Phase II Geo-Environmental Assessment Report

1-7 Hargrave Place
London
N7 0BP

Prepared for:

Moreland & Co
93 Bell Lane
London
NW4 2AR

EPS Project:	UK14.1681
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1-7 HARGRAVE PLACE, LONDON

NON TECHNICAL SUMMARY

This report presents the findings of a Ground Investigation undertaken to identify the ground conditions as well as provide a geotechnical appraisal of the ground conditions encountered. Pertinent findings and conclusions may be summarised as follows:

- The intrusive investigation comprised the forming of three window sample boreholes to depths of up to 5m below ground level (bgl) and one deeper shell and auger borehole to 20m bgl. Ground conditions were found to comprise a layer of gravelly, sandy made ground to approximately 0.6m overlying firm to very stiff brown London Clay.
- Contaminant risk screening levels, representative of minimal risk to site users, were exceeded at two locations within shallow soils for Lead. As no soft landscaping is understood to be proposed for the future development at the site, these levels of lead have not been considered to represent an unacceptable risk to future site workers and users.
- Asbestos fibres were encountered in two of the shallow soil samples submitted for analysis. After quantification, the level of asbestos within both samples was found to fall below laboratory detection limits and is therefore not considered to present an unacceptable risk to future site workers and users. It is recommended however that suitable health and safety control measures are implemented throughout redevelopment works. If any visible evidence of asbestos is encountered then specialist contractors should be contacted to safely identify and remove this material.

ENGINEERING SUMMARY

- The ground conditions are considered suitable for the use of conventional spread foundations, bearing on the London Clay, adopting allowable bearing pressures of 88kN/m^2 at 1.0m, with an increase in bearing pressure as foundation depth increases. It is understood that piles may well be a preferred option for this site.
- A CBR Value of 2.5% is recommended for the shallow soils likely to be encountered at subgrade level.
- A design sulphate class of DS-1 together with an aggressive chemical environment for concrete classification of AC-1s is recommended.

The above points represent a simplified summary of the findings of this assessment and should not form the basis for key decisions for the proposed development. A thorough review of the details contained within the following report, or discussion with EPS is recommended.

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1 INTRODUCTION

In September 2014, Environmental Protection Strategies Ltd, (EPS) was commissioned by Moreland & Co to undertake a Phase II Geo-Environmental Assessment at 1-7 Hargrave Place, London, N7 0BP (the 'site'); see Figure 1. A current site layout plan and an aerial photograph are included as Figure 2 and 3 respectively. Selected photographs and a photograph location plan are included in Appendix A.

This report presents the findings, conclusions, and recommendations of the investigation.

1.1 Previous Report

A Phase I Desk Study was produced by Soils Ltd in June 2014. This report identified the potential for shallow soils to be contaminated as a result of the sites historic use.

1.2 Objectives

The objectives of this investigation were as follows:

a) To investigate contaminant linkages identified and determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure safe development in accordance with the Model Procedures for the Management of Land Contamination - Contaminated Land Report 11.
b) To collect information on ground conditions and strength in order to make appropriate recommendations for future geotechnical design.

1.3 Scope of Work

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRA Circular 01/2006, BS10175 –'*Investigation of Potentially Contaminated Sites*,' and BS EN 1997 '*Geotechnical Design,*' the following tasks were undertaken:

Intrusive Investigation:

- Site walkover and obtaining photographic records.
- Health and safety briefing / site supervision.
- Drilling of window sampling boreholes to a maximum depth of 5.0m below ground level, (bgl) at three locations.
- Recording of ground conditions including in-situ testing as well as inspection of samples for visual and olfactory contamination.
- Drilling of a Shell and Auger borehole at one location to a depth of 20m bgl.

Reporting:

- Data collection and interpretation
- Reporting

The findings of these investigations and their conclusions are presented in the following sections.

1.4 Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd, (EPS) makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface, however, ground conditions are naturally variable and it may be possible that the ground conditions encountered may differ to those encountered during the investigation.

No visible evidence of Japanese Knotweed was identified during the site walkover, however this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its presence at certain times of the year. For this reason EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species, or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

If third parties have been contracted / consulted during compilation of this report, the validity of any data they may have supplied, and which are included in the report, have been assessed as far as possible by EPS, however, EPS cannot guarantee the validity of these data.
The report has been prepared for the client(s) listed on the report title page and has been subject to standard internal EPS review procedures. EPS accepts no liability or responsibility for use of, or reliance upon, this report and / or the information contained within it by third parties.

No part of this report, or references to it, may be included in published documents of any kind without approval from EPS.

This report and its contents, together with any supporting correspondence or other documentation, remain the property of Environmental Protection Strategies Ltd until paid for in full.

2 SUMMARY OF INTRUSIVE INVESTIGATIONS

The intrusive ground investigation was undertaken on the 9th and 10th of October 2014 in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of all site activities is presented in the following sections:

2.1 Site Description

The site is located at 1-7 Hargrave Place, London, N7 0BP around national grid reference 529712, 185040 and approximately 2km north of Kings Cross Station. Hargrave Place itself is present to the north, with Brecon Mews to the south and Brecknock Road (A5200) to the east. A disused public house and large block of residential flats exist to the west, with the surrounding area generally comprising a mixture of residential and small commercial properties.

The proposed development area is covered almost entirely by an abandoned commercial, (small warehouse style) building, most recently used as a bed manufacturers and upholsterers. A small brick paved parking area is located to the east of this building. The site slopes gently towards the north (Hargrave Place), with no mature or large vegetation noted within the surrounding area. Photographs of the site and a photograph location plan are included as Appendix A.

2.2 Borehole Locations

Borehole locations were selected through consideration of below ground utilities as well as operational and health & safety considerations.

A total of three window-sampling boreholes, (WS1 – WS3) and one deeper shell and auger borehole (BH1) were formed within the brick paved parking area to the east in order to assess the nature and quality of underlying soils to depths of up to 20m below ground level, (bgl).

The overall objective in terms of borehole location was to provide an appropriate lateral and vertical coverage of the site with regard to the proposed development in order to provide information relating to the ground conditions and strength.

The boreholes were drilled in accordance with standard EPS drilling methodologies, and subcontractors were supervised at all times by an EPS engineer. After completion, gas monitoring wells were installed at all three of the window sample borehole locations. Each monitoring well was installed using 50mm diameter uPVC well casing and fitted with a gas tap. Slotted casing (1mm slot) was installed at each location from the base of the borehole to approximately 1.0m below the surface. The installations were completed to ground surface using plain casing. A filter pack of 2-3mm washed gravel extended from the base of the borehole to approximately 0.1m above the slotted section with a bentonite seal to surface. All installations were finished with flush–mounted, bolt-down headworks and the area around the borehole was reinstated to its original condition. The deeper shell and auger borehole was backfilled to ground level upon completion.

2.3 Soil Sampling

Each borehole was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase liquids on a precautionary basis.

Soil samples were obtained from throughout the boreholes for potential future laboratory testing and for record purposes.

A laboratory testing schedule is included as Table 1.

2.4 Laboratory Testing

2.4.1 Chemical Analysis

Samples obtained for analysis of identified contaminants of concern were submitted to Jones Environmental Forensics Ltd of Deeside, who hold appropriate UKAS / MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered to the laboratory by approved courier.

2.4.2 Geotechnical Testing

Geotechnical testing was undertaken by Soil Property Testing, Huntingdon, a UKAS accredited laboratory.

Copies of chain of custody documentation are held by EPS and will be made available on request.

3 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the ground investigation.

3.1 Ground Conditions

A total of four boreholes were formed at the site and the ground conditions encountered, from ground level, were found to comprise:-

- Made Ground
- London Clay Formation

A summary of the strata encountered across the site is provided below.

Geological Strata	Maximum Depth to Base of Strata, (m bgl)	Strata Thickness, (m)
Made Ground	0.5	0.5
London Clay Formation	>20	Not Proven

3.1.1 Made Ground

Made ground consisting of a surface of Brick Paving underlain by sandy gravel, grading to clayey sandy gravel was encountered to depths of approximately 0.6m bgl in all boreholes.

3.1.2 London Clay Formation

Firm, becoming very stiff brown London Clay with occasional grey veining, was encountered in all of the boreholes beneath the made ground to depths of up to 20m bgl. Between 6.80 and 7.20m bgl a strong brown mudstone band was encountered.

3.1.3 Groundwater

No groundwater was encountered in any of the boreholes during the investigation.

3.1.4 Borehole Records

Site specific borehole records are included as Appendix B and give descriptions and depths of strata encountered as well as presenting the results of in-situ testing.

3.2 Physical Evidence of Contamination

Other than made ground encountered in the top 0.6m, no visual or olfactory evidence of contamination or putrefiable materials were identified during the intrusive investigation. No other palpable evidence of contamination was encountered in any of the boreholes formed during the ground investigation.

3.3 Laboratory Analysis

3.3.1 Chemical Analysis-Soils

A laboratory analysis testing schedule is presented as Table 1 and all environmental sample results obtained from the laboratory are included as Appendix C.

The key results of laboratory testing on environmental soil samples are summarised as follows:

Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	4	4	8.9	12.8	WS3 (0.2-0.4)
Cadmium	4	1	-	0.1	WS3 (0.2-0.4)
Chromium	4	4	24.4	60.6	WS2 (0.7-0.9)
Copper	4	4	25	69	WS2 (0.2-0.4)
Mercury	4	3	0.2	1.0	WS2 (0.2-0.4)
Nickel	4	4	21	37	WS2 (0.7-0.9)
Lead	4	4	18	368	WS3 (0.2-0.4)
Selenium	4	-	-	-	-
Zinc	4	4	73	135	WS3 (0.2-0.4)
Benzo[a]pyrene	4	1	-	0.07	WS2 (0.2-0.4)
PAH (Total of 16)	4	0	-	-	-
TPH	4	-	-	-	-
SOM (%)	2	2	0.7	2.4	WS1 (0.3-0.5)
Phenols	4	-	-	-	-
pH	7	7	7.84	8.73	WS1 (0.3-0.5)
Water Soluble Sulphate (g/l)	7	5	0.0591	0.2611	WS3 (4.0)

- Asbestos free fibres were identified within two of the four samples submitted for analysis (WS2 and WS3). This is discussed further in section 4.3.

Notes: - Contaminant not found above laboratory detection limits
PAH Polycyclic Aromatic Hydrocarbons
TPH Total Petroleum Hydrocarbons
SOM Soil Organic Matter

3.3.2 Geotechnical Testing

A summary of the geotechnical testing undertaken is provided below.

Strata	**Range of Parameters**					
	Moisture Content (%)		Plasticity Index (%)		Undrained Shear Strength (kPa)	
	Min	Max	Min	Max	Min	Max
London Clay	27	28	44	46	110	176

The natural moisture content was established for three samples of cohesive soil in accordance with BS 1377 Part 1:7.3 and BS1377: Part 2:3.2.

Atterberg limit tests were undertaken on three samples of cohesive soil in accordance with BS1377: Part 1:7.4 and BS1377: Part 2:3.2&4.2.

Undrained, unconsolidated triaxial tests were undertaken on three samples of undisturbed soils recovered from the deeper borehole in accordance with BS1377: Part 1 and BS1377: Part 7.

A laboratory analysis testing schedule is presented as Table 1 and all geotechnical sample results obtained from the laboratory are included as Appendix D.

4 TIER 1 QUALITATIVE RISK ASSESSMENT

4.1 Tier 1 Screening – Generic Assessment Criteria, (GAC)

4.1.1 Tier 1 Screening - Soils

In order to screen laboratory data for concentrations of contaminant in soil with potential to cause harm to human health in a residential setting, UK Soil Guideline Values, (SGVs) and an In-House Generic Assessment Criteria, (GACs) for contaminants in soil have been used. The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports*, (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Generic Assessment Criteria for Human Health Risk Assessment – LQM and CIEH 2nd edition*, (2009).

