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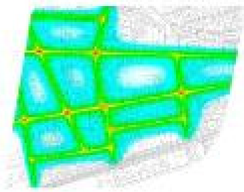
Geo-Environmental Site Investigation
102 Camley Street, London

REC Reference: 20698P1R0

Report Prepared For: Taylor Wimpey Central London

May 2014





QUALITY ASSURANCE

Issue/revision	Issue 1	Revision 1	Revision 2
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EXECUTIVE SUMMARY

Site Address	102 Camley Street, Camden, NW1 0NF
Grid Reference	529719, 183729
Site Area	0.002Ha
Current Site Use	The site comprises a yard with a single permanent building and a smaller building situated on the northern boundary.
Intrusive Ground Investigation	
Ground Conditions	**Made Ground** Encountered from ground level to a proven depth of 3.50mbgl. Red brown slightly clayey gravelly SAND. Sand is fine to coarse, gravel of fine to coarse flint, concrete, brick, clinker and organic matter. Soft yellow brown slightly sandy gravelly CLAY. Gravel of fine to coarse brick flint and clinker with low – frequent cobbles and occasional organic matter. The Made Ground was cased during the drilling of the cable percussive borehole. Obstructions and underground services noted throughout. **Bedrock** Stiff light brown thinly laminated CLAY (LONDON CLAY FORMATION) from a depth of 3.50mbgl to 29.50mbgl. Very stiff dark blue grey slightly sandy very silty CLAY (WOOLWICH AND READING BEDS) from a depth of 29.50mbgl to a depth >40.0m0bgl. **Ground Water** Groundwater was encountered as perched water (seepage) with the cable percussive borehole at a depth of 2.00mbgl.
Geotechnical Considerations	
Foundations and Construction Considerations	Given the number of storeys that the proposed development will comprise, it is likely that all structures will be piled into the London Clay Formation and Lambeth Group. A range of indicative pile capacities has been given for CFA piles. Any basement is likely to be constructed into the London Clay Formation encountered at a depth of 3.50mbgl in BH101. Given that the near surface London Clay Formation has been identified as medium to high volume change potential, consideration should be given to the potential heave effect of the London Clay Formation caused by the release of overburden pressure within the Made Ground. However, applied loads are likely to reduce this affect. Significant dewatering is unlikely to be required given that groundwater was encountered as a seepage within the Made Ground only. In addition to this and as reported in the Desk Top Study for the site, the railway lines to the east of the site are likely to have had extensive drainage installed during the construction of CTRL and this would have aided drainage in the vicinity of the site. Consideration should be given to the location of the railway and Thameslink Tunnel situated to the east of the site and the canal and towpath situated to the south. It will therefore be necessary to notify regulators of your intention to develop the site and some liaison will be required.

	Consideration should be given to the potential of unexploded ordnance within the site area and we would recommend that a full UXO desk top study is carried out prior to commencement of works. A number of obstructions and underground services were encountered during the works. These are likely to require removal or pile locations pre-probed prior to commencement of works.
Sulphate Assessment	Class DS-4, AC-3s
Revised Conceptual Site Model (CSM)	
Elevated metal and PAH concentrations were encountered within the made ground. However, given that the proposed development will include all areas to be capped by hardstanding, it is considered that the site does not present a significant risk to human health. Furthermore it is considered that the site does not present a significant risk to controlled waters. Consideration should however be given to the potential risk from the encountered concentration posed to ground workers. This should be undertaken through the COSHH assessment for development works. Such measures including good site hygiene and PPE should be considered.	

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APPENDICES

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd have been commissioned by Taylor Wimpey Central London (TWCL) to undertake a Phase II Geo-Environmental Intrusive Investigation at 102 Camley Street, Camden, NW1 0NF. A site location plan is presented in Appendix III, Figure 1.

1.2 Proposed Development

It is understood that TWCL are considering purchasing the site and constructing an 8 to 12 storey residential tower. As such, due diligence information is required in order to support this purchase.

1.3 Objectives

The objectives of the geo-environmental investigation are to:

- Undertake a preliminary stage of investigation and analysis to provide an overview of conditions identified;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors;
- Assess the geotechnical information and provide preliminary recommendations in relation to foundations; and
- Provide recommendations regarding future required works.

1.4 Limitations

The limitations of this report are presented in Appendix I.

1.5 Confidentiality

REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed.

Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 SITE INVESTIGATION

2.1 Desk Study Information

Potential contamination sources have been identified from the desk study undertaken by Arup in March 2014 (ref. Job number 601321-02). The potential contamination sources identified from this study are listed in Table 2.1 below:

Table 2.1 Summary of Potential Contaminant Sources

Risk Description	Risk Classification
Potential for contamination on site	Low to moderate (potential for asbestos)
Potential for contamination from off-site sources	Low (limited by ground conditions)
Site sensitivity	Very low (underlain with London Clay, canalised surface water, commercial urban setting)
Risk of harm to human health during development	Moderate (without mitigation) reducing to very low
Risk of harm to human health during operation	Low (without mitigation) reducing to very low
Risk of pollution to groundwater	Negligible
Risk of pollution to surface water	Very low
Risk of damage to building materials and services	Low (without mitigation) reducing to very low

All acronyms used within this report are defined in the Glossary presented in Appendix II.

