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Land Quality, Ground Conditions and Contamination

Ref: 12698 Date: July 2021

1. A Land Quality Statement was prepared by Harrison Group to accompany approved planning permission reference 2013/1014/P dated May 2014 at the Tybalds Estate:

"Mixed use development to provide 93 mixed tenure residential units (Class C3), alterations to existing dwellings and entrances, 249 sqm of new/replacement community facilities (Class D1) an energy centre, refuse, cycle and caretakers facilities and associated landscape and public realm improvement works. The provision of a new internal access road and the reorganisation of car parking within the site and the surrounding area."

- 2. This development was never implemented. The current application, which seeks planning permission for a revised scheme at the Tybalds Estate, is required to be accompanied by a Land Quality Statement.
- 3. It has been confirmed with planning officers that the report prepared to accompany the 2014 planning permission can be submitted with the revised planning application. Harrison Group's report is therefore appended to this document and forms part of the planning application submission.

HARRISON GROUP ENVIRONMENTAL LIMITED

Document: Ground Investigation Report

Project: Tybalds Close Estate, Camden

Reference No.: GL16481

Date: May 2012

Prepared for: Tibbalds Planning and Urban Design

Instructed By: Campbell Reith Hill LLP

REPORT STATUS:

Revision	Comments	Prepared By	Approved By	Issued By	Audited By
0	DRAFT	INIT GP SIGN COMMENTS DATE 22/05.2012	INIT JK Sign Comments Date 22/05.2012	INIT GP Sign Comments Date 22/05.2012	INIT JK SIGN COMMENTS DATE 22/05.2012
1	FINAL	INIT GP SIGN COMMENTS DATE 20/06/2012	INIT JK SIGN COMMENTS DATE 20/06/2012	INIT GP SIGN COMMENTS DATE 20/06/2012	INIT JK SIGN COMMENTS DATE 20/06/2012
		Init Sign Comments Date	Init Sign Comments Date	Init Sign Comments Date	Init Sign Comments Date
		Init Sign Comments Date	Init Sign Comments Date	INIT SIGN Comments Date	INIT SIGN COMMENTS DATE

This sheet to be kept on PSI / Report file.

Auditors to insert their comments on the table, to annotate the report itself or provide comments on a separate sheet. (Please state which)

For final reports a hard copy of the signed off form will be kept on the appropriate QA file.

Document:	Ground Investigation Report
Project:	Tybalds Close Estate, Camden
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harrisongeotechnical ENGINEERING



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FOREWORD

General Conditions Relating To Ground Investigation

This investigation has been devised to generally comply with the relevant principles and requirements of BS10175: 2001 "Investigation of potentially contaminated sites - Code of practice" and where directed by the principles and application rules of Eurocode 7 (EC7 – Part 1 and Part 2). The recommendations made and opinions expressed in this report are based on the information obtained from the sources described using a methodology intended to provide reasonable consistency and robustness.

The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between exploratory positions, these are only for guidance and no liability can be accepted for their accuracy.

Boring and sampling procedures are undertaken in accordance with BS5930:1999+A2:2010, "Code of Practice for Site Investigations". Likewise in situ and laboratory testing complies with B.S.1377, "Methods of Tests for Soils for Civil Engineering Purposes", unless stated otherwise in the text. Chemical Testing has been undertaken by UKAS accredited laboratory, ALcontrol.

The groundwater conditions entered on the boring records are those observed at the time of investigation. The normal rate of boring usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions.

Some items of the investigation have been provided by third parties and whilst Harrison Group have no reason to doubt the accuracy, the items relied on have not been verified. No responsibility can be accepted for errors within third party items presented in this report.

This report is produced for the benefit of the client alone. No responsibility can be accepted for any consequences of this information being passed to a third party who may act upon its contents/recommendations.

REPORT

ON A

GROUND INVESTIGATION AT

TYBALDS CLOSE ESTATE, LONDON BOROUGH OF CAMDEN.

1 TERMS OF REFERENCE & INTRODUCTION

The work covered by this report was undertaken on behalf of Tibbalds Planning and Urban Design in accordance with the relevant contract documentation (EJBejb10907-200212-GI Spec V10.2) received from Campbell Reith Hill LLP (CampbellReith). CampbellReith also acted as Consulting Engineers for the project.

Consideration is being given to the re-development of the structures currently occupying the site. The investigation was required to provide factual geotechnical and geoenvironmental data, both from field work and from subsequent laboratory testing.

This report presents the results of the fieldwork and laboratory testing, along with a summary of the ground conditions encountered together with records of the post-fieldwork monitoring.

2 SITE DESCRIPTION

The site comprised the various residential blocks of flats identified as being part of the Tybalds Close Estate in the London Borough of Camden.

The site comprised an irregular area of land enclosed within rear fence-lines to properties fronting onto Great Ormond Street (north of the site), the rear property boundaries to blocks of offices fronting onto Theobald's Road (south of the site), Orde Hall Street (east of the site) and extending to the rear fence-lines of terraced properties fronting onto Orde Hall Street and blocks of flats fronting onto Boswell Street (western site boundary).

The site incorporated existing lower level multi-storey blocks, two residential tower blocks, areas of hardstanding, car parking and access roads, together with play areas and limited landscaping.

The site can be identified by approximate National Grid reference 530512E, 181940N, with a general elevation of 24m above Ordnance Datum (aOD).

A site location plan (GL16481-DR001) has been presented in Appendix A.

3 EXPECTED GEOLOGY

The British Geological Survey (BGS) Sheet 156, North London, 1:50,000 scale indicates that the site is underlain by solid geology consisting of the London Clay Formation, which in turn overlies the Lambeth Group. The BGS sheet identifies the presence of superficial Lynch Hill Gravel Deposits beneath the site overlying the London Clay Formation.

4 FIELDWORK

The scope of the site works was generally in accordance with that proposed by CampbellReith and comprised the following:

- 4 no. Cable Percussive Boreholes;
- 6 no. Window Sample Boreholes;
- Installations;
- 7 Foundation Inspection Pits

The investigation locations were agreed on site with the Engineer subject to local constraints. The intrusive fieldworks were carried out between 6th to the 13th March 2012 at the locations shown on the appended Fieldwork Location Plan presented in the appendix as drawing GL16481-DR002.

4.1 Cable Percussive Boreholes

Three percussive boreholes, BH T1 to 35.00m and BH T2A and BH T4 to 10.00m below existing ground level (bgl), were drilled using 200mm reducing to150mm diameter casing and equipment. Borehole T2 was replaced by BH T2A due to encountering concrete obstruction at 1.00m. Borehole T3 could not be drilled due to the continual presence of a parked car during the fieldwork obstructing access.

The boreholes were required in order to sample, test and log the sub-soils underlying the site. During drilling a falling head test was attempted in borehole BH T1 and BH T2A. During infilling a sufficient head of water to fully comply with the appropriate standard could not be achieved. However, we have presented the permeability results available in Appendix B.

Upon completion the boreholes were installed with combined gas and groundwater monitoring wells, as summarised in Table 4.3.

A detailed description of all the strata encountered, position and types of samples taken along with any groundwater observations made at the time of drilling are included on the borehole logs presented in Appendix B.

4.2 Window Sample Boreholes

Five window sample boreholes, WS T1, WS T2A to WS T5 were drilled by tracked dynamic continuous sampler drilling rig, were required in order to sample, test and log the sub-soils underlying the site. Window sample T2 encountered an obstruction at 0.40m and was replaced by WS T2A.

The window sample boreholes were undertaken using a Premier window sampling rig to a maximum depth of 3.00m bgl at which point the density of the soils prevented further penetration.

Upon completion window sample boreholes WS T1 and WS T5 were installed with combined gas and groundwater monitoring wells, as summarised in Table 4.3.

A detailed description of all the strata encountered, position and types of samples taken along with any groundwater observations made at the time of drilling are included on the window sample borehole records presented in Appendix B.

4.3 Installations

The following boreholes were installed with standpipes for monitoring gas and groundwater. Table 4.3 below summarises these installations.

Monitoring Point LD	Diameter of Installation	Base Depth of Installation	Response bç	e Zone (m gl)	Target Strata
	(mm)	(m bgl)	Тор	Base	
BH T1	50	6.00	1.00	6.00	Made Ground/Natural Soils (Lynch Hill Gravel)
BH T2A	50	7.00	1.00	7.00	Made Ground/Natural Soils (Lynch Hill Gravel)

BH T4	50	2.00	1.00	2.00	Made Ground
BH T4	50	7.00	3.00	7.00	Natural Soils (Lynch Hill Gravel)
WS T1	50	3.00	1.00	3.00	Made Ground
WS T5	50	2.20	1.00	2.20	Made Ground

 Table 4.3: Summary of Gas and Groundwater installations.

Detailed descriptions of the installations and their corresponding backfill materials are included on the relevant exploratory hole logs presented in Appendix B.

4.4 Gas and Groundwater Monitoring

A programme of gas and groundwater monitoring has been commissioned.

The results of gas and groundwater monitoring carried out to date are presented in Appendix C.

Gas monitoring

Gas monitoring was undertaken prior to groundwater monitoring and sampling.

Gas monitoring was carried out in accordance with Clause 9.10X of the CampbellReith Specification for Ground Investigation (Reference: EJBejb10907-200212-GI Spec V10.2).

Gas samples, where required, were stored in cool boxes with bubble wrap and were sent to the laboratory within 24 hours of being sampled along with chain of custody sheets.

Groundwater monitoring

Groundwater monitoring was carried out in accordance with Clause 7.8A of the CampbellReith Specification for Ground Investigation (Reference: EJBejb10907-200212-GI Spec V10.2).

Determination of the groundwater levels were derived using an interface dip-meter.

Where sufficient groundwater was encountered the borehole installations were purged prior to obtaining groundwater samples using low flow techniques. The depth to the groundwater level and the depth of the installation were recorded and the required purge volume calculated as follows:

Purge volume (litres) = 3 to 5 x π r² x l x 1000

Where, r = radius of installation (millimetres), I = length of water column in installation (metres).

Samples of the groundwater were obtained for subsequent laboratory analysis with use of disposable bailers.

Samples were stored in cool boxes with ice packs and were sent to the laboratory within 24 hours of being sampled along with chain of custody sheets.

4.5 Foundation Inspection Pits

Seven foundation inspection pits, FP T1 to FP T7, were excavated at positions identified by CampbellReith. With the exception of foundation pit FP T6 which was dug by backhoe mechanical excavator, the remaining pits were excavated by hand. Details of the foundations exposed are included within Appendix B.

5 GROUND CONDITIONS

5.1 Exploratory Hole Lithology

Detailed descriptions of the lithology encountered can be found on the appropriate logs included in Appendix B. It is our understanding that an appraisal of the site's lithology is being presented under separate cover by the consulting engineer.

5.2 Groundwater

Groundwater and any LNAPL levels encountered during the drilling and subsequent monitoring of the exploratory holes to date are summarised in Table 5.2 below.

Exploratory Hole Location	Depth groundwater encountered during	Depth groundwater encountered during monitoring (mbgl)								
	drilling (mbgl)	Round 1 (23 rd March 2012)	Round 2 (5 th April 2012)	Round 3 (17 th April 2012)						
BH T1	Not encountered*	4.85	4.84	4.04						
BH T2A	Not encountered*	4.22	4.24	4.24						
BH T4 (shallow)	Not encountered*	Dry at 1.95	Dry at 1.95	Dry at 1.96						
BH T4(deep)	Not encountered*	6.48	6.58	6.58						
WS T1	Not encountered	Dry at 3.00	Dry at 3.00	Dry at 3.00						
WS T5	Not encountered	Dry at 2.19	Dry at 2.18	Dry at 2.18						

*Water added to assist drilling. Groundwater strike may have been obscured.

 Table 5.2: Summary of Groundwater levels during drilling/excavation & monitoring

6 LABORATORY TESTING

6.1 Geotechnical Laboratory Testing

Geotechnical laboratory testing on selected soil samples recovered from the exploratory holes was scheduled by CampbellReith and was carried out to identify the physical characteristics of the soils encountered and the requirements for the design of buried concrete.

The geotechnical laboratory testing was undertaken at HGE's UKAS accredited laboratory. Unless otherwise stated the tests were performed to B.S. 1377, "Methods of Test for Soils for Civil Engineering Purposes". The exception being pH, water soluble sulphate, acid soluble sulphate and total sulphur, which were undertaken at ALcontrol using methods prescribed in BRE Digest SD1 "Concrete in aggressive ground" (2005 edition). Organic matter determinants were also undertaken at ALcontrol to B.S. 1377

The schedule of laboratory testing and results available to date are presented in Appendix D.

6.2 Environmental Laboratory Testing

All environmental laboratory testing on the soil, groundwater and gas samples recovered from the exploratory holes was scheduled by CampbellReith in order to facilitate the assessment of the chemical characteristics and potential contamination of the site.

Alcontrol laboratories carried out the analytical chemical testing to UKAS accredited procedures unless stated otherwise.

The schedule of laboratory testing and results available to date are presented in Appendix D.

Report Compiled by:

Report Checked by

Graham Dowlen BSc (Hons), MSc, C.Geol, F.G.S. Geotechnical Engineer.

John Keay B.Sc. (Hons), F.G.S. Associate Director Geotechnical.

REFERENCES

BSI British Standard BS5930:1999 (with Amendment 2:2010), 'Code of Practice for Site Investigations'.
BSI British Standard, 2001, BS10175:2001, 'Investigation of Potentially Contaminated Sites'
BSI British Standard. 1990. BS1377:1990, 'Methods of Test for Soils for Civil Engineering Purposes'.
Building Research Establishment, 2005. Special Digest 1:2005, 'Concrete in Aggressive Ground'.
CampbellReith Specification for Ground Investigation (EJBejb10907-200212-GI Spec V10.2)

LIST OF APPENDICES

APPENDIX A: DRAWINGS

Site Location Plan (GL16481-DR001) Exploratory Hole Location Plan (GL16481-DR002)

APPENDIX B: EXPLORATORY HOLE RECORDS

Data Sheet: Site Investigation Methods Key to Site Investigation Records Cable Percussion Borehole Records Window Sample Borehole Records Foundation Inspection Pit Records Falling Head Test Records

APPENDIX C: GAS & GROUNDWATER MONITORING RECORDS

- Gas Round 1 (23rd March 2012)
 - Round 2 (5th April 2012)
 - Round 3 (17th April 2012)
- Groundwater Round 1 (23rd March 2012)
 - Round 2 (5th April 2012)
 - Round 3 (17th April 2012)

APPENDIX D: LABORATORY TESTING

Summary Geotechnical Laboratory Testing Schedule Geotechnical Laboratory Results Summary of Chemical Laboratory Schedule (Soils) Chemical Laboratory Test Results Summary of Chemical Laboratory Schedule (Water) Chemical Laboratory Test Results

APPENDIX A

DRAWINGS





FM-HY-G-6083 Rev B L:\16400\GL16481 - Tybalds Estate\Drawings\GL16481 - DR001.dwg

APPENDIX B

EXPLORATORY BOREHOLE RECORDS

DATA SHEET: SITE INVESTIGATION METHODS

The following sheet provides basic details of the site investigation methods employed in the direct investigation phase of this report. Detailed method statements may be provided if, requested, or further information may be obtained from the relevant British Standard, or Environment Agency publications. Prior to any excavation being undertaken, a surface sweep using a cable detector is undertaken, in order to avoid services. Details of the lithology encountered are generally presented on the relevant field record sheets, which also detail the type and depths of samples taken, the results of any in-situ tests, and any groundwater observations noted at the time. Other pertinent information may also be recorded.

CABLE PERCUSSIVE BOREHOLES

The cable percussive borehole drilling rig may be towed by a 4x4 pick up or similar vehicle, and is capable of obtaining disturbed and undisturbed soil samples down to approximately 40m depth. The hole may be formed at a diameter of 200mm or most typically 150mm, with samples obtained direct from the drilling tools. Undisturbed samples (U100) may be obtained, and in-situ testing may include Standard or Cone Penetration Tests (SPT/ CPT) to BSEN ISO22476-3, plus permeability testing as per BS5930:1999. Please note we report raw SPT N values rather than corrected $N_{(60)}$ values. We can report in either format if requested by our client.