For concentrations of Lead in soil, there are currently no published human health screening criteria available and EPS has used the Category 4 Screening Level (C4SL) for lead as an appropriate guide for professional judgement with respect to reasonable 'low risk' levels in the context of this site.

In addition to screening the concentrations of contaminant in soil for risks to human health, EPS has also screened the concentrations for potential to cause harm to water resources. The criteria used for this process were derived by EPS using the following technical guidance:

- Environment Agency Remedial Targets Methodology: *Hydrogeological Risk Assessment for Land Contamination*.

Tier 1 Risk Screening criteria for Low Groundwater Resource Potential, (LGwRP) have been adopted for this site due to the unproductive London Clay present, and due to the site not being within a Source Protection Zone for groundwater abstraction.

A summary of the screening criteria and the methodology used to derive them is included in Appendix E.

4.2 Assessment of Soil Results

The results of the screening process for on-site human receptors show that Category 4 Screening Levels, representative of low risk values for a residential setting were exceeded for Lead at two locations as detailed below.

Contaminant	C4SL (mg/kg)	No. of Exceedances	Highest Exceedance (mg/kg) & Sampling Location
Lead	200	2	368 (WS3)

Screening criteria representative of minimal risk to the underlying groundwater were not exceeded for any contaminants of concern.

4.3 Environmental Conclusions and Recommendations

Category 4 Screening Levels, representative of low risk in a residential setting, were exceeded for Lead at two locations. It is understood that there are no proposals for any soft landscaping to be incorporated into the development at the site and therefore the levels of lead identified are not considered to represent an unacceptable risk to future site users or workers. The lack of any soft landscaping will eliminate any contact between future site users and shallow soils, therefore removing any potential contaminant pathway. Any hardstanding included into the proposed development would need to be designed to remain as permanent hardstanding, (i.e. cemented in) and should not be able to be converted easily. If any soft landscaping were to be proposed for the site, implementation of a clean soil cover system, to limit the level of interaction between future site users and the underlying material, is likely to be required.

Asbestos fibres (Chrysotile) were identified by the initial asbestos screen within two shallow soil samples taken from WS2 and WS3. One of these samples (WS2) reported quantifiable amounts of asbestos, with the second (WS3) identifying only trace amounts, (less than 0.001% of the sample). Sample WS2 was submitted for further analysis to establish the quantity of fibres present. The results of this further analysis showed that less than 0.001% of the sample contained asbestos fibres and therefore only trace amounts were present. This level of fibres is below the laboratory limit of detection and along with the trace detection in WS3, is not considered to represent an unacceptable risk to future site users and workers.

Future site workers should be advised of the presence of trace amounts of asbestos fibres within shallow soils at the site. If any visible evidence of asbestos is encountered during redevelopment works, a specialist contractor will need to be commissioned to safely remove this material. Furthermore any asbestos containing material to be removed from site should be characterised as hazardous waste and disposed of appropriately.

Additional precautionary measures to reduce the risk of exposure to contamination are also detailed below:-

a) All construction workers operating at the site should be advised of the potential for contact with concentrations of Lead above low risk levels within shallow made ground materials. Appropriate health and safety precautions should also be adopted during any excavation works to avoid exposure to soils. Reference should be made to the following HSE document: *Protection of Workers and the General Public during Development of Contaminated Land.*
b) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out. A method statement for encountering any unexpected contamination is included as Appendix F of this report.

In accordance with the Model Procedures for Management of Land Contamination (Contaminated Land Report 11), risks have not been identified by this work which will require further assessment. A summary of the approach outlined in CLR11, marking the work completed under the risk assessment phase, is presented as a flow diagram in Figure 5 of this report.

5 GEOTECHNICAL APPRAISAL

The ground conditions have been found to comprise a layer of made ground overlying bedrock geology of brown London Clay. It is understood that the site is to be developed with a four storey structure consisting of ground floor commercial use and three levels of residential accommodation.

5.1 Structural Foundations

The ground conditions are considered suitable for the use of conventional spread foundations, either strip footings or pad foundations bearing on the underlying London Clay.

A summary of allowable bearing capacities is provided in the table below. The allowable bearing capacity is the permissible increase in vertical stress at the level of the underside of the foundation, above existing overburden pressure, which may be calculated on the basis of a soil density of 18kN/m^3.

Foundation Depth (m)	Allowable Bearing Capacity (kN/m^2)
1.0	85
1.5	110
2.0	150
2.5	175

At the above bearing pressure total settlements are unlikely to exceed approximately 20mm.

A minimum foundation depth of 1.0m, below existing or proposed ground level is considered suitable for the site, subject to the following provisos:-

a) Cohesive soils are present beneath the entire site, and whilst no mature vegetation was noted in the immediate surrounding area, foundation design will need to take into account the presence of trees, including any to be planted. London Clay should be considered as having a High Volume Change Potential in accordance with *NHBC Standards Chapter 4.2-'Building Near Trees'*.
b) All foundations should fully penetrate any made ground or disturbed ground and extend a minimum of 150mm into undisturbed natural strata.

Where structural loads exceed the above allowable bearing pressures, which may be the case for a building of this size, an alternative option to spread foundations above would be the use of piles.

Piles are considered likely to terminate in the London Clay, and carry their loads in a combination of end bearing and skin friction. It would be unwise to assume any positive contribution to skin friction within the Made Ground.

In view of the wide variety of piles sizes available, and the range of installation plant and techniques, detailed estimates of pile carrying capacity have not been prepared as part of this report. The design of the piles should be carried out by, and should remain the responsibility of the specialist piling contractor, who will reflect their own methods, experience and design procedures within their proposals.

Where necessary, heave precautions should be used for piles and ground beams in full accordance with NHBC standards. Piles should be designed with an appropriate factor of safety to resist uplift caused by any desiccation and should be adequately reinforced.

The site and ground conditions are suitable for the use of Continuous Flight Auger (CFA) piles or driven piles. The use of driven piles, however, may cause noise and vibration nuisance to site neighbours which would tend to negate their use in this situation.

5.2 Ground Floor Construction

Due to the presence of high volume change clay soils, and the depth of made ground, the use of suspended ground floor construction is recommended.

5.3 Groundworks

Whilst excavations in the London Clay may remain stable for short periods during construction the stability of these deposits should not be relied upon in unsupported excavations.

Heavy plant and stockpiles of materials should not be permitted close to the edges of unsupported excavations.

Further reference may be made to *CIRIA Report No. 97 'Trenching Practice,'* 1992.

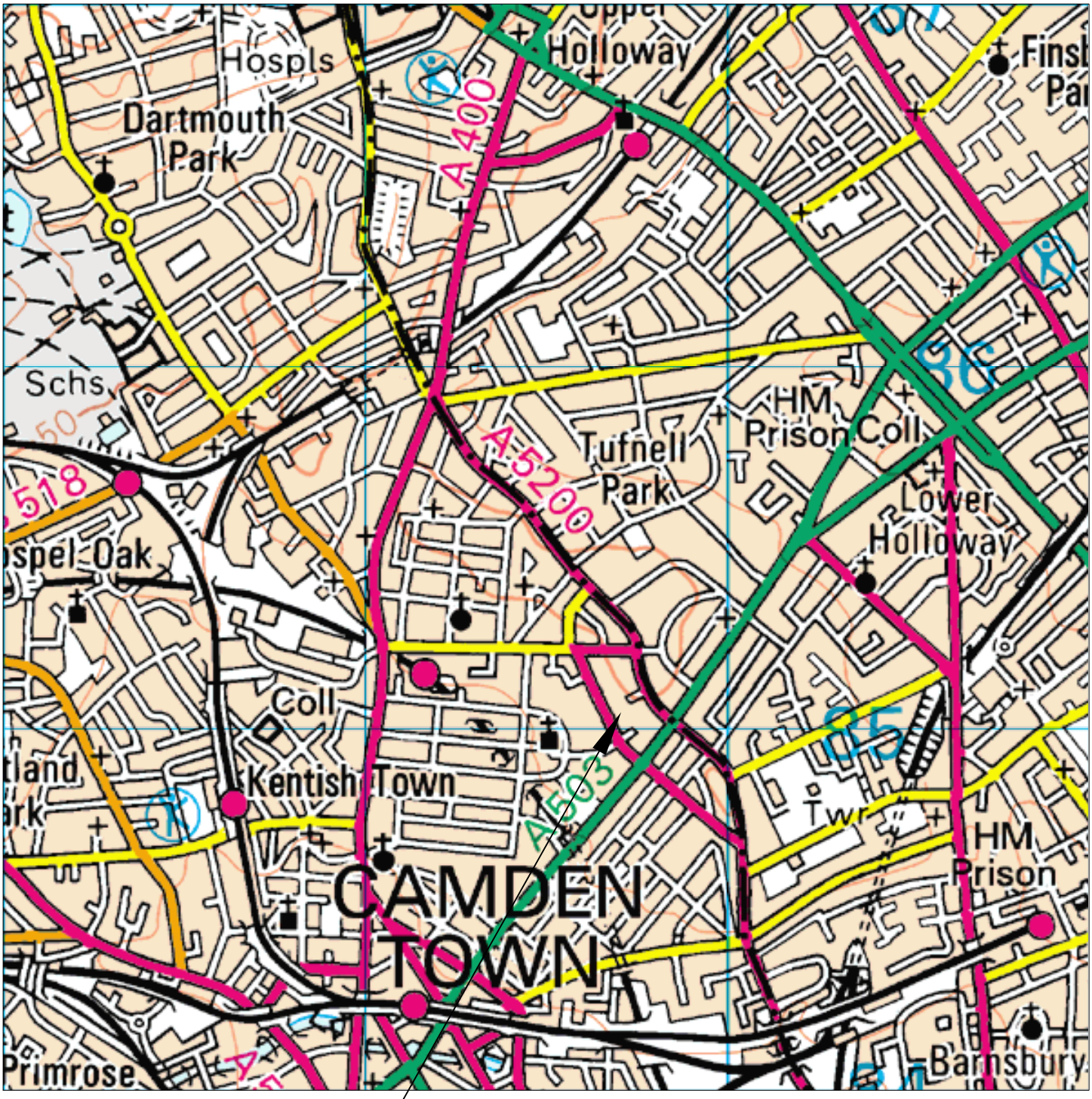
5.4 Concrete Grade

Sulphate contents and pH values determinations were carried out by both the analytical and geotechnical laboratories. Sulphate contents were recorded between 0.0591g/l SO_4 and 0.2611g/l SO_4. The pH values ranged from 7.8 to 8.7.

Due to the potentially pyritic nature of the London Clay, concentrations of total sulphur were also recorded. These ranged from 0.02% to 0.03% and in accordance with Part 1 of the BRE Special Digest 1 '*Concrete in Aggressive Ground*' have been converted to Total Potential Sulphate (TPS), which ranged from 0.06% to 0.09%.

In accordance with Part 1 of the BRE Special Digest 1 '*Concrete in Aggressive Ground*' 2005, a design sulphate class of DS1 is considered suitable for the site, with an aggressive chemical environment for concrete, AC-1s.

FIGURES



Title:	**Site Location Plan**
Project:	1-7 Hargrave Place, London, N7 0BP
Client:	Moreland & Co
Fig No:	1
Scale:	NTS
Drawn By:	KH
Approved By:	WE
Job No:	UK14.1681
Dwg No:	M&C/HargravePlace/1014/01
Date:	October 2014

Please Note: Figure reproduced from drawing supplied by client.

