U4	50							

REMARKS						Project No	
1. Excavating a pit from 0.00m to 1.20m for 1 hour						10832	
2. Water added from 1.80m to 4.50m						Scale	Page
3. Borehole cased to 7.00m depth						1:50	1/2
4. Live roots observed to 1.70m depth							

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample W - Water Sample S/C - SPT Spoon/Cone W - Water Strike W - Water Rise	N - SPT Blows for 0.3m Blows for quoted penetration Vane Shear Test Cohesion () kPa Level on completion Level casing withdrawn Standpipe Level	Groundwater Strikes				Groundwater Observations				
		Depth m				Date				
		No	Struck	Rose to	Rate	Cased	Sealed	Hole	Depth m	Water
							03/01/07	12.00	7.00	damp
							03/01/07	12.00	0.00	dry

GROUND ENGINEERING Geo-Environmental Specialists 01733 566566			Site: ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM				BOREHOLE BH2		
Samples and In-situ Tests			Date: 02/01/07	Hole Size: 150mm dia to 15.00m			Ground Level: 10.61m. D.D.		
Depth m	Type	Blows	(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m	
0.20 0.30-0.70	D1 B1				MADE GROUND - Dark brown and black sandy GRAVEL of sub-angular to angular ash and asphalt		0.30	10.31	
0.70-1.10	B2				MADE GROUND - Orange brown and black mottled gravelly SAND. Gravel of angular to sub-angular flint and ash		0.70	9.91	
1.10-1.60 1.25-1.55	B3 C	N10			MADE GROUND - Soft, orange brown mottled slightly gravelly, sandy CLAY. Gravel of angular to sub-angular ash and flint		1.10	9.51	
1.90-2.40 2.05-2.35	B4 C	N36	1.50		Firm, orange brown and dark brown mottled slightly gravelly, sandy CLAY. Gravel of angular to sub-rounded flint and quartzite (LANGLEY SILT)		1.80	8.81	
3.00-3.50 3.15-3.45	B5 C	N33	3.00		Dense, orange brown slightly clayey, very sandy GRAVEL of sub-angular to sub-rounded flint and quartzite (KEMPTON PARK GRAVEL)				
4.20-4.60 4.35-4.65	B6 C	N14	4.00		Medium dense, silty, gravelly SAND. Gravel of sub-angular to sub-rounded flint and quartzite		4.20	6.41	
5.00-5.50 5.15-5.45 5.50	B7 C W1	N13	5.00		(KEMPTON PARK GRAVEL)				
6.00-6.20 6.15-6.45 6.20-6.50	B8 C B9	N22	6.00		Stiff, fissured dark brown CLAY with fine sand/silt partings		6.20	4.41	
7.00-7.45	U1	42	6.50						
7.45	D2								
8.00	D3								
8.50-8.95	U2	42	6.50		(LONDON CLAY)				
8.95	D4								
9.50	D5								
10.00-10.45	U3	40	6.50				10.00	0.61	

REMARKS
 1. Excavating a pit from 0.00m to 1.10m for 1 hour
 2. Water added from 2.00m to 4.00m
 3. Borehole cased to 6.50m depth
 4. Gas monitoring standpipe installed to 7.00m depth

Project No
10832
 Scale 1:50
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KEY
 D - Disturbed Sample
 B - Bulk Sample
 U - Undisturbed Sample
 W - Water Sample
 S/C - SPT Spoon/Cone
 ∇ - Water Strike
 ∇ - Water Rise
 N - SPT Blows for 0.3m
 * - Blows for quoted penetration
 V - Vane Shear Test Cohesion () kPa
 ∇c Level on completion
 c∇w Level casing withdrawn
 ∇s Standpipe Level

Groundwater Strikes						Groundwater Observations			
Depth m						Date			
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						02/01/07	15.00	6.50	damp
						02/01/07	15.00	0.00	dry
						17/01/07	7.00	0.00	2.76