The equipment requires a minimum 2m access width, and the rig itself is 6m long (11m including tow). A rough 3m x 5m base area is required for drilling, but each site should be considered on specifics.

The technique can penetrate dense made ground, rubble and concrete or weathered rock/thin bands of rock using a chisel. However, in some cases these materials can form obstructions.

Standpipes can be installed, otherwise the borehole would be backfilled with spoil, or where instructed bentonite, concrete or sand may be used. Excess spoil is either removed from site or left in a tidy heap nearby.

In wet drilling conditions, the spoil can spread over a wide area through splashing and flow of the spoil from the tools, unless precautions are taken to prevent this. Conversely, the system can be very clean for instance when drilling through dry clay soil.

WINDOW SAMPLER BOREHOLES

The window sampler system comprises a series of varying diameter (max 80mm) steel tubes of either 1m or 2m length having a slot or window cut along the side. The tubes are driven into the ground using a light percussive hammer attached to solid rods, and withdrawn by use of a jack. The hammer may be machine mounted, or for restricted access work, hand held. The soil sample is forced up into the tube during the driving, samples being obtained directly through the slot or window. The sampler generally achieves depths of around 3-5m in favourable soils. Use of a super heavy tracked rig allows samples to be retrieved in liners. Greater diameter boreholes are also achievable (<115mm).

STANDPIPE INSTALLATIONS

Window sampler boreholes may be fitted with gas/ water monitoring standpipes, which generally comprise a 38mm diameter upvc slotted and plain casing to the required depths as appropriate, and may be fitted with a gas tap bung or end cap, and lockable cover. Full details of the standpipe installations and associated backfill are given on the relevant borehole records. Other diameters and types of standpipe are available if required.

HAND DUG TRIAL PITS

Hand dug pits may be undertaken for a variety of reasons, which include service observation pits, obtaining near surface samples, and examining foundations of existing buildings. Pits are excavated using a shovel, postholers and other suitable equipment. Detailed records of hand dug pits are only normally recorded where foundation depths and information is required.

GROUNDWATER MONITORING

Groundwater monitoring is undertaken in accordance with the Specification for Ground Investigation EJBejb-10907-200212-GI Spec V10.2

GROUND GAS MONITORING

Ground gas composition and flow monitoring is undertaken in accordance with Clause 9.10X of the Specification for Ground Investigation EJBejb-10907-200212-GI Spec V10.2.

6		Key to Site Investigation Records								
hai	rrisongroup	Project: Tybalds Close Estate, Camden								
Project ID.: G	L16481	Client:Tibbalds Planning and Urban DesignEngineer:Campbell Reith Hill LLPContractor:Harrison Group Environmental Limited								
In-situ Testing	g & Observations									
S or C	Standard Penetration Test purposes'. Uncorrected tes - solid cone.	as per BS1377:1990 'Methods of test for soils for civil engineering t result shown on the log at the relevant depth. S - split spoon or C								
*	n100 - dynamic penetration	test graphical presentation of the blows taken to drive 100mm.								
+	Equivalent SPT 'N' value. B soils unless specificed in th	ased on standard empirical calculation after Card & Roche for sandy ne text.								
IV	In-situ (down hole) vane sh peak - p or remoulded - r	ear strength								
HV	In-situ hand vane test, shea peak - p or remoulded - r	ar strength reported in kPa								
PP	Pocket penetrometer test,	shear strength reported in kPa								
К	In-situ permeability test res	ult, expressed in m/s								
PID	In-situ screening by photo- Head space testing undert	lonisation detector, expressed as ppm aken as per contract documents.								
TCR SCR RQD If	TCRTotal Core Recovery, %As defined in BS5930:1999. Details of flush returns etc. areSCRSolid Core Recovery, %given on the relevant log sheet.RQDRock Quality Designation, %IfFracture spacing, mm									
\square	Groundwater strike	Level to which groundwater has risen after the specified time. (Nominal 20 mins)								
Sampling										
D / GD B / GB LB W ES FW	Small / geotechnical distur Bulk / geotechnical disturb Large bulk disturbed samp Water sample Environmental soil sample, Environmental water samp	bed sample, around 1kg ed sample, around 5Kg le, around 20Kg for earthworks testing in more than one container if appropriate le, in more than one container if appropriate								
U / UT P LS / C CBR	Undisturbed / Ultra thin und CP boreholes, 38mm diam specfied on the individual The number of blows taker sheet at the appropriate de Pushed piston sampler, no Liner sample, e.g. from wir California Bearing Ratio (C individual record sheet for	disturbed driven tube sample. Nominal 100mm diameter, 450mm length in neter, 100mm length in WS borehole. Dimension of trial pit cores to be records. It to drive the sample tube the full length is reported on the log opth. 'NR' indicates no recovery achieved. minal 100mm diameter idowless sampler / Core sample, e.g. from rotary core drilling BR) test - either mould sample taken or in situ testing. See further information								
General com	ments									
 Samples Falternative in the report 2. Electronic Geoenviro Electronic legend and 	nave been described in accor e material specific weathering ort text. data provided in relation to t onmental Specalists (AGS) da Transfer of Geotechnical and d backfill codes are as per th	dance with BS5930:1999 'Code of practice for site investigation' unless an classification is considered more appropriate. This will be recorded his project has been produced using the Association of Geotechnical & ta transfer format, with specific reference the their publication								
Site specific o	comments									

This data was produced by Harrison Geotechnical Engineering Limited, Unit A11, Poplar Business Park, 10 Prestons Road, London, E14 9RL t: 020 7537 9233 f: 020 7987 0361

harrisongroup	Percu	issio	n Bo	reh	ole Re	cord	BH T1			
	Project: Ty	/balds (Close Es	state,	Camden					
Project ID : GI 16481	Coordinates: 530557.4E							Ground Level: 23.17mAOD		
	181973.7N							Sheet 1 of 4		
Description	Legend	Depth (m)	O.D. Level (m)	Sam Type	pples/ Test Depth (m)	Casing (Water) Depth (m)	Т	Remarks and est Results	Installations	
Grass over segmented CONCRETE PAVEMENT with dark brown organic sandy silt infill.		0.20	22.97	ES1 ES2	0.15 0.30				0.20	
MADE GROUND. Loose red brown and brown occasionally off white and grey silty gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse brick and ceramic pipe fragments. Occasional lenses of grey brown slightly sandy slightly gravelly silty clay.				D1 ES3 ES4 D2 ES5 C B1 ES6	0.50 0.50 0.75 1.00 1.00 1.50 1.50 1.50 1.50		N=	5 (2,2,2,1,1,1)	1.00-	
				D3 ES7 C B2	2.00 2.00 2.50 2.50-2.95		N=2	15 (1,1,2,2,8,13)		
Dense orange brown and dark yellow brown silty gravelly fine to coarse SAND. Gravel is subrounded to rounded fine to coarse flint.		2.90	20.27	ES8 D4 ES9	2.50 3.00 3.00					
Dense dark yellow brown silty sandy GRAVEL. Gravel is subrounded to rounded fine to coarse flint.		3.60	19.57	C ES10 B3 ES11	3.50 3.50 3.50-3.95 4.00	3.50	N=3	4 (3,4,6,8,10,10)		
At 4.50m: becomes very dense.				C ES12 B4	4.50 4.50 4.50-4.95	4.50	50/245m	m (4,8,13,12,13,12)		
(Stiff) brown silty CLAY. Firm to stiff fissured grey silty CLAY with occasional light grey silt laminae and fissure		5.10	18.07 17.77	D5 ES13 UT1	5.20 5.25 5.50-5.95		60 blows: 100% recovery			
infill. Occasional off white sand size selenite crystals.				D6	6.00				6.00	
				S D7	7.00 7.00-7.45	5.40	N=	16 (2,3,3,4,4,5)	8.00	
				UT2	8.50-8.95		60 blov	vs: 100% recovery		
				D8	9.00					
Continued next sheet	the second second			1	Water Level	Observat	ions			
Hole Diameter Details Chiselling Details Diameter (mm) Depth (m) From (m) To (m)	Date		Water Strike (r	n)	Standing Time (mins)	Stan Leve	ding I (m)	Casing Depth (m)	Depth Sealed (m)	
200 26.00 6.00 150 35.00										
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Dates: 06/03/2012-08/03/2012 Plant: Dando 2000 Cable Percussive Rig Drilled By: M. Jones Logged By: G. Dowlen Checked By: J. Keay	Remarks: 1. Inspection 2. Groundwat 3. Water adde 4. Installation 1.000mbgl, jused. 5. Backfill det from 6.00m 6. Standing T	pit excava ter was noi ed to assis details: 50 plain from ails: Arisin abgl to 1.00 ime/ Dayw	ted from Gl encounter t drilling fro imm diame 1.00mbgl tr gs from 35. Dmbgl, ben orks: 1.0 h	L to 1.20 ed. m 3.000 ter HDF o GL. Fi 00mbg tonite p our fenc	Ombgl. mbgl to 5.10mbg E standpipe ins inished with gas I to 8.00mbgl, bb ellets from 1.000 cing on 06/03/20	gl (400 litres) talled from 6 tap, end cap entonite pell mbgl to 0.20 12.	0.00mbgl ti o and flush ets from 8 mbgl and	o GL. Slotted from 6.0 n fitting cover. Geowra 00mbgl to 6.00mbgl, concrete from 0.20mb	Ombgi to p and geosock gravel filter packs igi to GL.	

harrisongroup	Percu	issio	n Bo	reho	ole Re	cord	BH T1				
	Project: Tybalds Close Estate, Camden										
Project ID · GI 16481	Coordinates: 530557.4E						Grour	nd Level: 23.17	mAOD		
		181	973.7N					Sheet 2 of	4		
Description	Legend	Depth (m)	O.D. Level (m)	Samı Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	г	Remarks and est Results	Installations		
Firm to stiff fissured grey silty CLAY with occasional light grey silt laminae and fissure infill. Occasional off white sand size selenite crystals. Hole Diameter Details Chiselling Details Diameter Details Chiselling Details Diameter Details Chiselling Details Diameter Details Chiselling Details Diameter Details Chiselling Details	Date		3.37 Water Strike (r	S D9 UT3 D10 S D11 UT4 D12 S D13 UT5 D14 S D15 N N T	10.00 10.00-10.45 11.50-11.95 12.00 13.00 13.00-13.45 14.50-14.95 15.00 16.00-16.45 17.50-17.95 18.00 19.00-19.45 19.00 19.00-19.45 Water Level Standing ime (mins)	6.00 6.00 6.00 0bservat	N= 60 blox N= 65 blox N= 68 blox N= 68 blox N= 1000 N=	18 (3,3,4,4,5,5) ws: 100% recovery 19 (3,4,4,5,5,5) ws: 100% recovery 24 (4,4,5,6,6,7) vs: 100% recovery 27 (4,5,6,6,7,8) Casing Depth (m)	Depth Sealed (m)		
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP	Remarks:										
Contractor:Harrison Group Environmental LimitedDates:06/03/2012-08/03/2012Plant:Dando 2000 Cable Percussive Rig											
Drilled By: M. Jones Logged By: G. Dowlen											
Checked By: J. Keay											
FM-Hn-R-3080 Print Date: 19/06/2012		Ha	arrison Gro	up Enviror	nmental Ltd, Ur	nit A11, Popla	ar Busines	s Park, 10 Prestons Roa	d, London E14 9RL		

	2	ha	rrisor	ngro	up	Percu	issio	on Bo	reh	ole Re	cord		BH T1			
						Project: Ty	/balds	Close E	state,	Camden						
Project	ID · GI	16481				Coordinates: 530557.4E						Grour	Ground Level: 23.17mAOD			
Појест		10401					181973.7N						Sheet 3 of 4			
		Descri	ption			Legend	Depth (m)	n O.D. Level (m)	Sam Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	Т	Remarks and est Results	Installations		
Very stiff	variably	light blue,	grey and r	ed		101201	E		D16	20.00						
Drown Cic	osely fis	surea siigni	tiy siity CL	AY.					UT6 D17	20.50-20.95		85 blov	ws: 100% recovery			
									S D18	22.00 22.00-22.45	6.00	N=3	9 (5,7,8,9,10,12)			
					UT7 D19	23.50-23.95 24.00		100 blo	ows: 70% recovery							
									S D20	25.00 25.00-25.45	6.00	50/255	mm (6,7,9,14,18,9)			
									UT8 D21	26.50-26.95 27.00		100 blo	ows: 70% recovery			
Very stiff CLAY.	to hard	closely fiss	ured dark	brown			27.70	-4.53	S D22	28.00 28.00-28.45	6.00	50/235n	nm (5,7,10,15,20,5)			
Very stiff grey, blue slightly si	closely fiss ccasionally /.	own		28.60	-5.43	UT9	29.50-29.95		100 blo	ows: 80% recovery						
										Water Level	Observat	ions				
Hole	Diameter Depth	Details	Ch	niselling D	etails Time	Date		Water		Standing	Stan	ding	Casing	Depth		
(mm) 200 150	26.00 35.00	6.00	(m)	(m)	(hhmm)			Strike (r	n) ⁻	Гіme (mins)	Leve	I (m)	Depth (m)	Sealed (m)		
Client: Engine Contrac Dates: Plant: Drilled Loggeo Checke	iibbalds Plan Campbell R Harrison Gr 06/03/2012- Dando 2000 A. Jones G. Dowlen I. Keay	Remarks:		Harrison Gro	up Enviro	nmental Ltd. Ur	I	ar Business	s Park, 10 Prestons Ro.	ad, London E14 9RI						

harrisongroup	Percu	issio	n Bo	reh	BH T1				
	Project: Ty	/balds (Close Es	state,					
Project ID.: GL16481	Coordinates: 530557.4E						Ground Level: 23.17mAOD		
		181	973.7N			1		Sheet 4 of	4
Description	Legend	Depth (m)	O.D. Level (m)	Sam Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	т	Remarks and est Results	Installations
Very slift to hard closely fissured dark light grey, blue grey occasionally brown and red brown slightly silty CLAY. Borehole Complete at 35.00 m		35.00	-11.83	S D24	30.00 31.00 31.00-31.45 32.50-32.95 33.00 34.00 34.00 34.00-34.45	6.00	50/235m	nm (7,9,11,15,18,6) ws: 100% recovery nm (8,10,14,18,18)	35.00
Hole Diameter Details Chiselling Details						Observat			
Diameter (mm) Depth (m) Casing Depth (m) From (m) To Time (hhmm) 200 26.00 6.00 6.00 6.00 6.00	Date		Water Strike (r	n) -	Standing Fime (mins)	Stan Leve	aing I (m)	Casing Depth (m)	Depth Sealed (m)
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Dates: 06/03/2012-08/03/2012 Plant: Dando 2000 Cable Percussive Rig Drilled By: M. Jones Logged By: G. Dowlen Checked By: J. Keay FM-Hn-R-3080 Print Date: 19/06/2012	Remarks:	H	arríson Groi	up Enviro	nmental Ltd. Ur	I	ar Business	Park, 10 Prestons Roz	ıd, London E14 9RI