Title:	**Current Site Layout Plan**		
Project:	1-7 Hargrave Place, London, N7 0BP	Scale:	NTS
		Drawn By: KH	Approved By: WE
Client:	Moreland & Co	Job No:	UK14.1681
Fig No:	2	Dwg No:	M&C/HargravePlace/1014/02
		Date:	October 2014

N

Approximate Site Boundary

eps

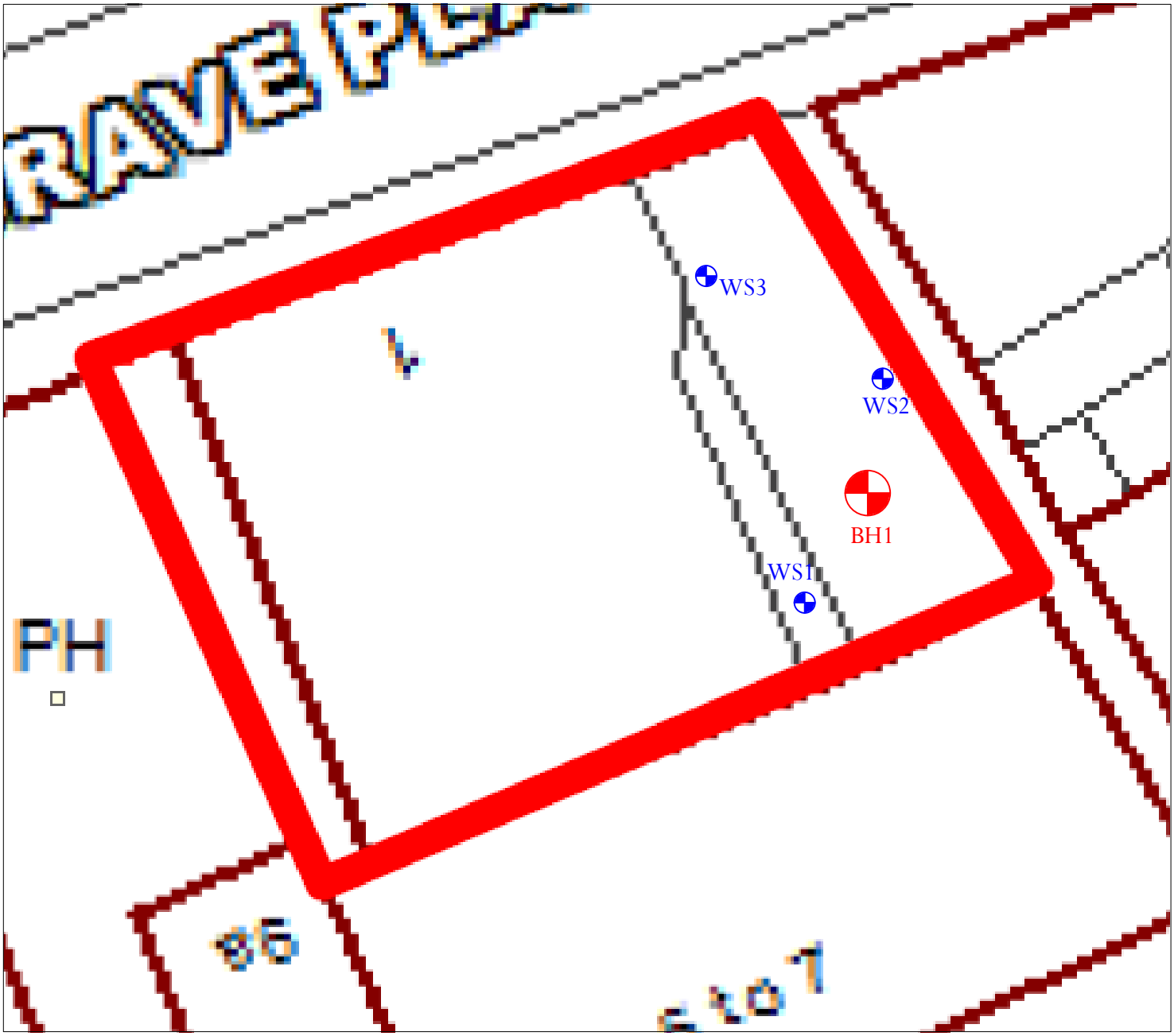
Title: Aerial Photograph

Project: 1-7 Hargrave Place, London, N7 0BP

Client: Moreland & Co

Fig No: 3

Scale:	NTS
Drawn By:	KH
Approved By:	WE
Job No:	UK14.1681
Dwg No:	M&C/HargravePlace/1014/03
Date:	October 2014

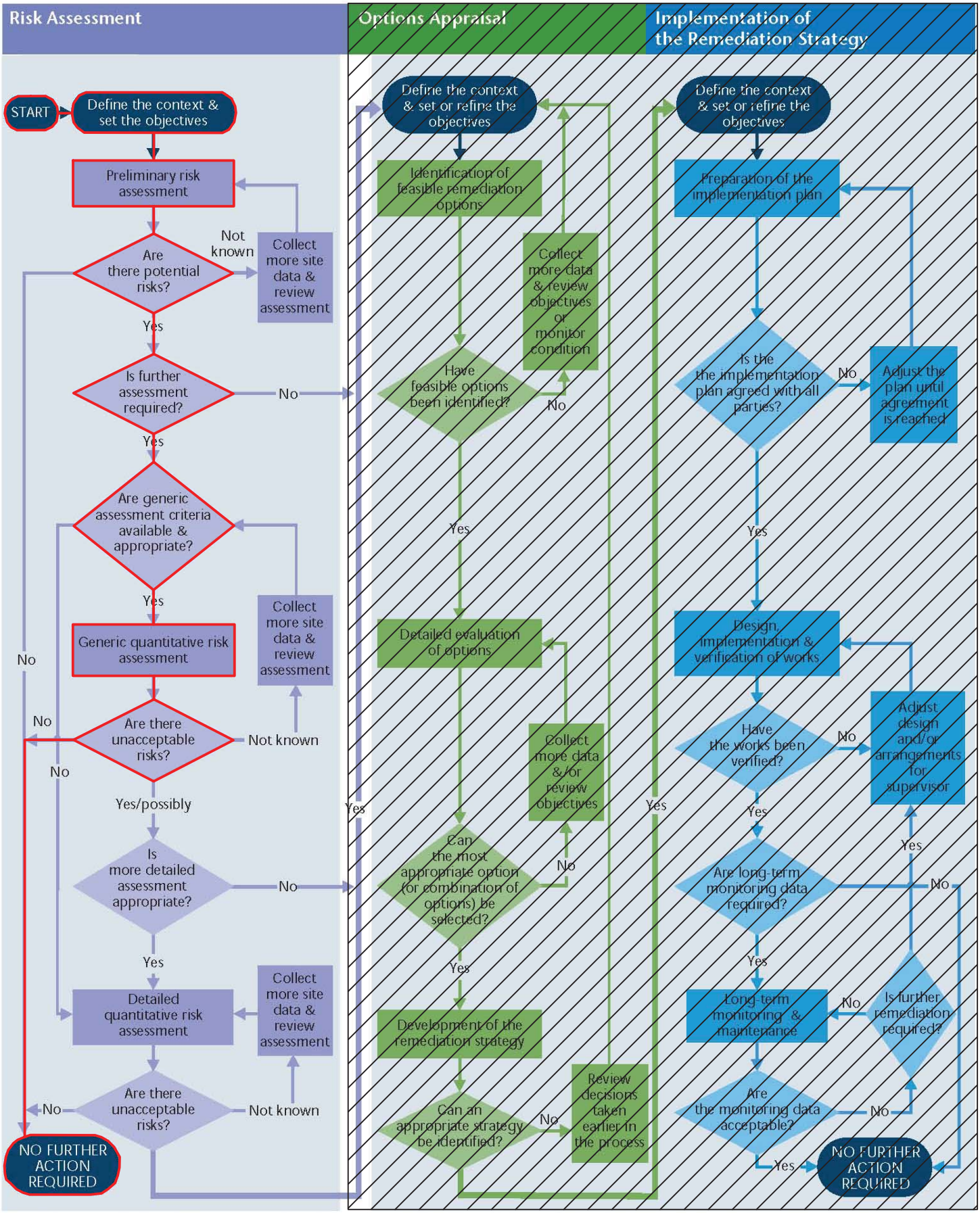


Key:

- Approximate EPS Borehole Locations
- Approximate Shell & Auger (Deep) Borehole Location
- Approximate Site Boundary

Please Note: Figure reproduced from drawing supplied by client.

Title:	Borehole Location Plan		
Project:	1-7 Hargrave Place, London, N7 0BP	Scale:	NTS
Client:	Moreland & Co	Drawn By: JG	Approved By: WE
Fig No:	4	Job No:	UK14.1681
		Dwg No:	M&C/HargravePlace/1014/04
		Date:	October 2014



Assessment Pathway for Site

Title:	**Site Context - CLR11**		
Project:	1-7 Hargrave Place, London, N7 0BP	Scale:	n/a
		Drawn By: JG	Approved By: SB
Client:	Moreland & Co	Job No:	UK14.1681
Fig No:	5	Dwg No:	M&C/HargravePlace/1114/05
		Revision Date:	November 2014

TABLES

Table 1 – Laboratory Testing Schedule

Sample ID	Sample Depth (m bgl)	Sulphate	TPH	EPS Mini Suite	Moisture Content & Atterberg Limits	Triaxial Test – Single Stage
WS1 (soil)	0.3-0.5	-	1	1	-	-
WS1 (soil)	2.0	1	-	-	-	-
WS2 (soil)	0.2-0.4	-	1	1	-	-
WS2 (soil)	0.7-0.9	-	1	1	-	-
WS2 (soil)	3.0	1	-	-	-	-
WS3 (soil)	0.2-0.4	-	1	1	-	-
WS3 (soil)	4.0	1	-	-	-	-
BH1 (soil)	3.5-4.0	-	-	-	1	-
BH1 (soil)	8.5-9.0	-	-	-	1	-
BH1 (soil)	12.0-12.5	-	-	-	1	-
BH1 (soil)	5.0	-	-	-	-	1
BH1 (soil)	10.0	-	-	-	-	1
BH1 (soil)	15.0	-	-	-	-	1

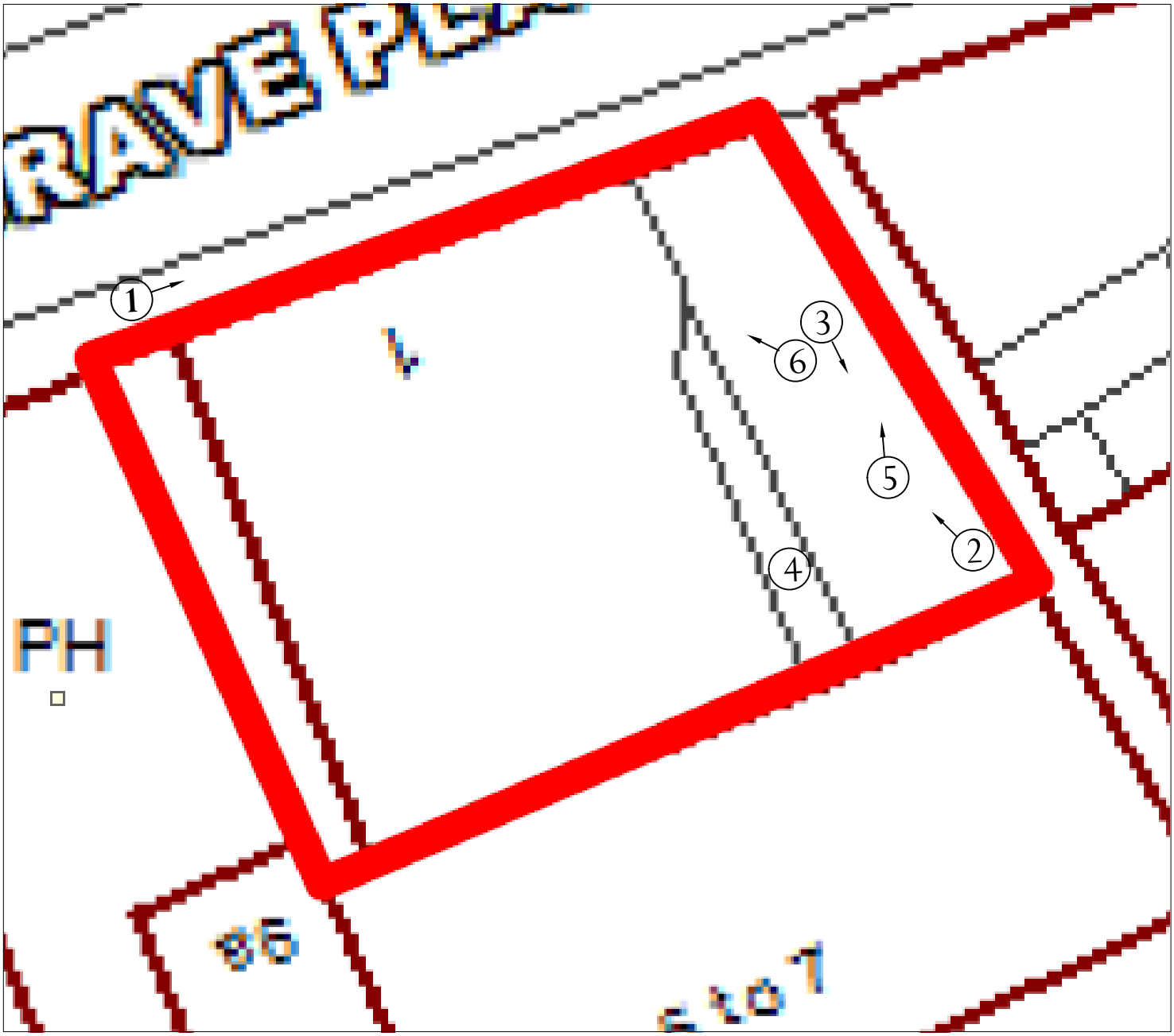
Notes:

mbgl	meters below ground level
1	Sample Taken
-	Sample Not Analysed
EPS Mini Suite	Organic Matter, pH, Sulphate, Cyanide, Metals, Polycyclic Aromatic Hydrocarbons, Phenols and Asbestos
TPH	Total Petroleum Hydrocarbons

APPENDICES

APPENDIX A

Selected Site Photographs



Key:

1 Approximate Photo Location

Approximate Site Boundary

Please Note: Figure reproduced from drawing supplied by client.

Title: Photo Location Plan

Project: 1-7 Hargrave Place, London, N7 0BP

Client: Moreland & Co

Appendix: A

Scale:	NTS		
Drawn By:	JG	Approved By:	WE
Job No:	UK14.1681		
Dwg No:	M&C/HargravePlace/1014/AppA		
Date:	October 2014		

Photo 1: View looking east along Hargrave Place	Photo 2: View looking north at site entrance.
	
Photo 3: View looking south at south eastern corner of site.	Photo 4: Material recovered from WS1
	
Photo 5: View of location WS2.	Photo 6: View of location WS3
	

APPENDIX B

Site Specific Borehole Logs

Environmental Protection Strategies
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Borehole No
WS1
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
1-7 Hargrave Place	UK14.1681		WLS
Location: Hargrave Place, London, N7 0BP		Level: -	Scale 1:25
Client: Moreland & Co		Dates: 09/10/2014	Logged By JG

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			BRICK PAVING
					0.30			MADE GROUND: Medium to coarse sandy gravel.
					0.60			MADE GROUND: Dark brown/grey clayey fine gravel containing brick fragments and some black staining.
		0.80	IVN	43				Soft brown/grey CLAY.
		1.00	SPT	N=5 (1,0/ 1,1,2,1)	1.00			Firm to stiff brown/grey CLAY.
		1.30	IVN	65				
		1.50	IVN	81				
		1.80	IVN	98				
		2.00	SPT	N=9 (1,1/ 2,2,2,3)				
		2.30	IVN	86				
		2.50	IVN	127				
		2.80	IVN	133				
		3.00	SPT	N=14 (2,2/ 3,3,4,4)				
		3.30	IVN	153				
		3.50	IVN	156				
		3.80	IVN	156				
		4.00	SPT	N=20 (4,3/ 4,5,5,6)				
		4.30	IVN	141				
		4.50	IVN	144				
		4.80	IVN	141				
		Type		Results				End of Borehole at 5.00 m

1
2
3
4

Remarks:

AGS

Environmental Protection Strategies
Tel: 01954 710666
email: info@epstrategies.co.uk
www.epstrategies.co.uk

Borehole No
WS2
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
1-7 Hargrave Place	UK14.1681		WS
Location: Hargrave Place, London, N7 0BP		Level: -	Scale 1:25
Client: Moreland & Co		Dates: 09/10/2014	Logged By JG

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			BRICK PAVING
					0.20			MADE GROUND: Medium to coarse sandy gravel.
								MADE GROUND: Soft dark grey clay containing brick fragments and clinker material.
					0.50			Soft brown/grey CLAY.
		0.80	IVN	46				
		1.00	SPT	N=3 (1,0/ 0,1,1,1)	1.00			Firm to stiff brown/grey CLAY.
		1.30	IVN	55				
		1.50	IVN	84				
		1.80	IVN	81				
		2.00	SPT	N=11 (2,2/ 2,3,3,3)				
		2.30	IVN	118				
		2.50	IVN	115				
		2.80	IVN	130				
		3.00	SPT	N=15 (3,2/ 3,4,4,4)				
		3.30	IVN	115				
		3.50	IVN	147				
		3.80	IVN	144				
		4.00	SPT	N=20 (3,3/ 4,5,5,6)				
		4.30	IVN	115				
		4.50	IVN	130				
		4.80	IVN	144				
		Type		Results				End of Borehole at 5.00 m

1
2
3
4

Remarks:

AGS

Environmental Protection Strategies
Tel: 01954 710666
email: info@epstrategies.co.uk
www.epstrategies.co.uk

Borehole No
WS3
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
1-7 Hargrave Place	UK14.1681		WS
Location: Hargrave Place, London, N7 0BP		Level: -	Scale 1:25
Client: Moreland & Co		Dates: 09/10/2014	Logged By JG

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			BRICK PAVING
					0.30			MADE GROUND: Medium to coarse sandy gravel.
					0.40			Coarse brick fragments.
					0.70			MADE GROUND: Soft dark grey gravelly clay containing brick and glass fragments with some balck staining.
		1.00	SPT	N=4 (1,0/ 1,1,1,1)				Soft light brown CLAY.
		1.30	IVN	58				
		1.50	IVN	72	1.50			Firm to stiff brown/grey CLAY.
		1.80	IVN	101				
		2.00	SPT	N=10 (2,1/ 2,2,3,3)				
		2.30	IVN	115				
		2.50	IVN	138				
		2.80	IVN	130				
		3.00	SPT	N=14 (3,2/ 3,3,4,4)				
		3.30	IVN	121				
		3.50	IVN	141				
		3.80	IVN	159				
		4.00	SPT	N=17 (3,3/ 3,4,5,5)				
		4.30	IVN	108				
		4.50	IVN	144				
		4.80	IVN	159				
		Type		Results				End of Borehole at 5.00 m

Remarks:

AGS

Soil Property Testing Ltd.
18 Halcyon Court, St Margarets Way, Stukeley Meadows,
Huntingdon, Cambs. PE29 6DG
Telephone (01480) 455579 Fax (01480) 453619
E-mail: enquiries@soilpropertytesting.com

UKAS TESTING No.0998

BOREHOLE RECORDS

Cowan Drilling Services carried out the boring on behalf of EPS Ltd., by light cable percussive techniques on the date shown on the records. On completion of boring all samples were then transported to Soil Property Testing Limited.

A schedule of Laboratory testing was prepared by EPS Ltd and was forwarded in an email attachment dated 14th October 2014 UK14.1681

Instructions were also received to carry out borehole logging and preparation of formal borehole records. The information recorded on the records is in accordance with the information required by BS5930: 1999 + A2:2010 Code of Practice for Site Investigations.

The description of the strata encountered are based on the visual examination of the samples provided by the driller, the driller's daily site report sheets and what is known of the geology of the site.

A sample/test key is shown on the bottom of the borehole record to enable identification of the various samples taken and tests performed on site.

Water details are as recorded by the driller at the time of boring, and as the groundwater may not have reached equilibrium within the timespan of the boring operations great care must be exercised with regard to the interpretation of the hydrological conditions of the site.

S.P.Townend FGS

Environmental Protection Strategies Ltd

Tel: 01954 710666

BOREHOLE LOG

Borehole BH1

Method	Date	Site
Light Cable Percussion.	10/10/14	UK14.1681 - Hargrave Place, Camden.

Dia mm	Coord	Ground Level m O.D.	Client
150			

Soil Samples/Tests Type/Test	Depth m.	Casing (Water) Depths m	Field Records	Legend	Depth m.	Description of Strata (thickness in m.) [reduced level in m.]
					0.10	Block Paving / Sand sub-base (0.10)
					0.30	Brown stoney soil with brick fragments (Drillers description) (0.20)
D1	0.50				0.50	Firm dark yellowish brown CLAY with black organic pockets and rare fine gravel and brick fragments (MADE GROUND) (0.20)
D2	1.00					Firm yellowish brown CLAY with rare grey veining and decayed roots (LONDON CLAY FORMATION) (1.60)
D3	1.20					
S1 (7)	1.35 - 1.65					
D4	2.00					
U1 (30)	2.10 - 2.50	1.40			2.10	
D5	2.55					Stiff extremely closely fissured yellowish brown CLAY with occasional grey veining and partings of orange and yellow silt/ fine sand (LONDON CLAY FORMATION) (4.70)
D6	3.00					
S2 (22)	3.15 - 3.45	1.40				
B1	3.50 - 4.00					
D7	4.00					
U2 (41)	4.10 - 4.50	1.40				
D8	4.55					- Becoming very stiff and with occasional selenite crstals
D9	4.90					
UT3 (48)	5.00 - 5.40	1.40				
D10	5.45					
D11	6.00					
D12	6.50					
S3 (43)	6.65 - 6.88	1.40				
B2	6.80 - 7.20		CHISELLING from 6.8 to 7.2m		6.80	Strong brown MUDSTONE with ironstaining recovered as cobble size fragments after chiselling (0.40)
					7.20	Very stiff extremely closely fissured dark yellowish brown CLAY with rare grey veining and occasional selenite crystals (LONDON CLAY FORMATION) (4.30)
U4 (71)	8.00 - 8.40	1.40				
D13	8.45					
B3	8.50 - 9.00					
D14	9.50					
S4 (26)	9.65 - 9.95	1.40				
UT5 (92)	10.00 - 10.40	1.40				

Remarks

A PIT WAS DUG FROM 0.1m to 1.2m BGL
CHISELLING FROM 6.8 TO 7.2m BGL - 1 HOUR
GROUNDWATER WAS NOT ENCOUNTERED DURING BORING
BOREHOLE BACKFILLED WITH ARISINGS
UT = THIN WALLED U100 TUBE

Logged by	Scale	End Casing Depth	Job No.
spt	1:50	m. 1.40	S28169

Sample/Test key:

U()	U100 Sample (blows)
D	Disturbed sample
B	Bulk sample
W	Water sample
-	Progress & Day
▼	Groundwater level

Penetration Tests

S ()	Standard (N value)
C ()	Cone (N value)
*	Blows and penetration when 300mm not achieved

Environmental Protection Strategies Ltd

Tel: 01954 710666

BOREHOLE LOG

Borehole BH1

Method	Date	Site
Light Cable Percussion.	10/10/14	UK14.1681 - Hargrave Place, Camden.