GROUND ENGINEERING Geo-Environmental Specialists 01733 566566			Site: ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM		TRIAL PIT TP1			
Samples and In-situ Tests			Date: 03/01/07	Pit Size: 3.00m L x 0.60m W x 3.30m D.		Ground Level: 10.51m. O.D.		
Depth m	Type	Result	(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m	
0.02	D1			MADE GROUND - Brown and black mottled gravelly SAND. Gravel of angular to sub-angular ash and limestone		0.02	10.49	
0.10	D2					MADE GROUND - Black sandy GRAVEL of angular to sub-angular clinker and ash with rare flint		0.15
0.40	D3			Brown, slightly gravelly, silty SAND. Gravel of angular to rounded flint and quartzite (KEMPTON PARK GRAVEL)		0.60		9.91
0.70	D4			Medium dense, orange brown, slightly gravelly SAND. Gravel of angular to rounded flint and quartzite. Becoming sand and gravel below 1.10m depth			1.60	8.91
0.90-1.06	MP1	100		(KEMPTON PARK GRAVEL)				3.30
1.10-1.20	B1			Medium dense, brown, sandy GRAVEL with rare flint cobbles. Gravel of angular to rounded flint and quartzite				
2.00-2.10	B2			(KEMPTON PARK GRAVEL)				
2.00-2.04	MP2	100						
3.00	W1							
3.00-3.14	MP3	100	1 ∇					
3.20-3.30	B3							
				Trial pit completed at 3.30m depth				

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample R - Root Sample W - Water Sample J - Jar Sample ∇ - Water Strike ∇ - Water Rise ∇c - Level on completion MP - Mackintosh Probe R() - Hand Penetrometer Cohesion () kPa V - Vane Shear Test Cohesion () kPa	REMARKS 1. No live roots observed 2. Water met at 3.00m depth 3. Pit sides unstable below 3.00m depth	Project No 10832	
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GROUND ENGINEERING

Geo-Environmental Specialists
01733 586588

Site: **ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM**

TRIAL PIT TP2

Date: **03/01/07**

Pit Size: **2.80m L x 0.60m W x 2.00m D.**

Ground Level: **10.68m O.D.**

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.02	D1			MADE GROUND - Red brown silty, slightly gravelly SAND. Gravel of limestone and flint		0.02	10.66
0.10	D2			MADE GROUND - Black, red brown and dark grey sandy GRAVEL of angular to rounded flint, ash, coal and limestone		0.15	10.53
0.40	D3			Brown and orange slightly gravelly, slightly silty SAND. Gravel of angular to rounded flint and quartzite (KEMPTON PARK GRAVEL)		0.50	10.18
0.80-0.90	B1			Medium dense, orange brown slightly silty SAND and GRAVEL. Gravel of angular to rounded flint and quartzite			
1.40-1.50	B2			(KEMPTON PARK GRAVEL)			
1.50	MP1	100				2.00	8.68
Trial pit completed at 2.00m depth							

- KEY**
- D - Disturbed Sample
 - B - Bulk Sample
 - U - Undisturbed Sample
 - R - Root Sample
 - W - Water Sample
 - J - Jar Sample
 - ∇ - Water Strike
 - ∇ - Water Rise
 - ∇c - Level on completion
 - MP - Mackintosh Probe
 - P() - Hand Penetrometer
Cohesion () kPa
 - V - Vane Shear Test
Cohesion () kPa

- REMARKS**
1. No live roots observed
 2. Pit dry
 3. Pit sides stable

Project No
10832

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GROUND ENGINEERING

Geo-Environmental Specialists
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Site: **ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM**

TRIAL PIT TP3

Date: **03/01/07**

Pit Size: 3.00m L x 0.60m W x 3.40m D.

Ground Level: **11.00m. O.D.**

Samples and In-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.02 0.10	D1 D2			MADE GROUND - Red brown, silty, slightly gravelly SAND. Gravel of flint and limestone MADE GROUND - Black and dark grey sandy GRAVEL of angular to rounded flint, limestone and asphalt		0.03	10.97
0.30	D3					0.10	10.90
0.70 0.70-0.75	D4 MP1	100		(KEMPTON PARK GRAVEL)			
1.10-1.20	B1						
1.70-1.80	B2			Medium dense, brown and orange brown, slightly silty, sandy GRAVEL of angular to rounded flint and quartzite		1.80	9.20
2.03-2.11	MP2	100					
2.50-2.60	B3			(KEMPTON PARK GRAVEL)			
3.10-3.20 3.10-3.20	B4 MP3	100	∇			3.40	7.60
Trial pit completed at 3.40m depth							

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c Level on completion
- MP - Mackintosh Probe
- P () - Hand Penetrometer Cohesion () kPa
- V - Vane Shear Test Cohesion () kPa

REMARKS

1. Live roots observed to 1.50m depth
2. Pit sides unstable below 2.07m depth
3. Water met at 3.10m depth

Project No
10832

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GROUND ENGINEERING

Geo-Environmental Specialists
01733 566586


Site: **ST. MARY'S COLLEGE, WALDEGRAVE ROAD, TWICKENHAM**

Date: 03/01/07

Pit Size: 0.60m L x 0.40m W x 0.60m D.