	2	ha	rrisor	ngroi	up	Percu	issic	on Bo	reh	ole Re	cord	BH T2				
						Project: Ty	/balds	Close E	state,	Camden						
Project	ID · GI	16481				Coordinates: 530474.6E						Groun	Ground Level: 23.49mAOD			
110,000	1001					181934.6N					Sheet 1 of 1					
		Descri	ption			Legend	Depth (m)	0.D. Level (m)	Sam Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	Т	Remarks and est Results	Insta	llations	
Broken F	AVING	SLAB.			/		- 0.05 - 0.15	23.44 23.34								
MADE G	ROUND SAND.	. Yellow bro	ne and]												
brown lo SAND. G occasion	cally cla ravel is al conci	yey silty gra angular fine rete, rare gl	to coarse ium brick ood	e i K, i I	C	1.00	22.49						1.00	1960 1960 1919		
At 1.00m: concrete. Borehole Complete at 1.00 m																
							-									
							Ē							-		
							1	1	1	Water Level	Observat	ions				
Hole Diameter	Diamete Depth	r Details Casing	Ch From	iselling D	etails Time	Date		Water	m) -	Standing	Stan	ding	Casing	De	oth	
<u>(mm)</u> -	(m) 35.00	Depth (m)	(m)	(m)	(hhmm)			Strike (f	n)	Time (mins)	Leve	I (m)	Deptn (m)	Seale	a (m)	
Client: Engine Contra Dates: Plant: Drilled	er: (ctor: (By: (Tibbalds Pla Campbell R Harrison Gr 09/03/2012 Dando 2000 M. Jones	Jrban Des P onmental cussive F	ı sign Limited Rig	Remarks: 1. Inspection 2. Groundwa 3. Concrete c 4. Backfill del 5. Standing T	pit excava ter was no obstructior tails: Arisir ime/ Dayy	ated from G of encounter n encounter ngs from 1.0 works: 1.0 h	L to 1.00 red. ed at 1.0 00mbgl to our fenci	mbgl. 0mbgl. Boreho o GL. ng on 09/03/20	le terminated	d and mov	ed to position BH T2	A.			
Logged	a By: (ed Bv [.]	J. Keav														
FM-Hn-R-30	30			Print Date:	19/06/2012		F	larrison Gro	up Envira	nmental Ltd, Ur	nit A11, Popla	ar Business	Park, 10 Prestons Ro	ad, Londoi	n E14 9RL	

harrisongroup	Percussion Borehole Record BH T2A									
	Project: T	ybalds	Close E	state,	Camden					
Project ID.: GL16481	Coordinat	es: 53	0474.5E				Grour	nd Level: 23.51	mAOD	
-		18	1936.9N	1		Casina		Sheet 1 o	f 2	
Description	Legend	Depth (m)	O.D. Level (m)	Sam Type	Depth (m)	(Water) Depth (m)	т	Remarks and est Results	Installations	
Broken PAVING SLAB.		– 0.05 – 0.15	23.46 23.36	ES1	0.20				0.20	
MADE GROUND. Yellow brown silty fine and medium SAND.		Ē		D1 ES2	0.50 0.50					
MADE GROUND. Medium dense brown, grey brown and grey locally slightly clayey silty gravelly fine and medium occasionally coarse SAND. Gravel is				D2 ES3	1.00 1.00				1.00	
angular fine and medium occasionally coarse brick, occasional concrete, glass, metal and wood fragments.				C B1 ES4 D3 ES5	1.50 1.50-1.95 1.50 2.00 2.00		N=	14 (1,2,3,3,4,4)		
Dense yellow brown silty fine and medium		2.90	20.61	C B2 ES6 D4 ES7	2.50 2.50-2.95 2.50 3.00 3.00		N=	17 (2,3,4,4,4,5)		
rounded fine to coarse flint.				C B3 ES8	3.50 3.50-3.95 3.50	3.50	N=3	31 (3,4,5,7,9,10)		
				C B4 ES9	4.50 4.50-4.95 4.50	4.50	N=43	3 (4,6,7,10,12,14)		
From 5.00m: becomes very dense.				C ES10 B5	5.50 5.50 5.50-5.95	5.50	N=50) (4,7,9,12,14,15)		
(Firm to stiff) brown silty CLAV	1.5.2.1.1.5.2.5. 	6.20	17.31	D5	6.20				<u> N</u> EX	
	2 2 2 2 2 2	6.60	16.91	ES11	6.50					
Stiff closely issured grey slity CLAY. Occasional light grey slit laminae and fissure infill.				UT1	7.00-7.45		65 blov	ws: 100% recovery	7.00	
				D6	7.50					
		S 8.50 D7 8.50-8.95 6.50 N=21 (3,4,4,5,6,6)								
Continued next sheet										
Hole Diameter Details Chiselling Details Diameter Depth Casing From To Time	Date		Water		Standing	Stan	ding	Casing	Depth	
(mm) (m) Depth (m) (m) (m) (hhm 150 10.50 6.50	n <u>)</u>		Strike (r	n)	Time (mins)	Leve	I (m)	Depth (m)	Sealed (m)	
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limite Dates: 09/03/2012-12/03/2012 Plant: Dando 2000 Cable Percussive Rig Drilled By: M. Jones Logged By: G. Dowlen Checked By: J. Keay FM-Hn-R-3080 Print Date: 19/06/2	d Remarks: 1. Inspection 2. Groundwa 3. Water add 4. Installatior 1.00mbgl, used. 5. Backfill de bentonite 6. Standing 1 test on 12/	n pit excava ter was no led to assis n details: 5 plain from etails: Bent pellets fror Time/ Dayy (03/2012.	ated from Gi t encounter t drilling fro 0mm diame 1.00mbgl t 0nite pellets n 1.00mbgl vorks: 3.0 h	L to 1.20 red. om 2.90n eter HDP o GL. Fir 5 from 10 to 0.20n ours awa	mbgl. E standpipe ins nished with gas 1.50mbgl to 7.00 hogl and concr aiting installatio	gl (400 litres) stalled from 7 tap, end cap Ombgl, grave ete from 0.20 n details/ma). 7.00mbgl t 9 and flusi 21 filter pace 20mbgl to C terials on 1 4 4 4 8	o GL. Slotted from 7.0 h fitting cover. Geowra :ks from 7.00mbgl to 3L. 09/03/2012 and 1.0 hr s Park, 10 Prestons Ro	00mbgl to ap and geosock 1.00mbgl, our permeability ad, London E14 9R!	

	2	ha	rrisor	ngro	up	Percu	issio	BH T2A							
~						Project: Ty	/balds	Close E	state, (Camden					
Project	ID · GI	16481				Coordinat	es: 530	0474.5E				Ground Level: 23.51mAOD			
FIUJECI	ID GL	10401					18	1936.9N					Sheet 2 of 2		
		Descri	ption			Legend	Depth (m)	O.D. Level (m)	Sam Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	т	Remarks and est Results	Installations	
Stiff close Occasion	ely fissu nal light	red grey sil [:] arev silt lan	ty CLAY.	fissure					UT2	10.00-10.45		68 blov	ws: 100% recovery		
infill.					/	C X C.C X I	10.50	13.01	D8	10.50				10.50	
Borenoie	Comple	ete at 10.50	m				E_								
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Hole	Diamoto	r Dotaile	Ch	iselling D	otails				· · · ·	Water Level	Observat	ions	I		
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hhmm)	Date		Water Strike (r	n) T	Standing Time (mins)	Stan Leve	ding I (m)	Casing Depth (m)	Depth Sealed (m)	
150	10.50	6.50													
Client:		l Fibbalds Plai	nnina and I	Jrban Des	l sign	Remarks									
Engine	er: (Campbell R	eith Hill LL	.P	5	Romanx3.									
Contra	ctor: I	Harrison Gr		onmental	Limited										
Dates:	()9/03/2012·	12/03/201	2	Dia										
Drilled	ו Bv: ו	Jando 2000 M. Jones	Cable Per	cussive F	kig										
Logged	d By: (G. Dowlen													
Checke	ed By: .	J. Keay													
FM-Hn-R-308	30			Print Date:	19/06/2012		Н	arrison Gro	up Enviroi	nmental Ltd, Ur	nit A11, Popla	ar Business	s Park, 10 Prestons Ro	ad, London E14 9RL	

	2	ha	rrisor	Igro	up	Percu	issio	on Bo	Borehole Record				BH T	4
						Project: Ty	/balds	Close E	state,	Camden				
Project	ID.: GL	16481				Coordinate	es: 53	0473.0E				Grour	nd Level: 25.2	ōmAOD
							18	1772.0N					Sheet 1 c	of 2
		Descri	ption			Legend	Deptł (m)	n O.D. Level (m)	San Type	nples/ Test	Casing (Water) Depth (m)	1	Remarks and Fest Results	Installations
Reinforce	ed CON	CRETE.			/		0.10	25.15	ES1	0.25				0.20
MADE G brown ar fine to co medium	ROUND nd grey l barse SA occasio	Dense to vocally claye ND. Gravel ND. coarse	very dense ey silty gra is angular e brick, ran	brown, velly fine and e concre	grey I :te,				D1 ES2 D2	0.50 0.50 1.00				1.00
occasior	al glass	, metal and	wood frag	ments.					ES3 C B1	1.00 1.50 1.50-1.95		N=	26 (2,4,5,6,7,8)	
									ES4 D3 ES5	1.50 2.00 2.00				2.00
									C B2 ES6	2.50 2.50-2.95 2.50 3.00		50/12	0mm (9,13,27,23)	3 00
Firm to s gravelly medium	tiff brow silty san SAND. (n and yello dy CLAY/ cl Gravel is rou	w brown sl layey fine a unded fine	lightly and and me	dium		3.20	22.05	D4 C B3	3.20 3.50 3.50-3.95	3.50	N=	19 (3,4,4,5,5,5)	
flint.							4.30	20.95	ES8 ES9 D5	4.00				
Dense ye GRAVEL and med	ellow bro . Gravel lium occ	own silty fin is subround asionally co	e to coarse ded to rour oarse flint.	e SAND a nded fine	and e				C ES10 B4 ES11	4.50 4.50 4.50-4.95 5.00	4.50	N=44	4 (4,6,9,10,12,13)	
									C ES12 B5 ES13	5.50 5.50 5.50-5.95 6.00	5.50	N=3	85 (3,5,7,8,10,10)	
									C	7.00	7.00	N=	.30 (4,6,7,7,8,8)	7.00
(Elma ta	- +:60		A) /			stat estat	7.40	17.85	B6	7.00-7.45				-
(Firm to s (Stiff) clo silty CLA	stiff) bro sely fiss Y. Occa	ured dark g	ay. grey slightly grey silt la	y minae			- 7.70 	17.55	ES16	8.00				
selenite	crystals.	Occasional	sand size						UT1	8.50-8.95		60 blo	ws: 100% recovery	
						D6 9.00								
						The second								-
11-1	Diamat	r Dotalla		icollin - D	otoile	Water Level Observa							1	
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hhmm)	Date Water Standing Stand Strike (m) Time (mins) Level							Casing Depth (m)	Depth Sealed (m)
150	10.00	7.50												
Client: Engine Contra Dates: Plant: Drilled Logged Checke	er: (ctor:) By:) d By: (ed By:)	Fibbalds Plai Campbell R Harrison Gr 12/03/2012 Dando 2000 M. Jones G. Dowlen J. Keay	nning and L Reith Hill LL Youp Envirc 13/03/201 O Cable Per	Jrban Des P onmental 2 cussive F	ign Limited Rig	 Inspection pit excavated from GL to 1.20mbgl. Groundwater was not encountered. Water added to assist drilling from 4.30mbgl to 7.40mbgl (200 litres). Installation details (Dual): 50mm diameter HDPE standpipe (A) installed from 7.00mbgl to GL. Slotted from 7.00mbgl to GL. Slotted from 3.00mbgl to GL. 50mm diameter HDPE standpipe (B) installed from 2.00mbgl to GL. Slotte from 2.00mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas taps, end caps and flush fitting cover. Geowrap and geosock used. Backfill details: Bentonite pellets from 10.45mbgl to 7.00mbgl to 7.00mbgl to 1.00mbgl, bentonite pellets from 1.00mbgl to 2.00mbgl to 2.00mbgl to GL. Standing Time/ Dayworks: 2.0 hours awaiting access to the site, 1.0 hour breaking out on 12/03/2012 and 1.0 hou permeability test on 13/03/2012. 						ed from 7.00mbgl ggl to GL. Slotted n fitting cover. 3.00mbgl, nite pellets from 112 and 1.0 hour		
FM-Hn-R-30	80			Print Date:	19/06/2012 Harrison Group Environmental Ltd, Unit A11, Poplar Business Park, 10 Prestons Road, London						ad, London E14 9RL			

harrisongroup	Percussion Borehole Record BH T4								4
	Project: Ty	/balds (Close E	state, (Camden				
Project ID : GI 16481	Coordinate	es: 530	473.0E				Groun	nd Level: 25.25	SmAOD
		181	772.0N					Sheet 2 o	f 2
Description	Legend	Depth (m)	O.D. Level (m)	Sam Type	ples/ Test Depth (m)	Casing (Water) Depth (m)	т	Remarks and est Results	Installations
(Stiff) closely fissured dark grey slightly silty CLAY. Occasional light grey silt laminae and fissure infill. Occasional sand size selenite crystals.		- - - - - -	14.80	C D7	10.00 10.00-10.45	7.50	N=	22 (3,4,4,5,6,7)	10.45
		1		,	Water Level	Observat	ions		
Hole Diameter Details Chiselling Details Diameter (mm) Depth (m) From (m) To (m)	Date		Water Strike (r	n) 1	Standing Time (mins)	Stan Leve	ding I (m)	Casing Depth (m)	Depth Sealed (m)
150 10.00 7.50									
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Dates: 12/03/2012-13/03/2012 Plant: Dando 2000 Cable Percussive Rig Drilled By: M. Jones Logged By: G. Dowlen Checked By: J. Keay FM-Hn-R-3080 Print Date: 19/06/2012	Remarks:	<u> н</u>	arrison Grou	up Enviro	nmental Ltd, Ur	iit A11, Popla	ar Business	s Park, 10 Prestons Ro	ad, London E14 9RL

harrisongr	oup	Window Sample Record WS T1 Sheet 1 of 1							
	1	Project: Ty	ybalds C	lose Estate	, Camden				
Project ID: GL16481		Coordinate	es: 5305 1819	532.6E 952.7N			Grour	nd Level: 23.	23mAOD
Description		Legend	Depth	O.D. Level	Samp	le Test		Remarks and	Installations
			(m)	(m)	Туре	Depth (m)	Te	est Results	1.2 M 1.2 M
Grass over TOPSOIL. Dark brown organic s	andy SILT.		- 0.20	23.03	ES1	0.10			0.20 -
MADE GROUND. Brown and dark brown sill fine and medium occasionally coarse SAND is angular fine and medium occasionally coa brick.	ty gravelly . Gravel arse		-		ES2 ES3	0.30			
MADE GROUND. (Firm to stiff) brown, grey grey silty sandy gravelly CLAY. Gravel is and fine to coarse brick and rare concrete.	brown and gular		 	22.13	ES4	1.20			
			-		ES5	1.60			
					ES6	2.00			
			- 2.50	20.73	ES7	2.40			
MADE GROUND. Brown, dark grey and grey slightly clayey silty gravelly fine and medium occasionally coarse SAND. Gravel is angula rounded fine and medium occasionally coar and occasional flint. Window Sample Complete at 3.00 m	y brown r to se brick		- 3.00	20.23	ES8 ES9	2.60			3.00-
Datas Decembr				Water Lev	el Observati	ons	0	D 11	
Diameter (mm) From (m) To (m) 115 1.20 2.00 115 2.00 3.00	Recovery (%) 100 100	Date		water Strike (m)	Standing Time (Mins	g Star 5) Level	iding (m)	Casing Depth (m)	Depth Sealed (m)
Client: Tibbalds Planning and Urban I Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmenta Date: 06/03/2012 Plant: Premier Window Sampling Ri Drilled By: M. Rose Logged By: G. Dowlen Checked By: J. Keay FM-Hn-R-3081 Print I	Remarks: 1. Inspection 2. Groundwa 3. Installation from 3.00r fitting cove 4. Backfill de 1.00mbgl	n pit excava iter was not o details: 50 mbgl to 1.0 er. Geowraj tails: Grave to 0.20mbg	ted from GL to encountered mm diameter Ombgl, plain f o and geosoc I filter packs f I and concret ison Group Envi	o 1.20mbgl. HDPE stanc rom 1.00mbg k used. rom 3.00mbg e from 0.20n	pipe installer gl to GL. Finis gl to 1.00mbc bgl to GL. Unit A11, Popia	d from 3.0 shed with II, benton	00mbgl to GL. Slo gas tap, end cap ite pellets from Park, 10 Prestons R	tted and flush oad, London E14 9RI	