Dia mm	Coord	Ground Level m O.D.	Client
150			

Soil Samples/Tests Type/Test	Depth m.	Casing [Water] Depths m	Field Records	Legend	Depth m.	Description of Strata (thickness in m.) [reduced level in m.]
D15	10.45					Very stiff extremely closely fissured dark yellowish brown CLAY with rare grey veining and occasional selenite crystals (LONDON CLAY FORMATION) (Continued from previous page)
D16	11.20					
D17	11.50				11.50	
S5 (35)	11.65 - 11.95	1.40				Very stiff extremely closely fissured dark greyish brown CLAY with partings of dark grey silt fine shell debris and grey calcareous casts (LONDON CLAY FORMATION) (8.50)
B4	12.00 - 12.50					
U6 (100)	13.00 - 13.40	1.40				
D18	13.45					
D19	14.20					
UT7(100)	15.00 - 15.40	1.40				
D20	15.45					
D21	16.10					
D22	16.50					
S6 (37)	16.65 - 16.95	1.40				
U8 (100)	18.00 - 18.40	1.40				
D23	18.45					
D24	19.10					
D25	19.50					
S7 (39)	19.65 - 19.96	1.40			20.00	BOREHOLE COMPETED AT 20.0m BGL

Remarks

A PIT WAS DUG FROM 0.1m to 1.2m BGL
CHISELLING FROM 6.8 TO 7.2m BGL - 1 HOUR
GROUNDWATER WAS NOT ENCOUNTERED DURING BORING
BOREHOLE BACKFILLED WITH ARISINGS
UT = THIN WALLED U100 TUBE

Logged by	Scale	End Casing Depth	Job No.
spt	1:50	m. 1.40	S28169

Sample/Test key:

U()	U100 Sample (blows)	S ()	Standard (N value)
D	Disturbed sample	C ()	Cone (N value)
B	Bulk sample	*	Blows and penetration when 300mm not achieved
W	Water sample		
	Progress & Day		
▼	Groundwater level		

Penetration Tests

TEST REPORT.

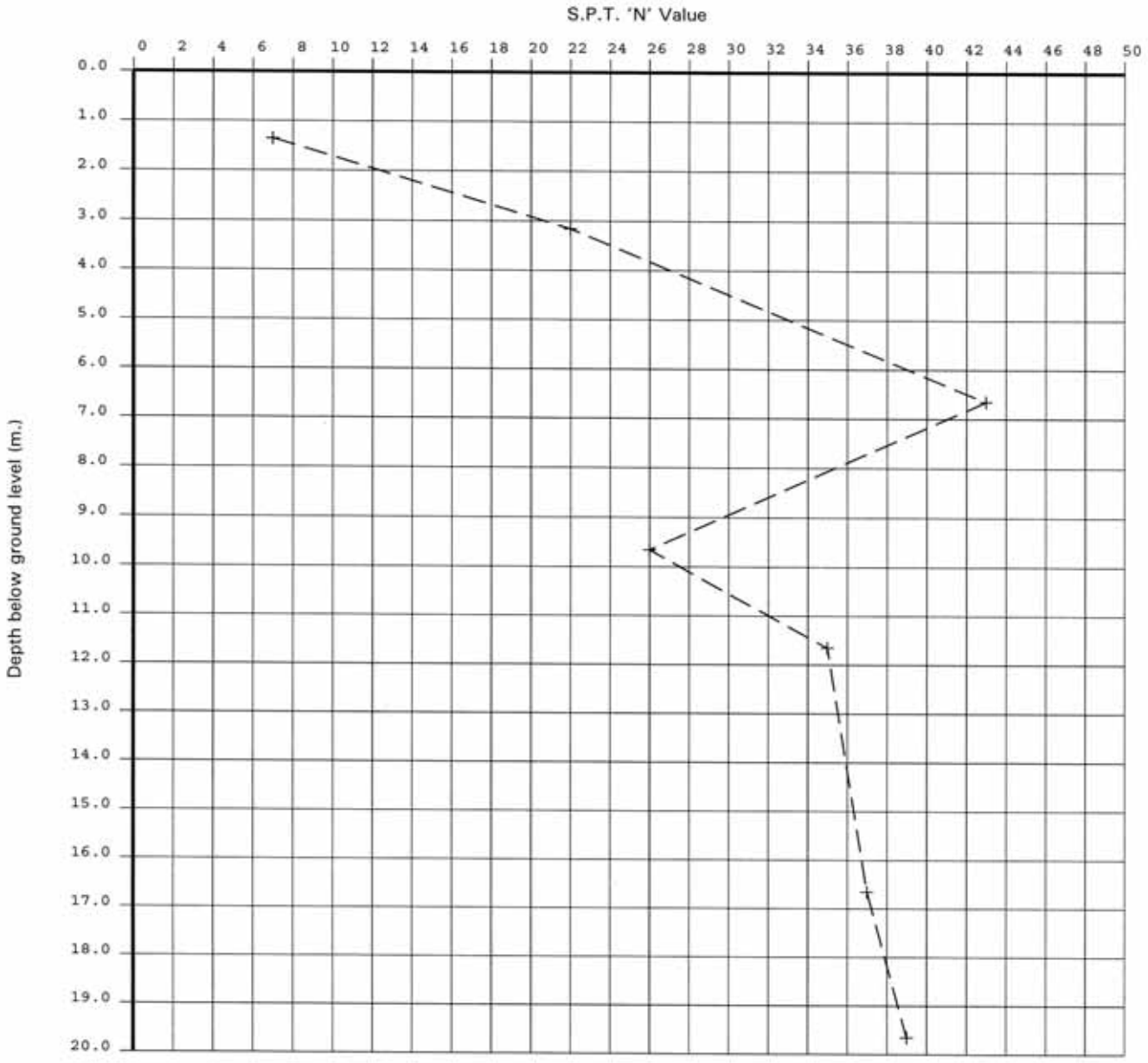
ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** of

Contract
UK14.1681 - Hargrave Place, Camden.

Serial No.
S28169

S.P.T. 'N' Value vs Depth below ground level (m.).



Key to Data Points	+ : BH1							

SPTPLOT

APPENDIX C

Laboratory Results- Environmental

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith
JE Job No.: 14/12308

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4	5-7	8-10	11	12-14	15				LOD/LOR	Units	Method No.
Sample ID	WS1	WS1	WS2	WS2	WS2	WS3	WS3						
Depth	0.3-0.5	2.0	0.2-0.4	0.7-0.9	3.0	0.2-0.4	4.0						
COC No / misc													
Containers	V J	T	V J	V J	T	V J	T						
Sample Date	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014						
Arsenic #M	12.4	-	NDP	8.9	-	NDP	-				<0.5	mg/kg	TM30/PM15
Arsenic	-	-	11.9	-	-	12.8	-				<0.5	mg/kg	TM30/PM62
Cadmium #M	<0.1	-	NDP	<0.1	-	NDP	-				<0.1	mg/kg	TM30/PM15
Cadmium	-	-	<0.1	-	-	0.1	-				<0.1	mg/kg	TM30/PM62
Chromium #M	46.1	-	NDP	60.6	-	NDP	-				<0.5	mg/kg	TM30/PM15
Chromium	-	-	39.2	-	-	24.4	-				<0.5	mg/kg	TM30/PM62
Copper #M	46	-	NDP	25	-	NDP	-				<1	mg/kg	TM30/PM15
Copper	-	-	69	-	-	42	-				<1	mg/kg	TM30/PM62
Lead #M	145	-	NDP	18	-	NDP	-				<5	mg/kg	TM30/PM15
Lead	-	-	292	-	-	368	-				<5	mg/kg	TM30/PM62
Mercury #M	0.2	-	NDP	<0.1	-	NDP	-				<0.1	mg/kg	TM30/PM15
Mercury	-	-	1.0	-	-	0.8	-				<0.1	mg/kg	TM30/PM62
Nickel #M	27.9	-	NDP	37.0	-	NDP	-				<0.7	mg/kg	TM30/PM15
Nickel	-	-	27.9	-	-	21.0	-				<0.7	mg/kg	TM30/PM62
Selenium #M	<1	-	NDP	<1	-	NDP	-				<1	mg/kg	TM30/PM15
Selenium	-	-	<1	-	-	<1	-				<1	mg/kg	TM30/PM62
Sulphur	-	0.02	-	-	0.02	-	0.03				<0.01	%	TM30/PM15
Total Sulphate #M	723	330	NDP	177	413	NDP	582				<50	mg/kg	TM50/PM15
Total Sulphate	-	-	321	-	-	399	-				<50	mg/kg	TM50/PM62
Zinc #M	73	-	NDP	84	-	NDP	-				<5	mg/kg	TM30/PM15
Zinc	-	-	108	-	-	135	-				<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #M	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-	<0.03	<0.03	-	<0.03	-				<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	-	<0.05	<0.05	-	<0.05	-				<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Phenanthrene #M	<0.03	-	<0.03	<0.03	-	0.03	-				<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Fluoranthene #M	<0.03	-	0.04	<0.03	-	0.06	-				<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	-	0.06	<0.03	-	0.05	-				<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	-	<0.06	<0.06	-	<0.06	-				<0.06	mg/kg	TM4/PM8
Chrysene #M	<0.02	-	0.04	<0.02	-	0.05	-				<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	-	0.11	<0.07	-	<0.07	-				<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	-	0.07	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	-	<0.04	<0.04	-	<0.04	-				<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	-	<0.6	<0.6	-	<0.6	-				<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	-	0.08	<0.05	-	<0.05	-				<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	-	0.03	<0.02	-	<0.02	-				<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	108	-	102	98	-	103	-				<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith
JE Job No.: 14/12308

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4	5-7	8-10	11	12-14	15				LOD/LOR	Units	Method No.
Sample ID	WS1	WS1	WS2	WS2	WS2	WS3	WS3						
Depth	0.3-0.5	2.0	0.2-0.4	0.7-0.9	3.0	0.2-0.4	4.0						
COC No / misc													
Containers	V J	T	V J	V J	T	V J	T						
Sample Date	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014						
TPH CWG													
Aliphatics													
>C5-C6 #M	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>C6-C8 #M	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>C10-C12 #M	<0.2	-	<0.2	<0.2	-	<0.2	-				<0.2	mg/kg	TM5/PM16
>C12-C16 #M	<4	-	<4	<4	-	<4	-				<4	mg/kg	TM5/PM16
>C16-C21 #M	<7	-	<7	<7	-	<7	-				<7	mg/kg	TM5/PM16
>C21-C35 #M	<7	-	<7	<7	-	<7	-				<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19	-	<19	<19	-	<19	-				<19	mg/kg	TM5/TM36/PM12/PM16
Aromatics													
>C5-EC7	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>EC8-EC10 #M	<0.1	-	<0.1	<0.1	-	<0.1	-				<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	-	<0.2	<0.2	-	<0.2	-				<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	-	<4	<4	-	<4	-				<4	mg/kg	TM5/PM16
>EC16-EC21	<7	-	<7	<7	-	<7	-				<7	mg/kg	TM5/PM16
>EC21-EC35	<7	-	<7	<7	-	<7	-				<7	mg/kg	TM5/PM16
Total aromatics C5-35	<19	-	<19	<19	-	<19	-				<19	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-35)	<38	-	<38	<38	-	<38	-				<38	mg/kg	TM5/TM36/PM12/PM16
MTBE #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
Benzene #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
Toluene #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
o-Xylene #	<5	-	<5	<5	-	<5	-				<5	ug/kg	TM31/PM12
Total Phenols HPLC	<0.15	-	<0.15	<0.15	-	<0.15	-				<0.15	mg/kg	TM26/PM21
Natural Moisture Content	33.6	-	NDP	31.4	-	NDP	-				<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-	<0.3	<0.3	-	<0.3	-				<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0929	0.1234	NDP	0.0591	0.2133	NDP	0.2611				<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	-	-	<0.0015	-	-	<0.0015	-				<0.0015	g/l	TM38/PM60
Total Cyanide #M	<0.5	-	<0.5	<0.5	-	<0.5	-				<0.5	mg/kg	TM89/PM45
Organic Matter	2.4	-	NDP	0.7	-	NDP	-				<0.2	%	TM21/PM24
pH #M	8.73	8.09	7.92	7.84	8.29	8.07	8.24				<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay					None	PM13/PM0
Sample Colour	Medium Brown	Light Brown	Medium Brown	Light Brown	Light Brown	Medium Brown	Light Brown					None	PM13/PM0
Other Items	stones	none	stones	none	none	stones and brick fragment	none					None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith
JE Job No.: 14/12308