TRIAL PIT
TP4

Ground Level: 10.62m. O.D.

Samples and in-situ Tests			(Date)	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result	Water				
0.05	D1			MADE GROUND - Brown and orange brown silty, sandy GRAVEL of angular to rounded ash, flint and quartzite MADE GROUND - Yellow brown SAND MADE GROUND - Brown and orange brown, slightly gravelly, silty SAND. Gravel of angular to rounded flint and quartzite		0.10	10.52
0.13	D2					0.15	10.47
0.30	D3					0.60	10.02
				Trial pit completed at 0.60m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- J - Jar Sample
- ∇ - Water Strike
- ∇ - Water Rise
- ∇c - Level on completion
- MP - Mackintosh Probe
- P() - Hand Penetrometer
- Cohesion () kPa
- V - Vane Shear Test
- Cohesion () kPa

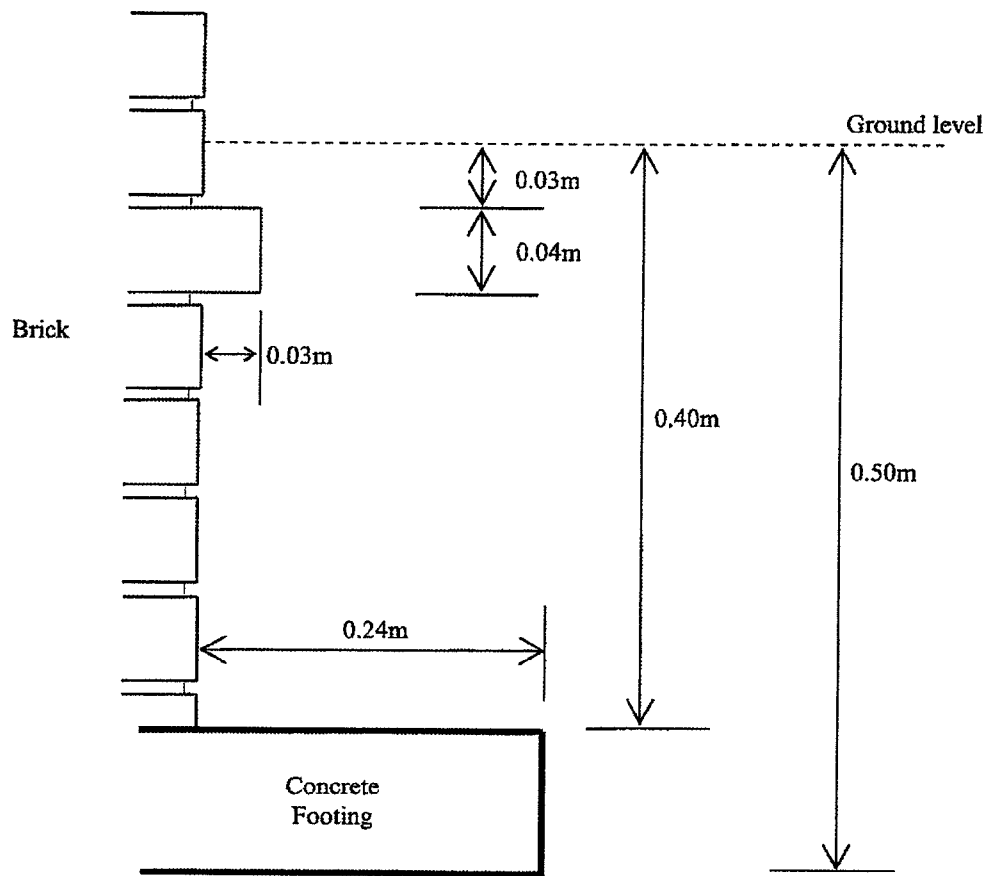
REMARKS

1. Live roots observed to 0.60m depth
2. Pit dry
3. Pit sides stable

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Trial Pit 4 Cross Section



Not To Scale

Project : St. Mary's College, Waldegrave Rd, Twickenham
Client : St. Mary's College

**GROUND
ENGINEERING**

Peterborough

Tel : 01733 566566

Project No.

C10832