Project: Tybalds Close Estate, Camden Project ID: GL16481 Coordinates: 530573.5E 181941.2N Description Legend Depth (m) O.D. Level (m) Sample Test TOPSOIL. Dark brown organic sandy SILT. 0.20 22.88 4 Depth (m) 22.68 MADE GROUND. Brown and dark brown silty gravelly fine to coarse SAND. Gravel is angular fine and medium occasionally coarse brick. 0.40 22.68 22.67 CONCRETE. Window Sample Complete at 0.41 m								
Project ID: GL16481 Coordinates: 530573.5E Description Legend Depth O.D. Sample Test TOPSOIL. Dark brown organic sandy SILT. 0.20 22.88 Type Depth MADE GROUND. Brown and dark brown silty gravelly fine to coarse SAND. Gravel is angular fine and medium occasionally coarse brick. 0.40 22.68 22.67 22.67 Vindow Sample Complete at 0.41 m -	Project: Tybalds Close Estate, Camden							
Description Legend Depth (m) O.D. Level (m) Sample Term TOPSOIL. Dark brown organic sandy SILT. -	Ground Level: 23.08mAOD							
TOPSOIL. Dark brown organic sandy SILT. 0.20 22.88 MADE GROUND. Brown and dark brown silty gravelly fine to coarse SAND. Gravel is angular fine and medium occasionally coarse brick. 0.40 22.68 CONCRETE. 0.41 22.67 Window Sample Complete at 0.41 m - -	t Remarks and Installations							
MADE GROUND. Brown and dark brown silty gravelly fine to coarse SAND. Gravel is angular fine and medium occasionally coarse brick. 0.20 22.88 CONCRETE. 0.41 22.68 Window Sample Complete at 0.41 m 0.41 22.67								
CONCRETE.	0.41							
Water Level Obs	ervations							
Drive Records Date Water Strike (m) Standing Time (Mins) Diameter (mm) From (m) To (m) Recovery (%) Date Strike (m) Strime (Mins)	Standing Level (m) Casing Depth (m) Depth Sealed (m)							
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Date: 06/03/2012 Plant: Premier Window Sampling Rig Drilled By: M. Rose Logged By: G. Dowlen Checked By: J. Keay	w sample hole terminated and moved to							

harrisongroup	Wind	ow S	ample	Reco	rd		WS T2A Sheet 1 of 1	1
	Project: T	ybalds C	Close Estate	e, Camder	ı			
Project ID: GL16481	Coordinat	es: 530 181	572.5E 940.6N			Grou	nd Level: 23.	31mAOD
Description	Legend	Depth (m)	O.D. Level (m)	Samp Type	le Test Depth (m)	Т	Remarks and est Results	Installations
TOPSOIL. Dark brown organic sandy SILT.	8888	-		ES1	0.10			-888
MADE GROUND. Brown and dark brown silty gravelly fine to coarse SAND. Gravel is angular fine and medium occasionally coarse brick.		- 0.20 - -	23.11	ES2	0.30			
		-		ES3	0.70			
MADE GROUND. (Firm to stiff) brown, dark brown an grey brown silty sandy gravelly CLAY. Gravel is	t t	- - 1.20 -	22.11	ES4	1.10			
angular fine to coarse brick and rare concrete.		-		ES5	1.50			
		- -		ES6	2.00			
		-		ES7	2.50			
Window Sample Complete at 3.00 m		- - 3.00 - -	20.31	ES8	3.00			- 3.00 - - - -
		-						
		-						
		-						-
		-						
		L		Motor		0.000		
Drive Records			Water	Standing	g Stan	ding	Casing	Depth
Diameter (mm) From (m) To (m) Recovery (% 115 1.20 2.00 100	b) Date		Strike (m)	Time (Min	s) Level	(m)	Depth (m)	Sealed (m)
115 2.00 3.00 100								
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Date: 06/03/2012 Plant: Premier Window Sampling Rig Drilled By: M. Rose Logged By: G. Dowlen	Remarks: 1. Inspectio 2. Groundw 3. Backfill d	n pit excava ater was no etails: Arisin	ated from GL to t encounterectings from 3.00r	o 1.20mbgl. I. nbgl to GL.				
Checked By: J. Keay								
FM-Hn-R-3081 Print Date:19/06/2	012	Hai	rrison Group Env	ironmental Ltd,	Unit A11, Popla	r Busines	s Park, 10 Prestons R	Road, London E14 9RL

	b ha	nrisono	roup	Wind	ow S	Sa	mple	Reco	rd		WS T3 Sheet 1 of 1		
9		J		Project: T	ybalds	s Clo	se Estate	, Camder	I				
Project ID:	GL16481			Coordinat	es: 53 18	3053 8191	1.5E 6.3N			Grou	nd Level: 24.4	12mAOI)
	Descriptio	วท		Legend	Dept	th	O.D.	Samp	le Test		Remarks	Instal	ations
	Decemption			Logona	(m))	(m)	Туре	Depth (m)	Т	est Results	linotan	uliono
Grass over M slightly claye \angular fine a	IADE GROUNE y slightly grave and medium br). Dark brown o elly SILT. Grave ick.	organic I is/		- - 0.20)	24.22	ES1 ES2	0.10				
MADE GROU silty gravelly angular fine a	JND. Brown, da fine to coarse s and medium of	ark brown and SAND. Gravel is ccasionally coa	grey brown s Irse brick.		-			ES3	0.60			-	
					- - - 			ES4	1.00				
MADE GROU slightly grave and medium fine and med ash sand.	IND. (Soft to fir Ily silty sandy occasionally c lium brick. Occ	m) dark grey a CLAY. Sand is oarse. Gravel i asional pocket	nd black fine s angular s of black		- - 1.40 - -)	23.02	ES5 ES6	1.50 1.60				
					-			ES7	2.00			_	882
MADE GROU brick GRAVE of black ash	JND. Red brow L. Occasional sand.	n angular fine brick cobbles a	to coarse and pockets		- 2.10 - -)	22.32	ES8	2.20				
					- - - -		21.42	ES9	2.90			3 00-	
Window Sa	Window Sample Complete at 3.00 m						21.72						
					-								
												_	
	Drive Re	ecords				1	Water	Water Lev Standing	el Observati	nding	Casina	Der	oth
Diameter (mm)	From (m)	To (m) 2.00	Recovery (%)	Date		St	rike (m)	Time (Mins	s) Leve	l (m)	Depth (m)	Sealed	d (m)
115	2.00	3.00	100										
Client: Engineer: Contractor: Date: Plant: Drilled By: Logged By: Checked By FM-Hn-R-3081	Tibbalds Plan Campbell Re Harrison Gro 06/03/2012 Premier Wind M. Rose G. Dowlen : J. Keay	ning and Urbar ith Hill LLP up Environmer dow Sampling I	n Design ntal Limited Rig 1t Date: 19/06/2012	Remarks: 1. Inspectior 2. Groundwa 3. Backfill de	n pit exca ater was etails: Ar	avateo not e isings Harriso	d from GL to ncountered s from 3.00n	o 1.20mbgl.	Unit A11, Popla	ar Busines	s Park, 10 Prestons Re	pad, Londor) E14 9RL

	ha	rrisona	roup	Wind	ow 9	Sam	ple	Reco	rd		WS T4 Sheet 1 of 1	
4	The	linisong	loup	Project: Ty	ybalds	Close	Estate	, Camden	l			
Project ID:	GL16481			Coordinate	es: 53 18	80462.6 81900.6	E N			Grou	nd Level: 23.	95mAOD
	Descriptio	on		Legend	Dept	h Le).D. evel	Samp	le Test	т	Remarks and	Installations
	IG SLAB				0.05	23	3.90	турс	Deptil (III)			N/N/11
MADE GROU medium SAN	ND. Off white D.	weakly cement	ed fine and		0.15	23	3.80	ES1	0.20			-
MADE GROU slightly clayey SAND. Gravel rare concrete cobbles.	ND. Brown, gr y silty gravelly l is angular fine . Occasional b	ey brown and fine to coarse e to coarse brid rick and concre	dark brown ck and ete					ES2 ES3	0.50			
MADE GROU and brown sli	ND. (Soft to fir ghtly sandy sli	m) dark grey, g ghtly gravelly s	grey brown silty k and		- - - - 1.50	22	2.45	ES4 ES5	1.40 1.60			
(Eirm to stiff)	brown and vel	low brown slid			- 2.10	2	1.85	ES6	2.00			
sandy slightly subrounded f Window Sa	gravelly silty (ine and mediu imple Comp	CLAY. Gravel is m flint. Dete at 2.30	m	na consta Stanicistani	- 2.30 -	2'	1.65	ES7	2.30			2.30 -
	Drive Pe	cords				Wate	r	Water Lev	el Observati	ons	Casing	Dopth
Diameter (mm)	From (m)	To (m)	Recovery (%)	Date		Strike	 (m)	Time (Mins	s) Level	(m)	Depth (m)	Sealed (m)
115 115	1.20 2.00	2.00 2.30	100 100									
Client: Engineer: Contractor: Date: Plant: Drilled By: Logged By: Checked By: FM-Hn-R-3081	Client:Tibbalds Planning and Urban DesignEngineer:Campbell Reith Hill LLPContractor:Harrison Group Environmental LimitedDate:06/03/2012Plant:Premier Window Sampling RigDrilled By:M. RoseLogged By:G. DowlenChecked By:J. KeayFM-Hn-R-3081Print Date: 19/06/2012				n pit exca ater was ample h etails: Ari	avated fro not enco ole termir sings fron Harrison Gr	om GL to untered hated at m 2.30n oup Envi	o 1.20mbgl. I. 2.30mbgl di nbgl to GL. ironmental Ltd,	ue to density Unit A11, Popla	of the str	rata encountered. s Park, 10 Prestons R	oad, London E14 9RL

Project ID: GL14481 Coordinates: 530505.8E 181841.0N Ground Level: 23.58mAOD Description Legend Depth Covertinates: 191841.0N Sample Test Ground Level: 23.58mAOD ASPIALT. Legend Depth Covertinates: 191841.0N Sample Test Research Installation ASPIALT. Legend Depth Covertinates: 191841.0N Sample Test Results Installation ASPIALT. Legend Depth Covertinates: 191841.0N Sample Test Results Installation ASPIALT. Legend in the nummer Installation Installation Installation Installation Installation MADE GROUND. Sint of the to console provide installation methods, and construct codeles. Installation Installation Installation MADE GROUND. Sint of the to console provide installation methods, and constallation installing Installation Installation Installation MADE GROUND. Sint of the to console provide installation installing Installation Installation Installation MADE GROUND. Sint of the to console provide installation installation Installation Installation Installa		ba	arrisono	roup	Window Sample Record WS T5 Sheet 1 of 1							
Project ID: GL 16481 Coordinators: S30505.8E 131841.0U Ground Level: 2.38mAOD ASPIALT: Logond Depth (m) Logond Depth Type Depth (m) Test Results Installation ASPIALT: 0.19 2.34H (m) Test Results Installation ASPIALT: 0.19 2.34H 760 0.25 1.00 0.00 ASPIALT: 0.19 2.34H 760 0.25 1.00 0.00 MADE GROUND: CSIII to Imp brown sightly sandy sight growdy GLAV. Sand is the and meduce. 1.00 1.00 2.32 0.20 0.20 MADE GROUND: Black and dark brown speckled white provely Stat. Cancel is subangular to subrounded 1.00 7.00 0.34 1.00 1.00 MADE GROUND: Black and dark brown speckled white provely Stat. Cancel is subangular to subrounded file to coarse- trade	4				Project: T	ybalds (Close Estate	e, Camden	I			
Description Legend Depth (m) Depth (m) One (m) Sample Test (m) Remarks and Test Results Installation ASPHALT.	Project ID:	GL16481			Coordinat	es: 530 181)505.8E 841.0N			Grou	nd Level: 23.	58mAOD
ASPHALT. Type Depth (m) Test Results ASPHALT. 0.0 2.44 FSI 0.35 2.44 FSI 0.35 </td <td></td> <td>Descriptio</td> <td>on</td> <td></td> <td>Leaend</td> <td>Depth</td> <td>O.D.</td> <td>Samp</td> <td>le Test</td> <td></td> <td>Remarks</td> <td>Installations</td>		Descriptio	on		Leaend	Depth	O.D.	Samp	le Test		Remarks	Installations
ASPHALT. 010 23.48 021 0.23 0.23 MADE ERCOUND. (5k to frm) known signify sandy. 010 23.48 023 0.23 0.24 Crawle subangular to subrounded the to coarse birk, concrete, sophalt, ash and clifker. 1.44 22.18 1.52 0.20 0.25 MADE ERCOUND. Black and disk brown specide while gravely SLT. Gravel's subangular to subrounded while gravely SLT. Gravel's subangular to subrounded fine and modum. 1.44 22.18 1.54 1.50 0.25 0.20 MADE ERCOUND. Black and disk brown specide while gravely SLT. Gravel's subangular to subrounded fine and modum. 1.44 2.218 1.54 1.50 1.80 Coarscand fine tank gravel and the subrounded fine to coarse. 2.20 2.18 1.28 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 1.80 2.20 </td <td></td> <td></td> <td></td> <td></td> <td>5</td> <td>(m)</td> <td>(m)</td> <td>Туре</td> <td>Depth (m)</td> <td>Т</td> <td>est Results</td> <td></td>					5	(m)	(m)	Туре	Depth (m)	Т	est Results	
Gravel is subangular to subconded fine to corse project. concrete. explait.gan and clinker. 140 2218 553 1.00 1.00 MADE GROUND. Black and dark brown speckled while gravelty SLT. Gravel is subangular to subconded gan lagrants. Occasional opsits solits. 140 2218 554 1.50 MADE GROUND. Black and dark brown speckled while gravelty SLT. Gravel is subangular to subconded gan lagrants. Occasional opsits solits. 140 2218 554 1.50 Orange grey sandy GRAVEL. Sand Is fine to coarse. Toring in the stand and the	ASPHALT. MADE GROU slightly grave	IND. (Sift to firr Ily CLAY. Sanc	n) brown slight d is fine and me	ly sandy edium.		- 0.10 -	23.48	ES1	0.25			0.20 -
MADE GROUND. Black and dark brown speckled white mean medium caranic, bore, bick, clinker and white figurents. Done, bick, clinker and white submular to submunded fine to coarse. fint. Figure figure white figure white figure	Gravel is sub brick, concre Frequent bric	angular to sub te, asphalt, ash k and concrete	rounded fine to n and clinker. e cobbles.	o coarse		-		ES2	0.50			
MADE GROUND. Black and dark brown speckled white (me and medium ceramic, bone, brick, elinker and sais fragments). L. Gravel is subangular to subrounded (me and medium ceramic, bone, brick, elinker and sais fragments). Cocasional operations salariago Fiss 1.00 ANADE GROUND. SBIR yrange brown CLAY Occasional operation stalaring 5.85 1.80 Orange groy sandy GRAVEL. Sand is fine to coarse. fan: 2.20 21.38 5.50 2.00 Orange groy sandy GRAVEL. Sand is fine to coarse. fan: 2.20 21.38 5.50 2.00 Window Sample Complete at 2.20 m 2.20 21.38 5.50 2.00 2.20 Window Sample Complete at 2.20 m 4.00 4.00 4.00 4.00 4.00 Expense France Sandel (m) 5.00 5.00 2.00 1.00 Window Sample Complete at 2.20 m 4.00 4.00 4.00 4.00 4.00 4.00 Water Level Observations 5.00						-		ES3	1.00			- - 1.00- -
gravely SLL Carde is Studing and Studenguar to Studengu	MADE GROU	IND. Black and	l dark brown sp	beckled white		- - - 1.40 -	22.18	ES4	1.50			
MADE_GROUND. (Sill) orange brown CLAY. Coccessional fine chark gravel and ion staining 2.20 21.38 Ess 2.20 Orange grey sandy GRAVEL. Sand is fine to coarse.	fine and med	ium ceramic, b s. Occasional	one, brick, clir	iker and		- 1.60 -	21.98	ES5	1.80			
Corrange grey sandy GRAVEL. Sand is fine to coarse. 220 21.38 21.38 20 20 20 Orange grey sandy GRAVEL. Sand is fine to coarse. Greater (m) 200 21.38 21.38 20 20 20 Window Sample Complete at 2.20 m Image: Complete at 2.20	MADE GROU Occasional f	IND. (Stiff) orar ine chalk grave	nge brown CLA el and iron stair	ning	51516525	2.00	21.58	ES6	2.00			
Lies Image: Contractor: Harrison Group Environmental Limited Date: 08/03/2012 Plant: Hand Excavated Trial Pit Drilled By: M. Rose Logged By: R. Caplin	Gravel is subangular to subrounded fine to coarse filint. Window Sample Complete at 2.20 m					- 2.20 	21.38					
Water Level Observations Diameter (mm) Drive Records Date Water Strike (m) Standing Time (Mins) Standing Level (m) Casing Depth Depth (m) Depth Sealed (m) 115 115 1.20 2.00 2.00 2.20 100 100 10						-						
Diameter (mm) From (m) To (m) Recovery (%) Date Strike (m) Time (Mins) Staining Staining Depth (m) Depth (m) Sealed (m) 115 2.00 2.00 100		Drive Records					Water	Water Lev	el Observat	ions	Casing	Donth
iiiš ičů iůů iůů iůů Client: Tibbalds Planning and Urban Design Remarks: Engineer: Campbell Reith Hill LLP Inspection pit excavated from GL to 1.20mbgl. Contractor: Harrison Group Environmental Limited Remarks: Date: 08/03/2012 Installation details: 50mm diameter HDPE standpipe installed from 2.20mbgl to GL. Slotted from 2.20mbgl to GL. Slotted from 2.20mbgl to GL. Slotted from 2.20mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas tap, end cap and flush fitting cover. Geowrap and geosock used. Drilled By: M. Rose Logged By: R. Caplin	Diameter (mm)	From (m)	To (m)	Recovery (%)	Date		Strike (m)	Time (Mins	s) Leve	l (m)	Depth (m)	Sealed (m)
Client: Tibbalds Planning and Urban Design Engineer: Campbell Reith Hill LLP Contractor: Harrison Group Environmental Limited Date: 08/03/2012 Plant: Hand Excavated Trial Pit Drilled By: M. Rose Logged By: R. Caplin	115	115 2.00 2.20 100										
Checked By: J. Keay EM.Hp.P. 3081 EM.Hp.P. 308	Client: Engineer: Contractor: Date: Plant: Drilled By: Logged By: Checked By	Tibbalds Plan Campbell Re Harrison Gro 08/03/2012 Hand Excava M. Rose R. Caplin : J. Keay	ning and Urbar ith Hill LLP up Environmer ited Trial Pit	t Date:19/04/2010	Remarks: 1. Inspection 2. Groundwa 3. Installation from 2.200 fitting cov 4. Backfill de 1.00mbgl	n pit excav ater was nin n details: 5 mbgl to 1. er. Geowr tails: Grav to 0.20mb	rated from GL to be encountered 00mm diameter 00mbgl, plain f ap and geosoc rel filter packs f ogl and concret	o 1.20mbgl. I. HDPE stand rom 1.00mbg k used. rom 2.20mbg te from 0.20m	pipe installe gl to GL. Finis gl to 1.00mbg bbgl to GL.	d from 2. shed with gl, bentor	20mbgl to GL. Slo n gas tap, end cap nite pellets from	tted and flush