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4	5-7	8-10	11	12-14	15					
Sample ID	WS1	WS1	WS2	WS2	WS2	WS3	WS3					
Depth	0.3-0.5	2.0	0.2-0.4	0.7-0.9	3.0	0.2-0.4	4.0					
COC No / misc												
Containers	V J	T	V J	V J	T	V J	T					
Sample Date	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1					
Date of Receipt	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/10/2014					
Mass of Dry Sample	43.1	-	39.5	46.2	-	51.2	-				<0.1	g

Please see attached notes for all abbreviations and acronyms

LOD/LOR	Units	Method No.
<0.1	g	PM4/PM0

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Description	Asbestos Containing Material	Asbestos Results	Asbestos Level	Comments
14/12308	1	WS1	0.3-0.5	2	14/10/14	soil/stones	None	NAD	NAD	
14/12308	1	WS2	0.2-0.4	6	14/10/14	soil/stones	Free Fibres	Chrysotile	Quantifiable	
14/12308	1	WS2	0.7-0.9	9	14/10/14	Soil/Clay	None	NAD	NAD	
14/12308	1	WS3	0.2-0.4	13	14/10/14	soil/stones	Free Fibres	Chrysotile	Trace	

Client Name: EPS Ltd

Reference: UK14.1681

Location: Hargrave Place

Contact: Sharleen Smith

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	NDP Reason
14/12308	1	WS2	0.2-0.4	5-7	Asbestos detected in sample
14/12308	1	WS3	0.2-0.4	12-14	Asbestos detected in sample

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith
JE Job No.: 14/12308

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	5-7												
Sample ID	WS2												
Depth	0.2-0.4										Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J												
Sample Date	09/10/2014												
Sample Type	Soil												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	11/10/2014												
Asbestos PCOM Quantification (Fibres)	<0.001										<0.001	mass %	TM65/PM42
Asbestos Gravimetric & PCOM Total	<0.001										<0.001	mass %	TM65/PM42
Sprayed coatings (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Loose Insulation (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Thermal Insulation - Caposite sectional insulation (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Thermal Insulation - Calcium silicate slabs (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Thermal Insulation - 85% Magnesia (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Thermal Insulation - All other types (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Asbestos Boards - AIB (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Asbestos Boards - Millboard (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Asbestos Cement (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Paper (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Braided Ropes textiles (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Vinyl Tiles (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Thermoplastic (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Reinforced PVC (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Reinforced plastic (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Friction products (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Bitumen Products - Roofing felts, DPC (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Bitumen Products - Mastics & adhesives (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Textured Coatings (% Asb by mass)	<0.001										<0.001	mass %	TM65/PM42
Asbestos Gravimetric Quantification (ACMs)	<0.001										<0.001	mass %	TM65/PM42

Client Name: EPS Ltd
Reference: UK14.1681
Location: Hargrave Place
Contact: Sharleen Smith

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 14/12308						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/12308

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

APPENDIX D

Laboratory Results- Geotechnical

TEST REPORT.

ISSUED BY : **SOIL PROPERTY TESTING LTD.**

DATE OF ISSUE : 28/10/14 **PAGE 1 of 12 Pages**

Contract UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

CLIENT:

Environmental Protection
Strategies Ltd
7B Caxton House
Broad Street
CAMBOURNE
CAMBRIDGE
CB23 6JN

Soil Property Testing

18 Halcyon Court, St Margarets Way,
Stukeley Meadows, Huntingdon,
Cambs. PE29 6DG.

Telephone (01480) 455579 Fax (01480) 453619
Email enquiries@soilpropertytesting.com

SAMPLES SUBMITTED BY:

Environmental Protection

APPROVED SIGNATORIES:

- ☐ **J.C.GARNER B.Eng (Hons.) FGS** Technical Director
- ☑ **S.P.TOWNEND FGS** Quality Manager
- ☐ **T.FOORD BSc (Hons.) FGS** Site Services Manager

S.P. Townend

SAMPLES LABELLED:

London N7

DATE RECEIVED: 13/10/14

SAMPLES TESTED BETWEEN 13/10/14 **and** 28/10/14

REMARKS: For the attention of Mr R Allen
Your Order No.: PO-14/4103

NOTES:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. (a) UKAS - United Kingdom Accreditation Service.
   (b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 2 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No.: S28169

SCHEDULE OF LABORATORY TESTS

Bh./ Tp No.	Sample Ref	Depth (from)	1:Moisture Content Determination	4:Liquid/Plastic limit 1 point	13:Triaxial Test single stage	Remarks
BH1	B1	3.50	*	*		
	UT3	5.00			*	
	B3	8.50	*	*		
	UT5	10.00			*	
	B4	12.00	*	*		
	UT7	15.00			*	
-	-	-	3	3	3	<— Total Number of Tests ——

Scheduled by: Environmental Protection

Target Date: 28/10/14

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 3 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	SAMPLE PREPARATION				Description	CLASS
								Method S/N	Ret'd 0.425mm (%)	Corr'd M/C <0.425mm	Curing Time (hrs.)		
BH1	3.50 -4.00	B1	28	72	27	45	0.02	N	0(A)		24	Stiff extremely closely fissured yellowish brown CLAY with occasional grey veining	CV
BH1	8.50 -9.00	B3	27	71	27	44	0.00	N	0(A)		24	Very stiff extremely closely fissured dark yellowish brown CLAY with rare grey veining and occasional selenite crystals	CV
BH1	12.00 -12.50	B4	28	75	29	46	-0.02	N	0(A)		24	Very stiff extremely closely fissured dark greyish brown CLAY with rare shell debris	CV

METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2 S = Wet Sieved Specimen N = prepared from Natural

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter. A = Assumed, M = Measured

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

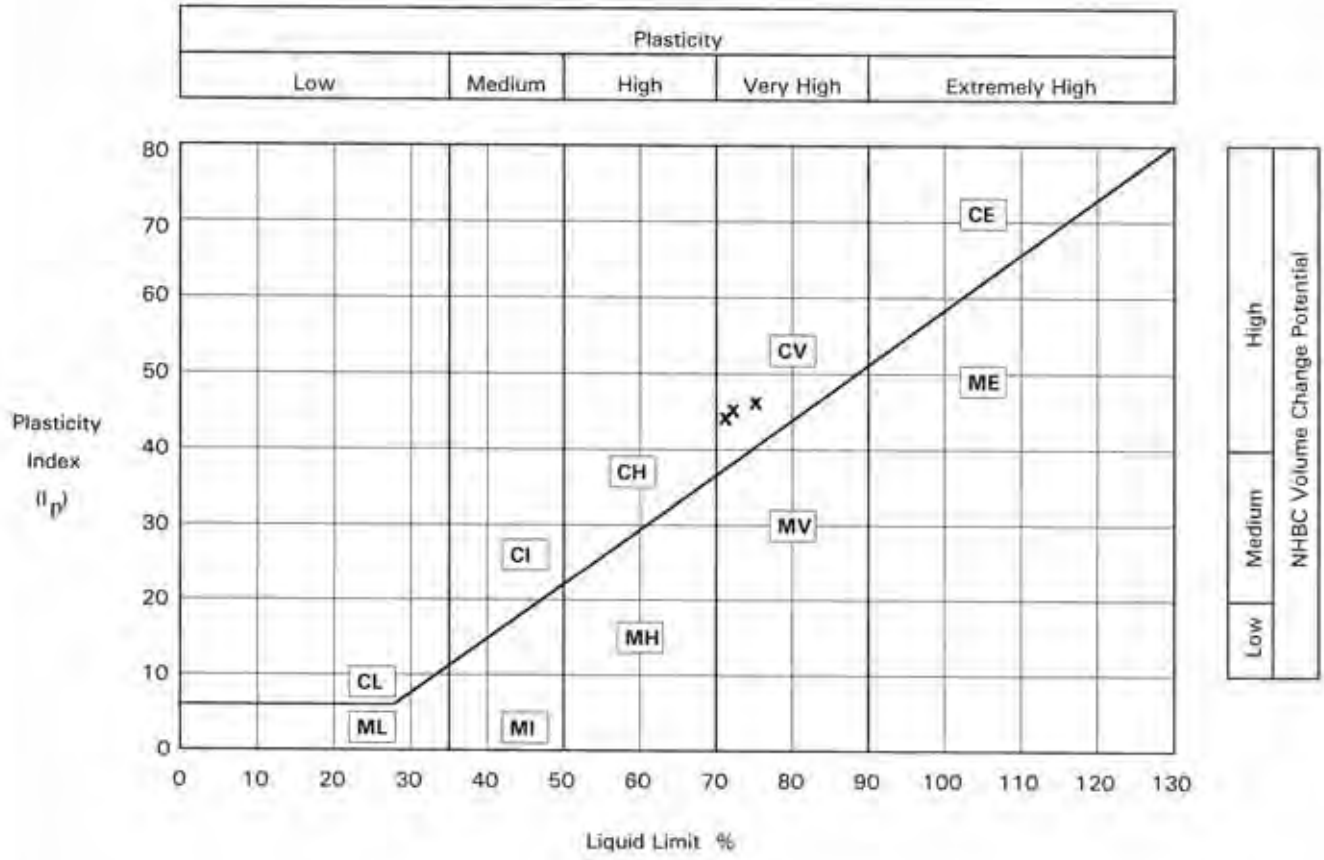
ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 4 of 12

Contract
UK14.1681 - Hargrave Place, Camden.

Serial No.
S28169

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : VOLUMR CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index PLASTICITY CHART BS5930:1999:Figure 18

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 5 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

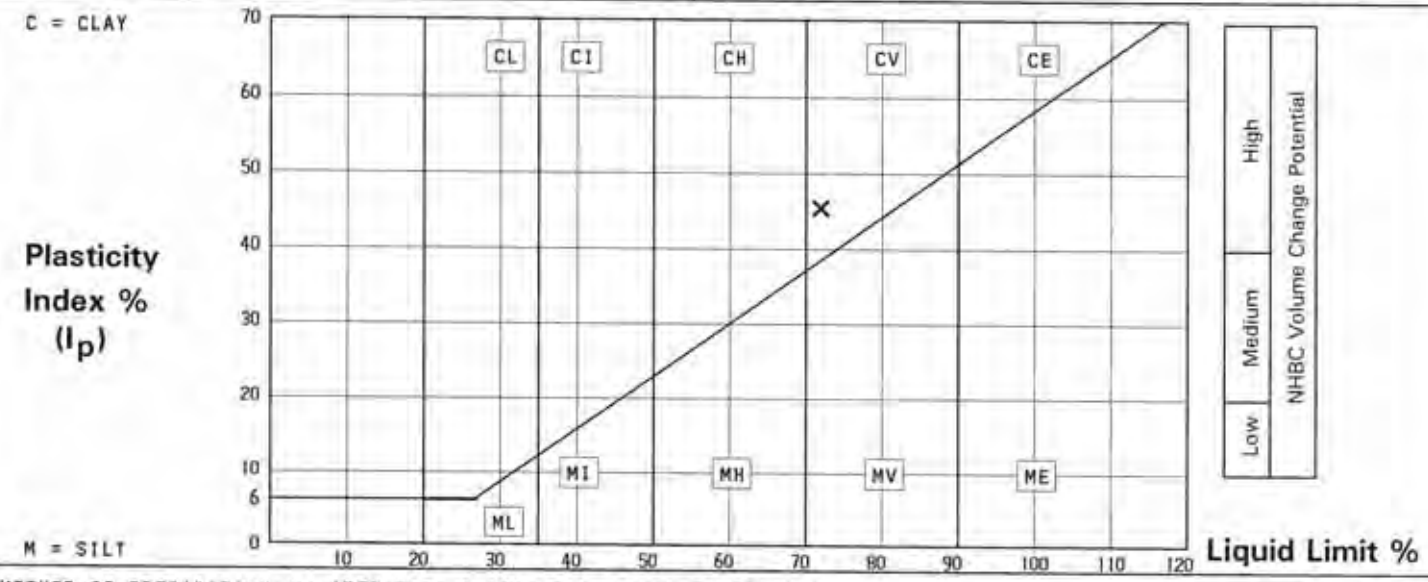
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
BH1	3.50 -4.00	B1	28	Stiff extremely closely fissured yellowish brown CLAY with occasional grey veining	