Foundation Inspection Pit FPT1 (Plan & Section)







running parallel to wall.



Foundation Inspection Pit FPT2 (Plan & Section)







Remarks:

1. Groundwater was not encountered.

2. Pit stable.

- 3. Backfill details: Arisings from 1.30mbgl to GL.
- 4. Samples taken: ES1 @ 0.20m, ES2 @ 0.50m, ES3 @ 1.00m.

Title:	Foundation Inspection Pit FPT2						
Client:	Tibbalds Planning and U	rban Design					
Drawn by:	JBB	Scale: Not to scale					
Drawing:	DR/GL16481/FPT2	Date: 08/03/2012					
	7						

harrison group

Foundation Inspection Pit FPT3 (Plan & Section)







Remarks:

1. Groundwater was not encountered.

2. Pit stable.

- 3. Backfill details: Arisings from 1.55mbgl to GL.
- 4. Samples taken: ES1 @ 0.20m, ES2 @ 0.50m, ES3 @ 0.80m, ES4 @ 1.00m, ES5 @ 1.50m.

Contract:	Tybalds Close Estate, Camden							
Title:	Foundation Inspection Pit FPT3							
Client:	Tibbalds Planning and Ur	ban Design						
Drawn by:	JBB	Scale: Not to scale						
Drawing:	DR/GL16481/FPT3 Date: 08/03/2012							

harrisongroup
Foundation Inspection Pit FPT4 (Plan & Section)



Foundation Inspection Pit FPT5 (Plan & Section)





Foundation Inspection Pit FPT7 (Plan & Section)







1. Groundwater was not encountered.

2. Pit stable.

- 3. Backfill details: Arisings from 1.60mbgl to GL.
- 4. Samples taken: ES1 @ 0.20m, ES2 @ 0.50m, ES3 @ 1.00m, ES4 @ 1.50m.

Contract:	Tybalds Close Estate, Came	den
Title:	Foundation Inspection Pit F	PT7
Client:	Tibbalds Planning and Urba	an Design
Drawn by:	JBB	Scale: Not to scale
Drawing:	DR/GL16481/FPT7	Date: 08/03/2012
	7_	

harrison group

			Falling Head	Permeability	Job No: GL16481
	harrisonarou	n	Test (Bo	orehole)	
	namsongrou	ρ	Date: 12/03	/2012	Borehole No./ BH T1
Client: Tibbal	ds Planning and Urbar	n Design	Location: Tybal	ds Close Estate, C	amden
Description:	Dense dark yellow bro	own silty s	andy GRAVEL.		
Borehole depi	ih (m):	5.10			
Groundwater	level before test:	4.85			
Depth of casir	ng (m):	4.10			
Initial driving h	nead (m) (Ho):	0.25			
Top of test zoi	ne (m):	4.10			
Base of test zo	one(m):	5.10			
Weather	vei(m):	4.00 Sunnv			
TIME (sec)	ELAPSED TIME (sec)	DEPTH I	O WATER (mb top of casing)	DRIVING HEAD (m)	COMMENTS
0	0		4.60	0.25	
30	30		4.84	0.01	
Remarks:					
The test has	been carried out in ge	eneral acc	ordance with BS593	30:1999 + A2:2010.	
Unable to ra	ise head above 0.25m	i despite p	placing approximate	ly 125L in 1 minute	
	quoteu nas peen rou		earest scale of magi		
Coeffic	cient of Permeability:		1E-03 m/s (I	Using the General	Approach - method d)

			Falling Head	Permeability	Job No: GL16481
Ĭ	harrisongroup	0	Date: 12/03	/2012	Borehole No./ BH T2A Test No.: 1 of 1
Client: Tibbal	ds Planning and Urban	Design	Location: Tybal	ds Close Estate, C	amden
Description:	Very dense yellow bro	wn silty S	AND and GRAVEL		
Borehole dept Borehole diam Groundwater I Depth of casir Initial driving h Top of test zor Base of test zor Initial water lev Weather:	th (m): heter (m): level before test: ng (m): head (m) (Ho): he (m): one(m): vel(m):	6.20 0.15 4.22 5.20 0.22 5.20 6.20 4.00 Sunny			
TIME (sec)	ELAPSED TIME (sec)	DEPTH T	O WATER (mb top of casing)	DRIVING HEAD (m)	COMMENTS
0 30	0 30		4.00 4.21	0.22 0.01	
The test has Unable to ra	been carried out in ge aise head above 0.22m	eneral acc despite p	ordance with BS593 lacing approximate	30:1999 + A2:2010. ly 125L in 1 minute	
Coeffic	cient of Permeability:		7.5E-04 m/s (I	Using the General	Approach - method d)

APPENDIX C

GAS & GROUNDWATER MONITORING RECORDS

Ċ			har	risonar	ano					0	ias Monit	oring Fie	eld Reco	p				
			5	n	<u>)</u> 5			Project Name:	Tybalds Close Est	ate, Camden			Job No: GI	-16481				
Client:	Tibbalds Planning a.	nd Urban Design																
Equipment				Model					Serial Number			-	Manufac	cturer's Calibr	ation Date			
Land Gas Analyser				GA2000					GA05814					19/10/2011				
DIA				PHOCHECK+					06-01410					10/02/2011				
Weather Conditions 24hrs Prior to Monitoring	Broken cloud, 13°C,	, 1027hPa.																
Weather Conditions During Monitoring	Broken cloud, 12°C,	, 1026hPa.																
Location I.D	Date	Time (hhmmss)	Temp (°C)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	C (%) C	:02 (%) 02	2 (%) H2S	(ppm) CO (r	ppm) Flow (I/F	Pod Ir)
BH T1	23/03/2012	11:55:00	12	1032	1033	1027	1025	-3.67	0.0	0.0	0.0	0.0	0.0	0.0	20.4	0 0	ö	0
BH T2A	23/03/2012	11:25:00	12	1032	1033	1027	1026	-2.51	0.0	0.0	0.0	0.0	0.0	1.8	3.8	0	V V	0.1
BH T4 (Shallow)	23/03/2012	12:30:00	12	1032	1033	1027	1025	-3.69	0.0	0.0	0.0	0.0	0.0	0.0	20.7	0	ö	0
BH T4 (Deep)	23/03/2012	12:35:00	12	1032	1033	1027	1025	-3.50	0.0	0.0	0.0	0.0	0.0	0.0	20.3	0 0	Ö	0
WS T1	23/03/2012	11:20:00	12	1032	1033	1027	1026	-2.65	0.0	0.0	0.0	0.0	0.0	0.0	20.6	0	ö	0
WS T5	23/03/2012	12:15:00	12	1032	1033	1027	1025	-2.49	0.0	0.0	0.0	0.0	0.0	0.9	19.1	0 0	0 ~	.1
BH T2A	23/03/2012	12:25:00	12	1032	1033	1027	1025	-2.43	0.0	0.0	0.0	0.0	0.0	0.1	2.4	0	~	0.1
Field Engineer:	G. Pursey								-				-	-	-	-	-	
Pump Running Time (sam	Ning): (Standard 120) sec)																
Flow Details (e.g. 5 sec ave	e): (Staridal d 30 sec rage for 1 min.):																	
Other Remarks:																		
PID : Photo-lonisation Dete	stor																	
"<" indicates that reading is ">" indicates that reading is	: under the limit ran, over the limit range	ge,																
"*" Level to be determined																		

			har	'isonor						0	as Monit	oring Fie	eld Recol	q				
			3	200	2			Project Name:	Tybalds Close Es	tate, Camden			Job No: GL	16481				1
Client:	Tibbalds Planning a	and Urban Design																
Equipment				Model					Serial Number				Manufac	turer's Calibra	ation Date			
Land Gas Analyser				GA2000					GA05814					19/10/2011				
DID				PHOCHECK+					06-01410					10/02/2011				
Weather Conditions 24hrs Prior to Monitoring	Scattered showers,	10c, 1005mBar																
Weather Conditions During Monitoring	Cloudy, 6c, 1019ml	Bar																1
Location I.D	Date	Time (hhmmss)	Temp (°C)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	C (%) C	02 (%) 02	(%) H2S	(ppm) CO (p	om) Flow Pc (I/Hr)	pc
BH T1	05/04/2012	12:30:00	9	966	1000	1005	1019	-2.91	0.0	0.0	0.0	0.0	0.0	0.0 20	0.2	0	0.0	
BH T2A	05/04/2012	11:55:00	6	966	1000	1005	1019	-3.14	0.0	0.0	0.0	0.0	0.0	0.6 19	9.6	0	<0.1	
BH T4 (Shallow)	05/04/2012	13:00:00	6	966	1000	1005	1019	-3.32	0.0	0.0	0.0	0.0	0.0	0.0 20	0.6	0	0.0	
BH T4 (Deep)	05/04/2012	13:05:00	9	966	1000	1005	1019	-3.01	0.0	0.0	0.0	0.0	0.0	0.0 20	0.2	0	0.0	
WS T1	05/04/2012	12:15:00	6	966	1000	1005	1019	-3.07	0.0	0:0	0.0	0.0	0.0	0.0 20	0.5	0	0.0	
WS T5	05/04/2012	12:50:00	9	966	1000	1005	1019	-2.84	0.0	0.0	0.0	0.0	0.0	0.7 19	0.0	0	0.0	
Field Engineer:	G. Pursey																	
Pump Running Time (samp Pump Running Time (purge	viing): (Standard 12(v): (Standard 30 sec) sec)																Т
Flow Details (e.g. 5 sec ave	rage for 1 min.):	,																Π
Other Remarks:																		
PID : Photo-lonisation Dete -* indicates that reading is	ctor under the limit ran	ле. Де.																
">" indicates that reading is "*" Level to be determined	s over the limit rang.																	

Harrison Environmental Group Ltd. Poplar Business Park, Unit C14, 10 Prestons Road, E14 9RL.

			har	risonar						0	as Monit	oring Fie	eld Recor	q			
			3	200	2		-	Project Name:	Tybalds Close Est	tate, Camden			Job No: GL	16481			
Client:	Tibbalds Planning a	and Urban Design															
Equipment				Model					Serial Number				Manufac	turer's Calibra	tion Date		
Land Gas Analyser				GA2000					GA05814					19/10/2011			
PID				PHOCHECK+					06-01410					10/02/2011			
Weather Conditions 24hrs Prior to Monitoring	Cloudy, 11c, 1023n	ıBar															
Weather Conditions During Monitoring	Scattered showers,	12c, 998mBar															
Location I.D	Date	Time (hhmmss)	Temp (°C)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	с (%) с	02 (%) 02	(%) H2S (ppm) CO (ppn) Flow Pod (I/Hr)
BH T1	17/04/2012	13:10:00	12	1020	1019	1023	866	-3.14	0.0	0.0	0.0	0.0	0.0	0.0 20	0.3 (0	0	0.0
BH T2A	17/04/2012	13;20:00	12	1020	1019	1023	866	-2.87	0.0	0.0	0.0	0.0	0.0	0.5 19	9.7 0	0	0.0
BH T4 (Shallow)	17/04/2012	13:45:00	12	1020	1019	1023	866	-2.99	0.0	0.0	0.0	0.0	0.0	0.0 20	0.5	0	0.0
BH T4 (Deep)	17/04/2012	13:50:00	12	1020	1019	1023	866	-2.41	0.0	0.0	0.0	0.0	0.0	0.0 20	0.1	0	0.0
WS T1	17/04/2012	13:00:00	12	1020	1019	1023	866	-2.94	0.0	0.0	0.0	0.0	0.0	0.0 20	0.4 (0	0.0
WS T5	17/04/2012	13:35:00	12	1020	1019	1023	866	-3.02	0.0	0.0	0.0	0.0	0.0	0.8 16	3.9 (0	0.0
Field Engineer:	G. Pursey						-	-			-	-	-	-	-	-	-
Pump Running Time (samt. Pump Runnina Time (purat	iling): (Standard 12()): (Standard 30 sec) sec)															
Flow Details (e.g. 5 sec ave	rage for 1 min.):																
Other Remarks:																	
PID : Photo-Ionisation Dete "<" indicates that reading is	ctor • under the limit ran	ge,															
">" indicates that reading is "*" Level to be determined	s over the limit rang	e,															

Harrison Environmental Group Ltd. Poplar Business Park, Unit C14, 10 Prestons Road, E14 9RL.

	harrisongroup	Wa	ter Monitorin	g Field Rec	ord
		Date:	23/03/2012	Job No :	GL16481
Client :	Tibbalds Planning and Urban Design	Project :	Tybalds Close	Estate, Camder	n
Method: Dipmeter	<u> </u>	Drawing No.:			
Weather (include T	emperature & Pressure)	State of Ground (e	e.g. Dry, Wet, Sr	now covered.)	
Broken cloud, 120	C, 1026hPa.				
Position No.	Time (hh:mm:ss)	Water Level (m)		Comments	
BH T1	12:00:00	4.85	Base of the pip	e: 6.00m, EW1	sample taken.
BH T2A	11:30:00	4.22	Base of the pip	e: 6.95m, EW1	sample taken.
BH T4(Shallow)	12:43:00	Dry	Base of the pip	e: 1.95m.	
BH T4 (Deep)	12:40:00	6.48	Base of the pip	e: 6.96m, no sa	ample taken.
WS T1	11:23:00	Dry	Base of the pip	e: 3.00m.	
WS T5	12:20:00	Dry	Base of the pip	e: 2.19m.	
	1	<u> </u>	Field Crew:	G. Pursey	

	harrisongroup	Wa	ter Monitorir	ng Field Rec	ord
9		Date:	05/04/2012	Job No :	GL16481
Client :	Tibbalds Planning and Urban Design	Project :	Tybalds Close	Estate, Camde	n
Method: Dipmeter		Drawing No.:			
Weather (include T	emperature & Pressure)	State of Ground (e	e.g. Dry, Wet, Si	now covered.)	
Cloudy, 6c, 1019m	Bar	Dry			
Position No.	Time (hh:mm:ss)	Water Level (m)		Comments	
BH T1	12:30:00	4.84	Base 5.99m Sa to achieve stea	ample taken aft dy state. Samp	er purging 5 litres ble Orange brown.
BH T2A	11:55:00	4.24	Base 6.94m. So litres to achieve brown.	ample taken af e steady state.	er purging 15 Sample Orange
BH T4(Shallow)	13:05:00	Dry	Base 1.95m		
BH T4 (Deep)	13:00:00	6.58	Base 6.95m. N	ot enough sam	ple to purge.
WS T1	12:15:00	Dry	Base 3.00m.		
WS T5	12:50:00	Dry	Base 2.18m.		
		1	Field Crew:	G. Pursey	

	harrisongroup	Wa	ter Monitorii	ng Field Rec	ord
9		Date:	17/04/2012	Job No :	GL16481
Client :	Tibbalds Planning and Urban Design	Project :	Tybalds Close	Estate, Camde	n
Method: Dipmeter	<i></i>	Drawing No.:			
Weather (include T	emperature & Pressure)	State of Ground (e	e.g. Dry, Wet, S	now covered.)	
Scattered showers	, 12c, 998mBar	Wet			
Position No.	Time (hh:mm:ss)	Water Level (m)		Comments	
BH T1	12:30:00	4.04	Base 6.00m Sa to achieve stea	ample taken afte ady state. Samp	er purging 8 litres le Orange brown.
BH T2A	11:55:00	4.24	Base 6.94m. S litres to achiev brown.	ample taken af e steady state.	er purging 10 Sample Orange
BH T4(Shallow)	13:05:00	Dry	Base 1.96m		
BH T4 (Deep)	13:00:00	6.58	Base 6.95m. N	lot enough sam	ple to purge.
WS T1	12:15:00	Dry	Base 3.00m.		
WS T5	12:50:00	Dry	Base 2.18m.		
	1	1	Field Crew:	G. Pursey	

APPENDIX D

LABORATORY TESTING

0	Date Scheduled:	Lab turn around:	Results Due Date:			Remarks						Cell pressure 220kPa		Cell pressure 340kPa	Cell pressure 460kPa		Cell pressure 580kPa	Cell pressure 700kPa		Cell pressure 820kPa	Cell pressure 940kPa		Fractured sample, no suitable sample to test		Cell pressure 1180kPa			Fractured sample, no suitable sample to test							Cell pressure 280kPa	
	-				nal																											-				
					Additic																													\vdash		-
						noitinpl no ssoJ	┝		-		_							-												 				\parallel	$\mid \mid$	-
						Triaxial U38																												$\mid \mid$		-
					gth	001U lsixsi1						×		×	×		×	×		×	×		TR		×			TR							×	
DULE					Strenç	benîncont																														
SCHEL						Dedometer																														
FORY S			up			J29T 782																														
BORAT	len		n Desid	,	on	/ibrating Rammer																														
AL LAI	, Camc		d Urba		mpacti	է։5kg Rammer	7																													
CHNIC	Estate		ing an	0	Co	շշրց Զուրու	2																													
EOTE	Close	-	s Planr			ground" suite for"Pyrite bearing pround"	ð S																													
0	ybalds	3L1648	ibbald		ical	nitial BRE Special Digest 1 suite for "Brownfield sites"	5				×																							×		
		0			Chem	Mater soluble sulphate & Hd	×			×						×			×			×		×			×			×		×				
						Drganic Matter)																													
	Jame:	ö	Client:			ette	1																													
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					ficatior	stricle Density	-																													
					Class	/[[6LD6Lg LIMI							×													×										×
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	dr					אוסוצומים ביסוונפונו							×													×			×							×
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	ison		Reith H	ouk.cor		oT dtg9C	0-1-0	0 1.9	0 3.9	0 4.9	0 5.2	0 5.9	0 6.0	0 8.9	50 11.	00 13.	50 14.	50 17.	00 18.	50 20.	50 23.	00 24.	50 26.	00 27.	50 29.	00 30.	00 31.	50 32.	00 34.	0.5	0 1.9	0 3.0	0 4.9	0 6.2	0 7.4	0 7.5
	harr		pbell F	ngroup	ample	nonfih From	1.0	1.5	3.5	4.5	5.2	5.5	6.0	8.5	11.5	13.0	14.5	17.5	18.0	20.5	23.5	24.0	26.E	27.0	29.5	30.0	31.0	32.5	34.0	0.5	1.5	3.0	4.5	6.2	7.0	7.5
			Cam	harriso	S	Sample Ref	2	-	3	4	5	-	9	2	3	11	4	5	14	9	7	19	80	21	6	23	24	10	26	-	-	4	4	2	-	¢
				GL@		Sample Type	0	В	8	В	۵	⊃	۵	⊃	⊃		⊃	⊃		⊃	⊃		⊃		⊃	D	D		D		ß	D	В	٥	⊃	۵
	Q		Project Enginee	Email Reports to:		Εχρίοι του Ηοίε Νο.	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T1	BH T2A	BH T2A	BH T2A	BH T2A	BH T2A	BH T2A	BH T2A

													GE(OTECH	INICAL I	LABOR	ATORY	SCHEL	JULE						0
Q		ha	rrisor	Jgrou	dr				Projec	t Name:		<u> </u>	ybalds C	Close Es	state, Ca	mden								.	Date Scheduled:
)					Projec	t ID:		U	3L16481												Lab turn around:
Project Engineer: Email Reports to:	: GL@har	Campbe	ell Reith I Dupuk.co	Hill LLP					Projec	t Client:		F	ibbalds {	Plannin	ig and Ur	ʻban D∈	esign								Results Due Date:
		Samp	ble				Classific	ation				Chemì	ical	_	Compa	action			Streng	ţ		A	ddition	lal	
Exploratory Hole No.	Sample Type	Sample Ref	Depth From	Depth To	ואטואנערפ לסחנפתנ	Density Atterberg Limit	Particle Density	eve Sieve	Dry Sieve	Pipette	Organic Matter	Pater soluble sulphate &	Initial BRE Special Digest 1 suite for "Brownfield sites"	suite for "Pyrite bearing ground"	4.5kg Rammer 2.5kg Rammer	Vibrating Rammer	CBK Test	Oedometer	Dnconfined	0010 IaixainT	Triaxial U38	noitingi no seol			Remarks
BH T2A	۵	7	8.50 8	1.95	-	_						×	-	-		_	_								
BH T2A	∍	2	10.00 1(0.45																×					Cell pressure 400kPa
BH T4	۵	3	2.00 2	00.								×													
BH T4	8	2	2.50 2	95				×																	
BH T4	D	4	3.20 3	1.20	×	×																			
BH T4	۵	3	3.50 3	1.95									×												
BH T4	۵	2	5.50 5	.95				×																	
BH T4	۵	6	7.00 7	.45 >	×	×																			
BH T4	∍	-	8.50 8	1.95																×					Cell pressure 340kPa
BH T4	D	7	10.00 1(0.45								×													
WS T1	ES	4	1.20	~	×	×																			
WS T1	ES	5	1.60										×												
WS T2A	ES	2	1.50		×	×																			
WS T2A	ES	7	2.50									×													
WS T3	ES	9	1.60	^	×																	×			
WS T4	ES	5	1.60										×												
WS T5	ES	2	0.50	^	×	×																			
WS T5	ES	5	1.80										×												
FP T3	ES	5	1.50	^	×	×																			
FP T4	ES	2	0.50	^	×	×																			
FP T4	ES	3	1.00										×												
FP T5	ES	2	0.50										×												
FP T7	ES	2	0.50	^	×	×										_									
		T	otal Scheo	Juled 1	3	11		9				13	80							13		-			
			Total T∈	ested 1	3	11		9				13	8	┝						11		-			

harrisontesting

PROJECT NAME:Tybalds Close Estate, CamdenPROJECT NUMBER:GL16481CLIENT:Tibbalds Planning and Urban DesignDATE OF ISSUE:04/05/2012

SUMMARY OF RESTRICTED TESTS

BH No.:	Sample	Sample No.	Test Scheduled	Reason why sample could not be tested
	Depth (m)			
DU T1	24 50	110	Unconsolidated Undrained Shear Strength	Sample contained numerous fractures. Unable to propare
DITT	20.50	08		test specimen of suitable height
BH T1	32.50	U10	Unconsolidated Undrained Shear Strength	test specimen of suitable height Sample contained numerous fractures. Unable to prepare test specimen of suitable height

REMARKS (Including any abnormalities or departures from procedure)





harrisontesting SERVICES

Harrison Testing Services

Units 1 & 2 Alston Road Hellesdon Park Industrial Estate Norwich NR6 5DS Tel: +44 (0) 1603 416333 Fax +44 (0) 1603 416443

Client: Harrison Group Environmental Poplar Business Park 10 Preston Road London E14 9RL

For the attention of: Jiban Bajracharya

Date of Issue: 04/05/2012 Page Number 1 of 20

			Report Form FMR30	000 Rev.C Revision Date 26/11/08
Project	Tybalds Close Estate, Camden	Samples	Received	11/04/2012
Report No	GL16481	Instruction	on received	03/04/2012
Your Ref	GL16481	Testing of	commenced	20/04/2012
	SUMMARY OF RESULTS ATTACH	ED		
	Test Method and Description		Quantity	UKAS Accredited
BS1377: Part 2: 1 BS1377: Part 7: 1	990:3.2 Moisture Content 990:4.3/4.5 Liquid & Plastic Limits - Definitive Method 990:9.3 Particle Size Distribution - Wet Sieve Method 990:9.4 Particle Size Distribution - Pipette Sedimentation Me 990:8.0 Unconsolidated Undrained Shear Strength - Single	ethod Stage	13 11 6 3 11	Yes Yes Yes Yes
Remarks:				
Issued by: M Wi	llson			
Approved Signatories	:			
M Willson (Laboratory	Manager), G Bream (Senior Laboratory Technician)			
Unless v Thi Only those result	ve are notified to the contrary, samples will be disposed afte s report should not be reproduced except in full without the s indicated in this report are UKAS accredited and any opini scope of UKAS accreditation	r a period of c written approv on or interpre	one month from t val of the laborate tations expresse	his date ory d are outside the

TEST REPORT TRANSMITTAL

PROJECT NAME:Tybalds Close Estate, CamdenPROJECT NUMBER:GL16481CLIENT:Tibbalds Planning and Urban DesignDATE OF ISSUE:04/05/2012

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT (ONE POINT CONE PENETROMETER METHOD), PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX TO BS1377 : PART 2 : 1990

BH/TP No	Depth (m)	Sample No.	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Passing 0.425mm	Soil Class	Sample Description
			(%)	(%)	(%)			(%)		
BH T1	6.00	D6	35	76	29	47	0.13	100	CV	Dark grey brown CLAY
BH T1	30.00	D23	27	75	30	45	-0.06	100	CV	Dark grey brown mottled purple and blue grey CLAY
BH T1	34.00	D26	21							Brown mottled blue arey CLAY
BITT	01.00	520	21							
BH T2A	7.50	D6	26	59	21	38	0.13	100	СН	Dark grey brown CLAY
BH T4	3.20	D4	17	32	14	18	0.18	96	CL	Orange brown mottled grey brown sandy CLAY
	0.00	D.	17	75			0.04	100	014	
BH 14	9.00	D6	17	/5	28	47	-0.24	100	CV	Dark grey brown CLAY
WS T1	1.20	ES4	20	36	19	17	0.04	71	CI	MADE GROUND (Dark grey brown slightly sandy
										slightly gravelly CLAY. Gravel is of flint and brick fragments)
WS T2A	1.50	ES5	19	31	16	15	0.18	50	CL	MADE GROUND (Dark grey brown and grey sandy slightly gravelly CLAY. Gravel is of flint, chalk and brick fragments)
WS T3	1.60	ES6	34							MADE GROUND (Dark brown slightly sandy gravelly CLAY. Gravel is of flint and brick fragments)
WS T5	0.50	ES2	13	42	27	16	-0.89	42	ML	MADE GROUND (Dark brown and brown slightly gravelly very sandy CLAY. Gravel is of flint, brick, clinker and slag fragments)

BS1377 : Part 2 : Clause 3.2 : 1990 Determination of Moisture Content

BS1377 : Part 2 : Clause 4.4 : 1990 Determination of Liquid Limit (Single Point Cone Penetrometer Method)

BS1377 : Part 2 : Clause 5 : 1990 Determination of Plastic Limit and Plasticity Index

Harrison Geotechnical Engineering



PROJECT NAME:Tybalds Close Estate, CamdenPROJECT NUMBER:GL16481CLIENT:Tibbalds Planning and Urban DesignDATE OF ISSUE:04/05/2012

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT (ONE POINT CONE PENETROMETER METHOD), PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX TO BS1377 : PART 2 : 1990

BH/TP No	Depth (m)	Sample No.	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Passing 0.425mm	Soil Class	Sample Description
			(%)	(%)	(%)		<u> </u>	(%)		
FP T3	1.50	ES5	23	42	16	26	0.27	100	CI	Orange brown slightly sandy CLAY
FP T4	0.50	ES2	21	43	21	22	0.02	55	CI	MADE GROUND (Dark grey brown and brown gravelly very sandy CLAY. Gravel is of flint, brick and concrete fragments)
FP T7	0.50	ES2	16	39	24	15	-0.57	51	CI	MADE GROUND (Grey brown slightly gravelly very sandy CLAY. Gravel is of flint and brick fragments)

BS1377 : Part 2 : Clause 3.2 : 1990 Determination of Moisture Content

BS1377 : Part 2 : Clause 4.4 : 1990 Determination of Liquid Limit (Single Point Cone Penetrometer Method)

BS1377 : Part 2 : Clause 5 : 1990 Determination of Plastic Limit and Plasticity Index

Harrison Geotechnical Engineering



PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:	BH T1
PROJECT NUMBER:	GL16481	Depth (m):	1.50
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:	B1
DATE OF ISSUE:	04/05/2012		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
		SILT			SAND			GRAVEL		