PREPARATION

Method of Preparation	Specimen from Natural Soil
Sample retained 0.425 sieve	(Assumed) 0 %
Corrected moisture content for material passing 0.425mm	%
Curing Time	24 Hours

Liquid Limit	72 %
Plastic Limit	27 %
Plasticity Index	45 %
Liquidity Index	0.02
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 6 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

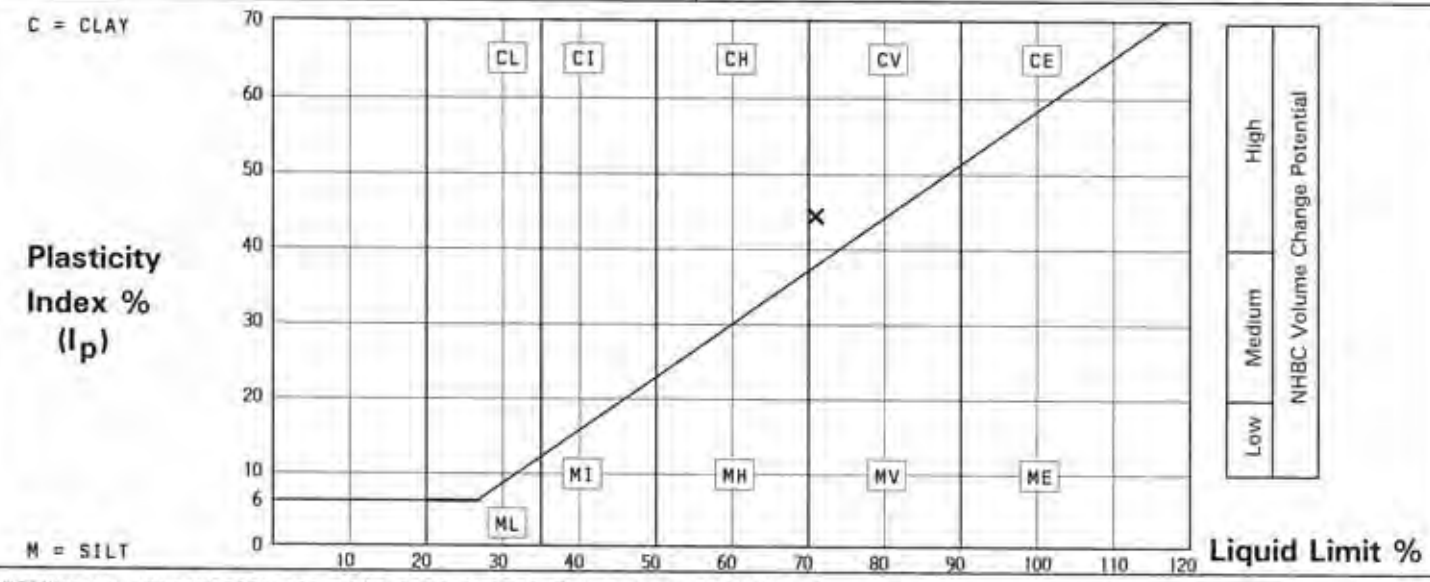
UKAS TESTING 0998

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
BH1	8.50 -9.00	B3	27	Very stiff extremely closely fissured dark yellowish brown CLAY with rare grey veining and occasional selenite crystals	Oven dried at a maximum of 80°C due to presence of selenite

PREPARATION

Method of Preparation	Specimen from Natural Soil	Liquid Limit	71 %
Sample retained 0.425 sieve	(Assumed) 0 %	Plastic Limit	27 %
Corrected moisture content for material passing 0.425mm	%	Plasticity Index	44 %
Curing Time	24 Hours	Liquidity Index	0.00
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 7 of 12

Contract UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

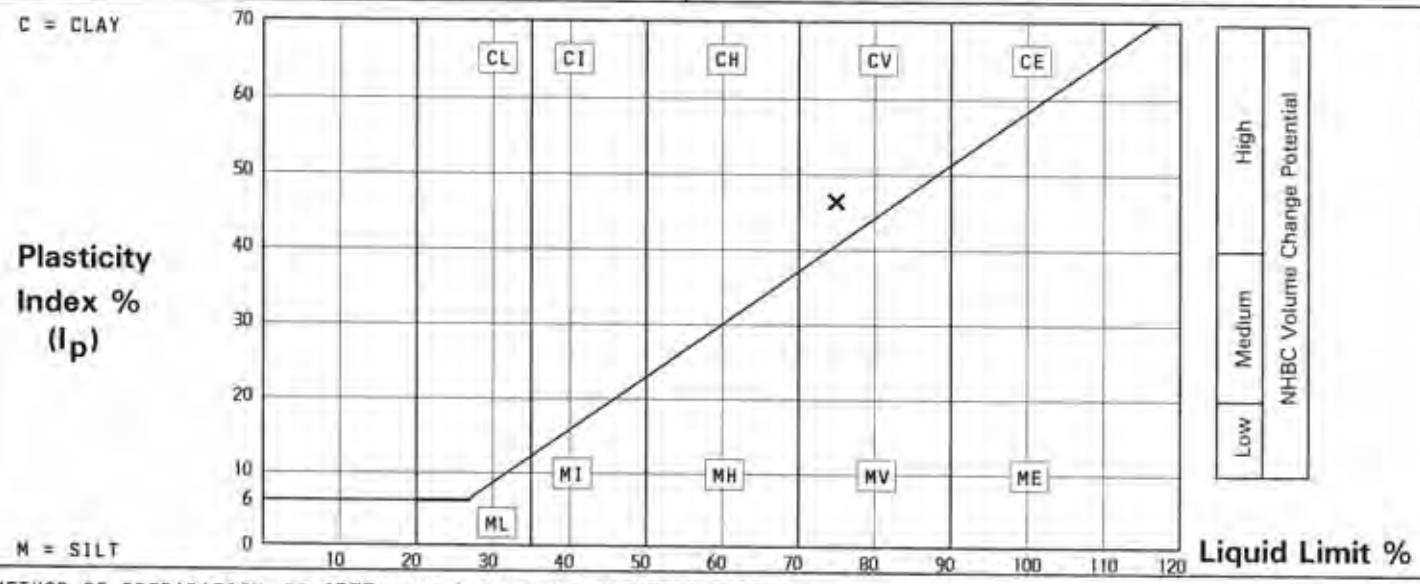
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
BH1	12.00 -12.50	B4	28	Very stiff extremely closely fissured dark greyish brown CLAY with rare shell debris	

PREPARATION

Method of Preparation	Specimen from Natural Soil
Sample retained 0.425 sieve (Assumed)	0 %
Corrected moisture content for material passing 0.425mm	%
Curing Time	24 Hours

Liquid Limit	75 %
Plastic Limit	29 %
Plasticity Index	46 %
Liquidity Index	-0.02
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 8 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Lateral Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	MOHRS CIRCLE ANALYSIS Cu (kPa)	MOHRS CIRCLE ANALYSIS ∅ (degrees)	Description
BH1	5.00	UT3	26	1.99	1.58	101	220	110			Stiff (High strength) extremely closely fissured yellowish brown CLAY with partings of orange silt and selenite crystals
BH1	10.00	UT5	26	1.99	1.58	202	353	176			Very stiff (Very high strength) extremely closely fissured yellowish brown CLAY with rare grey veining and selenite crystals
BH1	15.00	UT7	27	1.99	1.57	301	288	144			Stiff probably very stiff (Very high strength) extremely closely fissured dark greyish brown CLAY with partings of dark grey silt fine shell debris and calcareous casts

METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4.2 & 8 PART 2:1990:7.2 PART 7:1990:8.3

METHOD OF TEST : BS 1377:PART 2:1990:3 Determination of Moisture Content 1990:7 Determination of Density
:PART 7:1990:8 Undrained Shear Strength 1990:9 Multi-stage test
Note Multi-stage test used when specimen has granular content / behaviour and length of specimen precludes the taking of 3 x 100mm dia by 200mm long specimens.

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

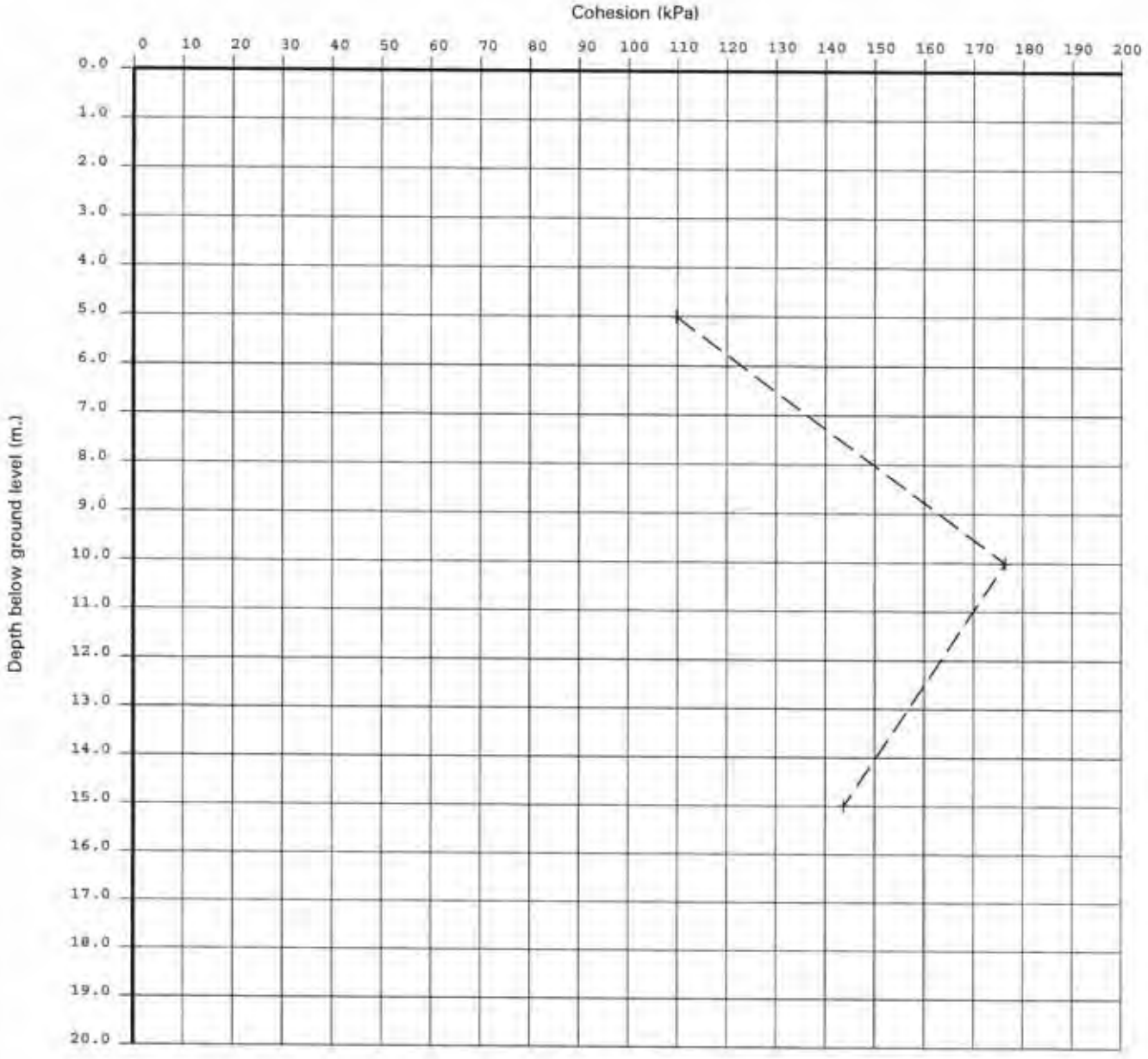
ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 9 of 12

Contract
UK14.1681 - Hargrave Place, Camden.