Darticlo Sizo (mm)	Porcontago Passing	Sample Descri	ption
	Fercentage Fassing	MADE GROUND (Brown and dark brown of	clayey silty very sandy GRAVEL.
75.0	100	Gravel is of flint and brid	ck fragments)
63.0	100		
50.0	100		
37.5	100		
28.0	95		
20.0	84		
14.0	80	Sample Proporti	ons %
10.0	74		
6.30	70	Cobbles	0.0
5.00	68	Gravel	35.6
3.35	67	Sand	29.4
2.00	64	Silt	20.6
1.18	62	Clay	14.5
0.600	58		
0.425	54		•
0.300	48	Remarks	
0.212	43		
0.150	40		
0.063	35		
0.020	25		
0.006	18		
0.002	14		

Harrison Geotechnical Engineering



PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:	BH T1
PROJECT NUMBER:	GL16481	Depth (m):	3.50
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:	B3
DATE OF ISSUE:	04/05/2012		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



Particlo Sizo (mm)	Percentage Passing	Sample Descrip	tion
	r ercentage rassing	Brown and orange brown sandy GF	AVEL. Gravel is of flint
75.0	100		
63.0	100		
50.0	100		
37.5	95		
28.0	82		
20.0	70		
14.0	54	Sample Proportio	ns %
10.0	42		
6.30	28	Cobbles	0.0
5.00	23	Gravel	86.7
3.35	18	Sand	13.2
2.00	13	Silt / Clay	0.1
1.18	9		
0.600	5		
0.425	3		•
0.300	1	Remarks	
0.212	0		
0.150	0		
0.063	0		

Harrison Geotechnical Engineering

Units 1 & 2 Alston Road Norwich NR6 5DS Tel: +44 (0)1603 416333 Fax: +44 (0)1603 416443 email: laboratory@harrisongroupuk.com



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PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:	BH T4	
PROJECT NUMBER:	GL16481	Depth (m):	5.50	
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:	B5	
DATE OF ISSUE:	04/05/2012			

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



Dorticle Size (mm)	Percentage Passing	Sample Descript	lion
Particle Size (mm)	Fercentage Fassing	Brown very sandy GRAVEL.	Gravel is of flint
75.0	100		
63.0	100		
50.0	99		
37.5	95		
28.0	93		
20.0	80		
14.0	67	Sample Proportion	ns %
10.0	58		
6.30	48	Cobbles	0.0
5.00	44	Gravel	66.1
3.35	38	Sand	33.7
2.00	34	Silt / Clay	0.2
1.18	31		
0.600	23		
0.425	15		
0.300	6	Remarks	
0.212	3		
0.150	1		
0.063	0		

Harrison Geotechnical Engineering

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PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:	BH T2A
PROJECT NUMBER:	GL16481	Depth (m):	1.50
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:	B1
DATE OF ISSUE:	04/05/2012		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
		SILT			SAND			GRAVEL		

Particlo Sizo (mm)	Porcontago Passing	Sample Descrip	tion
	Fercentage Fassing	MADE GROUND (Dark grey brown slightly	clayey silty SAND / GRAVEL.
75.0	100	Gravel is of flint, brick, concrete, asp	halt and slag fragments)
63.0	100		
50.0	100		
37.5	97		
28.0	91		
20.0	88		
14.0	84	Sample Proportio	ns %
10.0	79		
6.30	74	Cobbles	0.0
5.00	71	Gravel	35.3
3.35	69	Sand	39.0
2.00	65	Silt	22.5
1.18	61	Clay	3.2
0.600	55		
0.425	51		
0.300	44	Remarks	
0.212	38		
0.150	33		
0.063	26		
0.020	13		
0.006	6		
0.002	3		

Harrison Geotechnical Engineering



PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:	BH T2A
PROJECT NUMBER:	GL16481	Depth (m):	4.50
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:	B4
DATE OF ISSUE:	04/05/2012		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



Darticla Siza (mm)	Porcontago Passing	Sample Description		
	reicentage rassing	Brown slightly silty very sandy GR	AVEL. Gravel is of flint	
75.0	100			
63.0	100			
50.0	100			
37.5	99			
28.0	94			
20.0	85			
14.0	68	Sample Proportio	ns %	
10.0	58			
6.30	50	Cobbles	0.0	
5.00	45	Gravel	64.9	
3.35	40	Sand	33.0	
2.00	35	Silt / Clay	2.1	
1.18	31			
0.600	23			
0.425	15		•	
0.300	7	Remarks		
0.212	4			
0.150	3			
0.063	2			

Harrison Geotechnical Engineering

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BH T4 2.50 B2

PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:
PROJECT NUMBER:	GL16481	Depth (m):
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:
DATE OF ISSUE:	04/05/2012	

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2: 1990: CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
		SILT			SAND			GRAVEL		

Particlo Sizo (mm)	Porcontago Passing	Sample Descripti	on
	Fercentage Fassing	MADE GROUND (Dark grey brown slightly of	clayey silty SAND / GRAVEL.
75.0	100	Gravel is of flint, brick and cond	crete fragments)
63.0	85		
50.0	80		
37.5	78		
28.0	75		
20.0	71		
14.0	65	Sample Proportion	s %
10.0	61		
6.30	57	Cobbles	15.0
5.00	54	Gravel	36.7
3.35	52	Sand	33.6
2.00	48	Silt	10.3
1.18	45	Clay	4.3
0.600	40		
0.425	36		
0.300	28	Remarks	
0.212	23		
0.150	19		
0.063	15		
0.020	7		
0.006	6		
0.002	4		

Harrison Geotechnical Engineering



PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

BH/TP No.:BH T1Depth (m):5.50Sample No.:U1

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Mode of failure
Sample Condition		Undisturbed		Mode of failure
Height	mm	200.0		
Diameter	mm	102.4		
Moisture Content	%	31		
Bulk Density	Mg/m ³	1.99		
Dry Density	Mg/m ³	1.52		
Test Details				
Membrane Thickness	mm	0.25		
Membrane Correction	kPa	0.65		
Rate of Axial Displacement	%/min	2.00		
Cell Pressure	kPa	220		
Strain at Failure	%	12.5		
Maximum Deviator Stress	kPa	123		
Shear Strength	kPa	62		Shear Strength
Mode of Failure		Compound		Parameters
		Medium strengt	n dark grey and occasional	
Sample Description		orange brown C	LAY	Cu 62 kPa
				Phi N/A °



REMARKS (Including any abnormalities or departures from procedure)



harrisontesting SERVICES

BH/TP No.:

Depth (m):

Sample No.:

PROJECT NAME:	Tybalds Close Estate, Camden	
PROJECT NUMBER:	GL16481	
CLIENT:	Tibbalds Planning and Urban Design	
DATE OF ISSUE:	04/05/2012	

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : **CLAUSE 8**

Sample Details				Mode of failure
Sample Condition		Undisturbed		wode of failure
Height	mm	200.0		
Diameter	mm	102.4		
Moisture Content	%	28		
Bulk Density	Mg/m ³	2.02		
Dry Density	Mg/m ³	1.57		
Test Details				
Membrane Thickness	mm	0.25		
Membrane Correction	kPa	0.34		
Rate of Axial Displacement	%/min	2.00		
Cell Pressure	kPa	340		
Strain at Failure	%	5.5		
Maximum Deviator Stress	kPa	244		
Shear Strength	kPa	122		Shear Strength
Mode of Failure		Brittle		Parameters
		High strength da	ark grey brown CLAY	
Sample Description				Cu 122 kPa
				Phi N/A °



REMARKS (Including any abnormalities or departures from procedure)

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BH T1

8.50

U2

BH T1

11.50

U3

BH/TP No.:

Depth (m):

Sample No.:

PROJECT NAME:	Tybalds Close Estate, Camden	
PROJECT NUMBER:	GL16481	
CLIENT:	Tibbalds Planning and Urban Design	
DATE OF ISSUE:	04/05/2012	

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Mode of fa	iluro
Sample Condition		Undisturbed		Wode of la	nure
Height	mm	200.0			
Diameter	mm	102.5			7
Moisture Content	%	25			
Bulk Density	Mg/m ³	2.04			
Dry Density	Mg/m ³	1.64			
Test Details				1 \	
Membrane Thickness	mm	0.25			
Membrane Correction	kPa	0.39			
Rate of Axial Displacement	%/min	2.00			
Cell Pressure	kPa	460			
Strain at Failure	%	6.5			
Maximum Deviator Stress	kPa	338			
Shear Strength	kPa	169		Shear Stre	ngth
Mode of Failure		Brittle		Paramete	ers
		Very high streng	th dark grey brown CLAY		
Sample Description				Cu 16	9 kPa
				Phi N//	Α°



REMARKS (Including any abnormalities or departures from procedure)



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harrisontesting

BH/TP No.:

Depth (m):

Sample No.:

PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				NA	ada of failura
Sample Condition		Undisturbed		IVIO	
Height	mm	200.0			
Diameter	mm	102.7			
Moisture Content	%	21			
Bulk Density	Mg/m ³	2.08			
Dry Density	Mg/m³	1.71			
Test Details				7	
Membrane Thickness	mm	0.25			
Membrane Correction	kPa	0.77			
Rate of Axial Displacement	%/min	2.00			
Cell Pressure	kPa	580			
Strain at Failure	%	15.5			
Maximum Deviator Stress	kPa	477			
Shear Strength	kPa	239		Sh	ear Strength
Mode of Failure		Compound			Parameters
		Very high streng	th dark grey brown CLAY		
Sample Description		_		Cu	239 kPa
				Phi	N/A °



REMARKS (Including any abnormalities or departures from procedure)

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BH T1

14.50

U4

PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

BH/TP No.:	BH T1
Depth (m):	17.50
Sample No.:	U5

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Mor	ha of failura
Sample Condition		Undisturbed		IVIOC	
Height	mm	200.0			
Diameter	mm	102.8		ľ	\frown
Moisture Content	%	26		(
Bulk Density	Mg/m ³	2.02		Y	
Dry Density	Mg/m ³	1.60			
Test Details					
Membrane Thickness	mm	0.25		•	
Membrane Correction	kPa	0.79			
Rate of Axial Displacement	%/min	2.00			
Cell Pressure	kPa	700			
Strain at Failure	%	16.0			
Maximum Deviator Stress	kPa	391			
Shear Strength	kPa	195		She	ar Strength
Mode of Failure		Brittle		Pa	arameters
		Very high streng	th dark grey brown CLAY		
Sample Description				Cu	195 kPa
				Phi	N/A °





BH T1

20.50

BH/TP No.:

Depth (m):

PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

Sample No.: U6

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Modo of failuro
Sample Condition		Undisturbed		woue or failure
Height	mm	200.0		
Diameter	mm	102.3		
Moisture Content	%	21		
Bulk Density	Mg/m ³	2.13		
Dry Density	Mg/m ³	1.77		
Test Details				
Membrane Thickness	mm	0.25		
Membrane Correction	kPa	0.37		
Rate of Axial Displacement	%/min	2.00		
Cell Pressure	kPa	820		
Strain at Failure	%	6.0		
Maximum Deviator Stress	kPa	320		
Shear Strength	kPa	160		Shear Strength
Mode of Failure		Brittle		Parameters
		Very high streng	th orange brown mottled	
Sample Description		reddish brown a	ind blue grey CLAY	Cu 160 kPa
				Phi N/A °



REMARKS (Including any abnormalities or departures from procedure)



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BH T1 23.50

U7

PROJECT NAME:	Tybalds Close Estate, Camden	BH/TP No.:
PROJECT NUMBER:	GL16481	Depth (m):
CLIENT:	Tibbalds Planning and Urban Design	Sample No.:
DATE OF ISSUE:	04/05/2012	

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details					Mod	ho of failuro
Sample Condition		Undisturbed			IVIOC	
Height	mm	200.0				
Diameter	mm	103.9				
Moisture Content	%	17				
Bulk Density	Mg/m ³	2.13				
Dry Density	Mg/m ³	1.82				
Test Details						
Membrane Thickness	mm	0.25				
Membrane Correction	kPa	0.58				
Rate of Axial Displacement	%/min	2.00				
Cell Pressure	kPa	940				
Strain at Failure	%	11.0				
Maximum Deviator Stress	kPa	764				
Shear Strength	kPa	382			She	ar Strength
Mode of Failure		Brittle			Pa	arameters
		Extremely high s	trength dark gre	y brown CLAY		
Sample Description					Cu	382 kPa
					Phi	N/A °



REMARKS (Including any abnormalities or departures from procedure)



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BH/TP No.:

Depth (m):

Sample No.:

PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details			
Sample Condition		Undisturbed	
Height	mm	200.0	
Diameter	mm	104.0	
Moisture Content	%	17	
Bulk Density	Mg/m ³	1.96	
Dry Density	Mg/m ³	1.68	
Test Details			
Membrane Thickness	mm	0.25	
Membrane Correction	kPa	0.36	
Rate of Axial Displacement	%/min	2.00	
Cell Pressure	kPa	1180	
Strain at Failure	%	6.0	
Maximum Deviator Stress	kPa	597	
Shear Strength	kPa	298	
Mode of Failure		Brittle	
Sample Description		Very high streng orange brown, p	th light blue grey mottled purple and greenish grey CLAY



BH T1

29.50

U9

Shear Strength Parameters Cu 298 kPa Phi N/A °



REMARKS (Including any abnormalities or departures from procedure)



PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

BH/TP No.:BH T2ADepth (m):7.00Sample No.:U1

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Mada of foilura	
Sample Condition		Undisturbed		wode of failure	
Height	mm	200.0			
Diameter	mm	102.9			
Moisture Content	%	27			
Bulk Density	Mg/m ³	2.01			
Dry Density	Mg/m ³	1.59			
Test Details					
Membrane Thickness	mm	0.25			
Membrane Correction	kPa	0.46			
Rate of Axial Displacement	%/min	2.00			
Cell Pressure	kPa	280			
Strain at Failure	%	8.0			
Maximum Deviator Stress	kPa	203			
Shear Strength	kPa	101		Shear Strength	
Mode of Failure		Brittle		Parameters	
		High strength da	ark grey brown CLAY		
Sample Description				Cu 101 kPa	
				Phi N/A °	



REMARKS (Including any abnormalities or departures from procedure)



harrisontesting

PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

BH/TP No.:BH T2ADepth (m):10.00Sample No.:U2

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				N.4	odo of foiluro	
Sample Condition		Undisturbed		111		
Height	mm	200.0				
Diameter	mm	101.3				
Moisture Content	%	30				
Bulk Density	Mg/m ³	2.01				
Dry Density	Mg/m ³	1.54				
Test Details						
Membrane Thickness	mm	0.25				
Membrane Correction	kPa	0.35				
Rate of Axial Displacement	%/min	2.00				
Cell Pressure	kPa	400				
Strain at Failure	%	5.5				
Maximum Deviator Stress	kPa	143				
Shear Strength	kPa	72		SI	Shear Strength	
Mode of Failure		Brittle		Parameters		
		Medium strengt	n dark grey brown CLAY			
Sample Description				Cu	72 kPa	
				Phi	N/A °	



REMARKS (Including any abnormalities or departures from procedure)

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PROJECT NAME:	Tybalds Close Estate, Camden
PROJECT NUMBER:	GL16481
CLIENT:	Tibbalds Planning and Urban Design
DATE OF ISSUE:	04/05/2012

BH/TP No.:BH T4Depth (m):8.50Sample No.:U1

DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details				Made of failure
Sample Condition		Undisturbed		wode of failure
Height	mm	200.0		
Diameter	mm	101.4		
Moisture Content	%	30		
Bulk Density	Mg/m ³	2.01		
Dry Density	Mg/m ³	1.55		
Test Details				
Membrane Thickness	mm	0.25		
Membrane Correction	kPa	0.60		
Rate of Axial Displacement	%/min	2.00		
Cell Pressure	kPa	340		
Strain at Failure	%	11.0		
Maximum Deviator Stress	kPa	176		
Shear Strength	kPa	88		Shear Strength
Mode of Failure		Brittle		Parameters
		High strength da	ark grey brown CLAY	
Sample Description				Cu 88 kPa
				Phi N/A °



REMARKS (Including any abnormalities or departures from procedure)

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Campbell Reith Hill Somerset House 47-49 London Road Redhill Surrey RH1 1LV

Attention: Rhyadd Watkins

CERTIFICATE OF ANALYSIS

Date: Customer: Sample Delivery Group (SDG): Your Reference: Location: Report No: 23 May 2012 H_CAMREITH_REH 120523-97

Redhill - Bourne Estate 182049

We received 11 samples on Thursday March 15, 2012 and 10 of these samples were scheduled for analysis which was completed on Wednesday May 23, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan Operations Manager



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CERTIFICATE OF ANALYSIS

Validated

SDG:	120523-97	Location:	Redhill - Bourne Estate	Order Number:	
Job:	H_CAMREITH_REH-5	Customer:	Campbell Reith Hill	Report Number:	182049
Client Reference:		Attention:	Rhyadd Watkins	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5490960	BHT1	D2	1.00	
5490949	BHT1	D11	13.00 - 13.45	
5490946	BHT1	D14	18.00	
5490955	BHT1	D19	24.00	
5490951	BHT1	D21	27.00	
5490953	BHT1	D24	31.00 - 31.45	
5490941	BHT1	B4	4.50	
5490948	BHT1	D5	5.20	
5490950	BHT4	D7	10.00 - 10.45	
5490944	BHT4	D3	2.00	
5332762	FPT3		2.00	09/03/2012

Only received samples which have had analysis scheduled will be shown on the following pages.