Serial No.
S28169

Cohesion (kPa) vs Depth below ground level (m.).



Key to Data Points	+ : BH1							

SPTPLOT

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No.: S28169

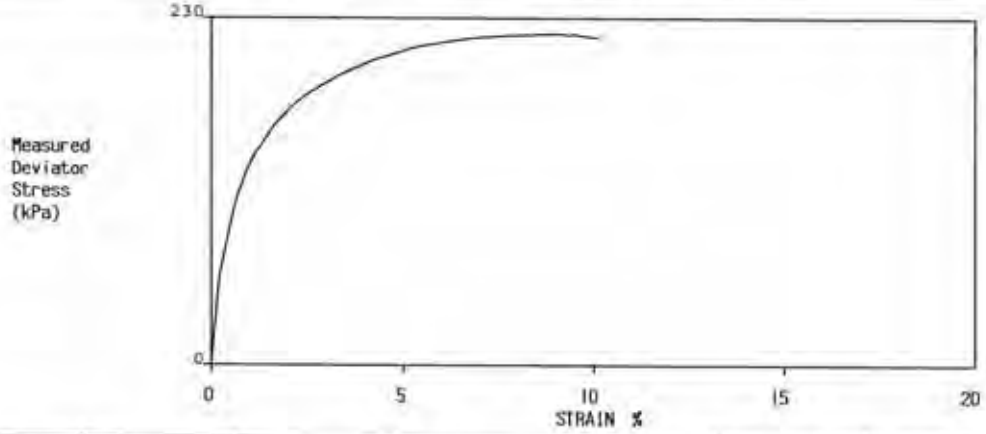
UKAS TESTING 0998

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
BH1	5.00	UT3	Stiff (High strength) extremely closely fissured yellowish brown CLAY with partings of orange silt and selenite crystals	Oven dried at a maximum of 80°C due to presence of selenite

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m) 5.02	199.8	102.9	3315	26	1.99	1.58

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at Failure	Measured Cell Pressure $\sigma 3$ (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress $\sigma 1 - \sigma 3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma 1 - \sigma 3)_f$ (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI °
	101	8.9	0.6	/	220	110		

METHOD OF PREPARATION: BS 1377:PART 1:1990:

METHOD OF TEST : BS 1377:PART 7:1990:8 Definitive Method. 1990:9 Multi-stage loading

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Tested in Vertical Orientation.
UKAS Calibration – loads from 0.2 to 10kN.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 11 of 12

Contract: UK14.1681 - Hargrave Place, Camden.

Serial No.: S28169

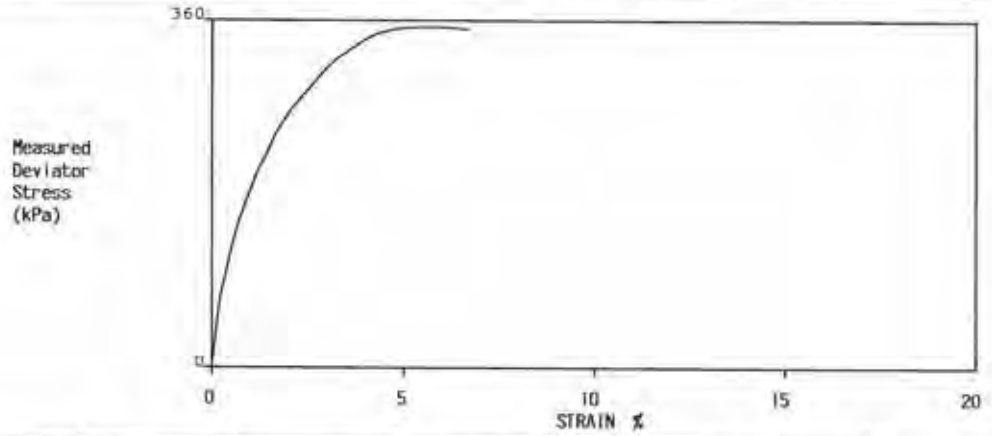
UKAS TESTING 0998

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
BH1	10.00	UT5	Very stiff (Very high strength) extremely closely fissured yellowish brown CLAY with rare grey veining and selenite crystals	Oven dried at a maximum of 80°C due to presence of selenite

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m) 10.15	155.8	103.0	2582	26	1.99	1.58

TEST INFORMATION — Rate of Strain 1.2 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at Failure	Measured Cell Pressure $\sigma 3$ (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress $\sigma 1 - \sigma 3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma 1 - \sigma 3)_f$ (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI °
	202	5.9	0.4	/	353	176		

METHOD OF PREPARATION: BS 1377:PART 1:1990:

METHOD OF TEST : BS 1377:PART 7:1990:8 Definitive Method. 1990:9 Multi-stage loading

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Tested in Vertical Orientation.
UKAS Calibration - loads from 0.2 to 10kN.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

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Contract UK14.1681 - Hargrave Place, Camden.

Serial No. S28169

UKAS TESTING 0998

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

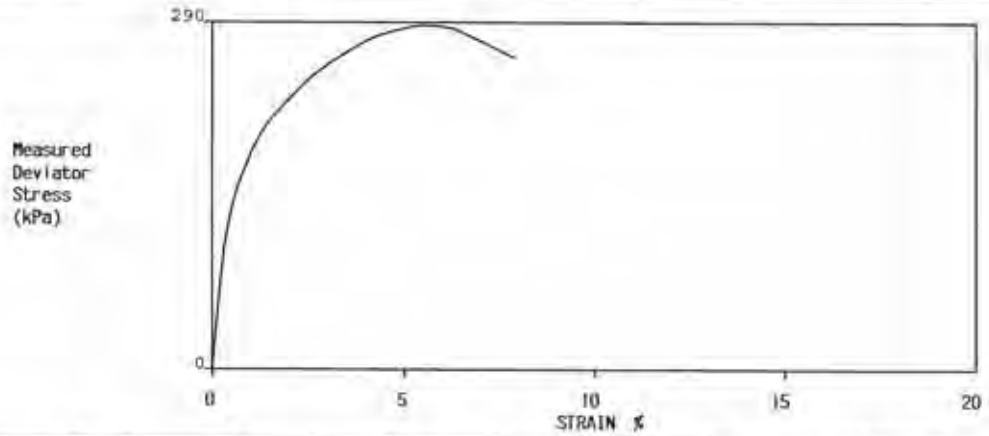
Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
BH1	15.00	UT7	Stiff probably very stiff (Very high strength) extremely closely fissured dark greyish brown CLAY with partings of dark grey silt fine shell debris and calcareous casts	

Initial Specimen

Depth of Top of Specimen (m): 15.06

Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
199.6	102.7	3300	27	1.99	1.57

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at Failure	Measured Cell Pressure $\sigma 3$ (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress $\sigma 1 - \sigma 3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma 1 - \sigma 3)_f$ (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI °
	301	5.7	0.4	/	288	144		

METHOD OF PREPARATION: BS 1377:PART 1:1990:

METHOD OF TEST : BS 1377:PART 7:1990:8 Definitive Method. 1990:9 Multi-stage loading

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Tested in Vertical Orientation.
UKAS Calibration - loads from 0.2 to 10kN.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

SPTR7GS

APPENDIX E

Summary of Tier I Screening

EPS Tier 1 Qualitative Risk Assessment

Generic Assessment Criteria - Residential Land Use

Contaminant	Tier 1 Soil Targets			Tier 1 Groundwater Targets	
	Human Health	Controlled Waters		Controlled Waters	
		LGwRP	HGwRP	LGwRP	HGwRP
Unit		**mg/kg**		**ug/l**	
Arsenic	32	n/c	n/c	50	10
Cadmium	10	n/c	n/c	5	5
Chromium	3000	n/c	n/c	250	50
Chromium VI	4.3	n/c	n/c	n/c	n/c
Copper	2330	n/c	n/c	28	28
Mercury	170	n/c	n/c	1	1
Nickel	130	n/c	n/c	200	50
Lead	200	n/c	n/c	250	10
Selenium	350	n/c	n/c	10	10
Zinc	3750	n/c	n/c	500	500
Benzene	0.33	0.252	0.008	30	1
Toluene	6.10E+02	1.17	1.17	50	50
Ethylbenzene	3.50E+02	15.0	10.0	300	200
Xylene	2.30E+02	0.885	0.885	30	30
MTBE	-	0.138	0.0276	75	15
Benzo(a)Pyrene	8.30E-01	10	1.44	0.7	0.1
Napthalene	1.50E+00	0.934	0.02	10	0.1
Dibenz(ah)anthracene	7.60E-01	n/c	n/c	n/c	n/c
Aliphatic C5-C6	3.00E+01	5.27	1.05	50	10
Aliphatic C6-C8	7.30E+01	23.2	4.64	50	10
Aliphatic C8-C10	1.90E+01	175	35.1	50	10
Aliphatic C10-C12	9.30E+01	1380	276	50	10
Aliphatic C12-C16	7.40E+02	27500	5490	50	10
Aliphatic C16-C35	4.50E+04	3.46E+06	6.91E+05	50	10
Aromatic C8-C10	2.70E+01	8.74	1.75	50	10
Aromatic C10-C12	6.90E+01	13.8	2.76	50	10
Aromatic C12-C16	1.40E+02	27.5	5.5	50	10
Aromatic C16-C21	2.50E+02	86.9	17.4	50	10
Aromatic C21-C35	8.90E+02	690	138	50	10

Notes:
LGwRP - Low Groundwater Resource Potential
HGwRP - High Groundwater Resource Potential
>SOL - GAC exceeds solubility saturation limit
n/c - not calculated

Tier 1 Soil Targets
Targets for Human Health have been taken from available Soil Guideline Values (SGVs), derived using standard sandy loam soil with 6% SOM. For contaminants where SGVs are not currently available, GACs from LQM & CIEH '*Generic Assessment Criteria for Human Health Risk Assessment - 2nd edition (2009)*' derived using standard sandy loam soil with 1% SOM were used as alternatives. The SGV for lead has now been withdrawn and in this case it has been considered most approrpiate to use the Category 4 Screening Level (C4SL) issued by DEFRA in December 2009. For sites where ground conditions differ significantly from sandy loam or site-specific SOM and pH are available, the Tier 1 human health targets may be revised.
Targets for Controlled waters have been derived using EA Remedial Targets Worksheet (v3.1) - using standard Sandy Loam ground conditions as described in Science Report SC050021/SR3, assuming no degradation for a 10m compliance distance with criteria of EQS or UKDWS for LGwRP and HGwRP respectively (see notes for Tier 1 GW targets)

Tier 1 Groundwater Targets
For LGwRP, targets have been taken as Freshwater EQS where available. For Ethylbenzene and BaP the WHO Health limit has been used and for MTBE and individual TPH fractions a 5 times multiplier of taste threshold and UKDWS has been taken repectively.
For HGwRP, targets have been taken as UKDWS where available, with the exception of Copper and Zinc where the EQS is lower than the DWS and therefore the EQS has been used as the groundwater target. For Ethlylbenzene the upper WHO ATO limit has been used. For Toluene and Xylene, the WHO ATO limit is higher than the EQS and so the lower value has been taken. For MTBE the taste threshold has been taken.

APPENDIX F

Methos Statement for Construction Workers Encountering Unexpected Contamination

METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen / discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment.
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered.
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken.
- Once appropriate action has been agreed and undertaken a written summary will be produced by EPS for submission to the Local Authority (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary.
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

EPS Contact Details:

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Secondary Contact	Will Evans	Director	Tel: 0781 253 9655

Email: info@epstrategies.co.uk (automatically forwarded to both of the above and office based personnel)