									Validated	
SDG: Job: Client Reference:	120523-97 H_CAMREITH_REH-5	Location Custome Attentior	 1: 2: 1:	Re Ca Rh	dhill mpt yade	- Bo bell R d Wa	urne eith tkin	e Est Hill s	ate Order Number: Report Number: 182049 Superseded Report:	
SOLID Results Legend	Lab Samp	le No(s)	5490940 5490941	5490948	5490951 5490949	5490955 5490953	5490960	5490950 5490944		
No Determination Possible	tion Custo Sample Re	mer eference	BHT1	BHT1	BHT1	BHT1	BHT1	BHT4 BHT4		
	AGS Ref	erence	B4	05	D11	D24	D2	D7		
	Depth	(m)	4.50	5.20	27.00 13.45	24.00 31.00 - 31.45	1.00	10.00 - 10.45 2.00		
	Conta	iner	400g Tub (ALE214)	BAG	BAG	BAG	BAG	BAG		
Anions by Kone (soil)	All	NDPs: 0 Tests: 10	x	(<u>x</u>	x x		x	x x		
Asbestos Identification (So	il) All	NDPs: 0 Tests: 2					x	x		
Magnesium (BRE)	All	NDPs: 0 Tests: 1		x						
NO3, NO2 and TON by KC	DNE (s) All	NDPs: 0 Tests: 1		x						
рН	All	NDPs: 0 Tests: 10	x	(X	xx		x	<mark>x</mark> x		
Sample description	All	NDPs: 0 Tests: 10	x>	(X	x x	xx	x	x x		

CERTIFICATE OF ANALYSIS

Validated

SDG: 120523-97 Location: Redhill - Bourne Estate Order Number: Job: H_CAMREITH_REH-5 Customer: Campbell Reith Hill Report Number: 182049 Client Reference: Attention: Rhyadd Watkins Superseded Report: 182049	SDG: 12	20523-97 Location:	Redhill - Bourne Estate	Order Number:
	Job: H	H_CAMREITH_REH-5 Customer:	Campbell Reith Hill	Report Number: 182049
	Client Reference:	Attention:	Rhyadd Watkins	Superseded Report:

Sample Descriptions

Grain Sizes									
very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm	- 2mm co	oarse 2mm - 1	0mm very co	oarse >10mm
Lab Sample No	o(s) Custo	mer Sample R	ef. Depth (m)	Co	lour	Description	Grain size	Inclusions	Inclusions 2
5490941		BHT1	4.50	Light	Brown	Sand	0.063 - 0.1 mm	Stones	N/A
5490946		BHT1	18.00	Dark	Brown	Silty Clay	0.063 - 0.1 mm	N/A	N/A
5490948		BHT1	5.20	Light	Light Brown Silty		0.063 - 0.1 mm	N/A	N/A
5490949		BHT1	13.00 - 13.45	5 Dark	Brown	Silty Clay	0.063 - 0.1 mm	N/A	N/A
5490951		BHT1	27.00	Dark	Dark Brown Clay		<0.063 mm	None	None
5490953		BHT1	31.00 - 31.45	5 Dark	Dark Brown Clay		<0.063 mm	None	None
5490955		BHT1	24.00	Dark	Brown	Clay	Clay <0.063 mm		None
5490960		BHT1	1.00	Dark	Dark Brown Sa		0.063 - 0.1 mm	Stones	Brick
5490944		BHT4	2.00	Dark	Brown	Sand	Sand 0.063 - 0.1 mm		Brick
5490950		BHT4	10.00 - 10.45	5 Dark	Brown	Clay	<0.063 mm	None	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

	ALcontrol Labora	atories		CEF	зти	FICATE OF A				Validated
SDG Job: Clier	: 12052 H_CAI nt Reference:	3-97 MREITH_F	REH-5	Location: Customer: Attention:	Re Ca Rh	edhill - Bourne Estate Impbell Reith Hill Iyadd Watkins		Order Number: Report Number: Superseded Report	182049 t:	
#	Results Legend ISO17025 accredited.	C	Customer Sample R	BHT1		BHT1	BHT1	BHT1	BHT1	BHT1
§ aq diss.filt tot.unfilt * **	Deviating sample. Aqueous / settled sample. Dissolved / filtered sample. Total / unfiltered sample. Subcontracted test. % recovery of the surrogate standar check the efficiency of the method. 1	d to The	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref	1.00 Soil/Solid - 15/03/2012 120523-97		13.00 - 13.45 Soil/Solid - 15/03/2012 120523-97	18.00 Soil/Solid - 15/03/2012 120523-97	24.00 Soil/Solid - 15/03/2012 120523-97	27.00 Soil/Solid 15/03/2012 120523-97	31.00 - 31.45 Soil/Solid - 15/03/2012 120523-97
(F)	samples aren't corrected for the reco Trigger breach confirmed	overy	Lab Sample No.(s) AGS Reference	5490960 D2		5490949 D11	5490946 D14	5490955 D19	5490951 D21	5490953 D24
Сотро рН	nent	LOD/Unit 1 pH	TM133	11.7	8 M 3	7.63	7.88 8 M	9.42 8 M	9.74 8 M	9.66 8 M
Solubl	e Sulphate 2:1	<0.003	TM243	0.212	<u>8 M</u>	0.822	0.644	0.0136	0.0588	0.0124
extrac	t as SO4 BRE	<u>g</u> /I			<u>8 M</u>	S M	S M	\$ M	\$ M	\$ M
			_							

CERTIFICATE OF ANALYSIS

Validated

SDG:	120523-97		Location: Re	edhill - Bourne Estate		Order Number:	1000.40	
Job: Client Reference:	H_CAMREIT	H_REH-5	Attention: RI	nyadd Watkins		Superseded Report	182049 t:	
Results Legenc # ISO17025 accredited. M mCERTS accredited. § Deviating sample. aq Aqueous / settled sample diss.filt Dissolved / filtered sample	1). le.	Customer Sample R Depth (m) Sample Type	BHT1 4.50 Soil/Solid	BHT1 5.20 Soil/Solid	BHT4 10.00 - 10.45 Soil/Solid	BHT4 2.00 Soil/Solid		
tot.unfilt Total / unfiltered sample. Subcontracted test. % recovery of the surrog. check the efficiency of th results of individual com samples aren't corrected	ate standard to e method. The pounds within for the recovery	Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s)	- 15/03/2012 120523-97 5490941 84	- 15/03/2012 120523-97 5490948 D5	- 15/03/2012 120523-97 5490950 D7	- 15/03/2012 120523-97 5490944 D3		
Component	LOD/U	AGS Reference	D4	5	07	5		
рН	1 p	H TM133	9	7.74 8 M	8.43	9.2		
Soluble Sulphate 2:1	<0.0	003 TM243	0.0095	0.0923	0.253	1.35		
extract as SO4 BRE Chloride 2:1 water/soil	g/ <0.0	I 001 TM243	§ M	§ M 0.0102	§ M	§ M		
Nitrate as NO3, 2:1 wat	er <0.00	003 TM243		0.00714				
Magnesium (BRE)	<0.0 a/	008 TM282		<0.008				



CERTIFICATE OF ANALYSIS

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SDG: 120523-97	Location:	Redhill - Bourne Estate	Order Number:	
Job: H_CAMREITH_REH-5	Customer:	Campbell Reith Hill	Report Number:	182049
Client Reference:	Attention:	Rhyadd Watkins	Superseded Report:	

Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	BHT1 D 2 1.00 SOLID 120523-97 5490960 TM048	27/04/12	Kevin Bowron	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receivered SDG Original Sample Method Number	BHT4 D 3 2.00 SOLID 120523-97 5490944 TM048	27/04/12	Kevin Bowron	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

CERTIFICATE OF ANALYSIS

Validated

SDG:	120523-97	Location:	Redhill - Bourne Estate	Order Number:					
Job:	H_CAMREITH_REH-5	Customer:	Campbell Reith Hill	Report Number: 182049					
Client Reference:		Attention:	Rhyadd Watkins	Superseded Report:					
Notification of Doviating Samples									

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5498442	BHT4 D7	10.00 - 10.45	SOLID	рН	pH	Sample holding time exceeded
5498492	BHT1 D19	24.00	SOLID	pН	рН	Sample holding time exceeded
5498495	BHT1 B4	4.50	SOLID	pН	рН	Sample holding time exceeded
5498502	BHT1 D21	27.00	SOLID	pН	рН	Sample holding time exceeded
5498531	BHT1 D24	31.00 - 31.45	SOLID	pН	рН	Sample holding time exceeded
5498548	BHT1 D14	18.00	SOLID	рН	рН	Sample holding time exceeded
5498577	BHT1 D5	5.20	SOLID	рН	рН	Sample holding time exceeded
5498814	BHT1 D11	13.00 - 13.45	SOLID	pН	рН	Sample holding time exceeded
5500744	BHT4 D3	2.00	SOLID	pН	рН	Sample holding time exceeded
5500806	BHT1 D2	1.00	SOLID	pН	рН	Sample holding time exceeded
5504088	BHT1	13.00 - 13.45	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5504591	BHT1	5.20	SOLID	Anions by Kone (soil)	Chloride 2:1 water/soil extract BRE	Sample holding time exceeded
5504591	BHT1	5.20	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5504613	BHT1	18.00	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5504653	BHT1	4.50	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520552	BHT1	31.00 - 31.45	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520556	BHT1	27.00	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520559	BHT1	24.00	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520565	BHT4	10.00 - 10.45	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520905	BHT1	1.00	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded
5520907	BHT4	2.00	SOLID	Anions by Kone (soil)	Soluble Sulphate 2:1 extract as SO4 BRE	Sample holding time exceeded

Note : Test results may be compromised

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CERTIFICATE OF ANALYSIS

Validated

 SDG:
 120523-97
 Location:
 Redhill - Bourne Estate
 Order Number:

 Job:
 H_CAMREITH_REH-5
 Customer:
 Campbell Reith Hill
 Report Number:
 182049

 Client Reference:
 Attention:
 Rhyadd Watkins
 Superseded Report:
 182049

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM243		Mixed Anions In Soils By Kone		
TM282		Extraction of Magnesium by BRE Method		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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CERTIFICATE OF ANALYSIS

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 120523-97
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 Rhyadd Watkins
 Superseded Report:
 182049

Test Completion Dates

Lab Sample No(s)	5490941	5490946	5490948	5490949	5490951	5490953	5490955	5490960	5490944	5490950
Customer Sample Ref.	BHT1	BHT1	BHT1	BHT1	BHT1	BHT1	BHT1	BHT1	BHT4	BHT4
AGS Ref.	B4	D14	D5	D11	D21	D24	D19	D2	D3	D7
Depth	4.50	18.00	5.20	13.00 - 13.45	27.00	31.00 - 31.45	24.00	1.00	2.00	10.00 - 10.45
Туре	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Anions by Kone (soil)	30-Apr-2012	30-Apr-2012	30-Apr-2012	30-Apr-2012	01-May-2012	01-May-2012	01-May-2012	01-May-2012	01-May-2012	01-May-2012
Asbestos Identification (Soil)								27-Apr-2012	27-Apr-2012	
Magnesium (BRE)			27-Apr-2012							
NO3, NO2 and TON by KONE (s)			01-May-2012							
рН	27-Apr-2012	27-Apr-2012	27-Apr-2012	27-Apr-2012	27-Apr-2012	27-Apr-2012	27-Apr-2012	30-Apr-2012	30-Apr-2012	27-Apr-2012
Sample description	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012	25-Apr-2012

Validated

CERTIFICATE OF ANALYSIS

 SDG:
 120523-97
 Location:
 Redhill - Bourne Estate
 Order Number:

 Job:
 H_CAMREITH_REH-5
 Customer:
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 Rhyadd Watkins
 Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. Surrogate recoveries -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. Product analyses -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY					
analysis	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS	
SOLVENTEXTRACTABLE MATTER	D&C	DOM	SOXTHERM	GRAVIMETRIC	
CYOLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC	
ELEMENTALSULPHUR	D&C	DOM	SOXTHERM	HPLC	
PHENOLS BY GOMS	WET	DOM	SOXTHERM	GC-MS	
HERBICIDES	D&C	HEXANEACETONE	SOXTHERM	GC-MS	
PESTICIDES	D&C	HEXANEACETONE	SOXTHERM	GC-MS	
EPH (DRO)	D&C	HEXANEACETONE	ENDOWEREND	GC-FD	
EPH (MIN OL)	D&C	HEXANEACETONE	ENDOWEREND	GC-FD	
EFH (CLEANED UP)	D&C	HEXANEACETONE	ENDOWEREND	GC/FD	
EPH CWGBY GC	D&C	HEXANEACETONE	ENDOWEREND	GC/FD	
PCBAROCLOR 1254/ PCBCON	D&C	HEXANEACETONE	ENDOWEREND	GC-MS	
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANEACETONE	MICROWAVE TM218.	GC-MS	
>06-C40	WET	HEXANEACETONE	SHAKER	GCFD	
POL YAROMATIC HYDROCARBONS RAPID GC	WET	HEXANEACETONE	SHAKER	GC-FD	
SEMIVOLATILEORGANIC COMPOUNDS	WET	DOMACETONE	SONICATE	GC-MS	

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STRRED EXTRACTION (STIR-BAR)	GCMS
BH	HEXANE	STRRED EXTRACTION (STIR-BAR)	GC FID
EPHCWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MNERALOL	HEXANE	STRRED EXTRACTION (STIR-BAR)	GC FD
PCB7 CONGENERS	HEXANE	STRRED EXTRACTION (STIR-BAR)	GCMS
PCBAROCLOR 1254	HEXANE	STRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DCM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DCM	SOLD PHASEEXTRACTION	HPLC
PESTOCROPP	DCM	LIQUID'LIQUID SHAKE	GCMS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GCMS
PHENOLSMS	ACETONE	SOLD PHASEEXTRACTION	GCMS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	R
MNERALOLbyR	TCE	STIRRED EXTRACTION (STIR-BAR)	R
GLYCOLS	NONE	DIRECTINIECTION	CC FD

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSC 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysolile	White Asbestos
Amoste	BrownAsbestos
Orodolite	Blue Asbestos
Fibrous Adinalte	-
Florous Anthophylite	-
Fibrous Trendite	-

182049