2.2 Site Investigation

A ground investigation was designed based on the findings of the desk study with exploratory holes advanced to target specific potential contaminant sources summarised in Table 2.1. In addition, exploratory holes have also been advanced to provide information on baseline conditions across the site. The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

2.2.1 Scope

The scope of intrusive works, as set out within the fee proposals (Ref: 20698-14/140326/L1) and scoped by TWCL and REC, comprised the following:

- A single cable percussive boreholes to 40mbgl with Standard Penetration Testing (SPT) at regular intervals in order to obtain information on pile design for the proposed development and information on deeper ground conditions;
- A single day of window sampling (approximately 4no. holes to 5.0mbgl) spread across the external areas of the site in order to obtain information on shallow ground conditions and to assess the extent of potential contamination across the site;
- 3no. return ground gas and water levels monitoring visits with collection of groundwater samples if present;
- Collection of samples from all exploratory holes for subsequent geotechnical and chemical laboratory testing;
- In situ geotechnical hand vane testing;

- Backfilling of the locations with arisings.

Exploratory fieldwork was completed between 11th and 17th April 2014. The works are summarised in Table 2.2 below:

Table 2.2 Summary of Fieldwork

Location Hole	Potential Source/Rationale	Type	Maximum Depth (m bgl)	Monitoring Wells Response Zone (mbgl)
Cable Percussive Hole				
BH101	To obtain information on deeper ground conditions in order to provide information on piled foundations	Cable Percussive Borehole	40.0	0.5 – 3.00
Window Sample Holes				
WS101 to 105	To obtain information on shallow ground conditions for assessment of shallow foundations and confirm findings of initial conceptual site model.	Window Sample Hole	4.00	4.00 – 1.00 (WS103)

m bgl – metres below ground level.

The sample locations are illustrated in Figure 2 (Appendix III).

Soil samples for chemical analysis were collected at regular intervals in appropriate sampling containers. All samples were subsequently stored in cool boxes prior to submission to analytical laboratory. All samples were collected using appropriate PPE and sampling equipment that was cleaned at each sampling location. A detailed copy of REC Ltd sampling methodology, QA procedures and laboratory chain of custody forms can be provided upon request.

2.2.2 In-Situ Standard Penetration Testing (SPT)

In-situ geotechnical testing was conducted using the Standard Penetration Test (SPT). The results are shown in the borehole logs in Appendix IV and presented in Table 3.3.

2.2.3 In-Situ Hand Shear Vane Testing

In-situ Hand Shear Vane testing was undertaken within fine grained soils. The tests were undertaken using 33mm shear vane paddle. The results and undrained shear strengths derived from testing are presented on the Engineering Logs in Appendix IV.

2.3 Laboratory Analysis

Details of chemical and geotechnical analysis are detailed further in section 2.3.1 and 2.3.2 below.

2.3.1 Chemical Analysis

Selected soil samples were submitted for a range of chemical analysis comprising the following:

- Asbestos fibres in soil;
- CLEA Metals;

- pH and water soluble sulphate;
- Speciated Polyaromatic Hydrocarbons (PAH); and
- Total Petroleum Hydrocarbons.

Scientific Analysis Laboratories (SAL) Ltd of Braintree undertook the analytical work in accordance with their UKAS accreditation where applicable. The testing results are included in Appendix V.

2.3.2 Geotechnical Analysis

Selected soil samples were submitted to Professional Soil Laboratory (PSL) of Doncaster where the following geotechnical tests were undertaken:

- Moisture Content Determination
- Atterburg Limits Determinations (including moisture content); and:
- Quick undrained (Cu) triaxial test; and
- Chemical testing for assessing concrete aggressivity.

The testing results are included in Appendix VI and discussed in Section 5.

3.0 GROUND AND GROUNDWATER CONDITIONS

3.1 Ground Conditions

3.1.1 Summary of Ground Conditions

The ground investigation generally confirmed the published geology and identifies the strata set out in Table 3.1 below:

Table 3.1 Summary of Strata

Strata	Min Depth to Top of Strata (mbgl)	Max Depth to Top of Strata (mbgl)	Max Thickness (m)
Made Ground	Ground Level	Ground Level	Proven thickness 3.50mbgl (BH101), unproven to >4.00mbgl (WS103)
London Clay Formation (Bedrock)	3.50 (BH101)	>4.00 (WS103)	26.00 (BH101)
Lambeth Group (Woolwich and Reading Beds)	29.50 (BH101)	29.50 (BH101)	>10.50 (BH101)

3.1.1.1 Made Ground

Made Ground was encountered within all intrusive locations to a maximum proven depth of 3.50m bgl (BH101). This unit was generally variable in composition comprising both fine and coarse grained soils. Coarse grained soils typically comprised red brown slightly clayey gravelly sand, fine grained soils typically comprises very soft to soft yellow brown slightly sandy gravelly clay. Frequent cobbles of brick and occasional organic matter were also encountered.

A strong hydrocarbon odour was noted in WS103 at a depth of 3.60mbgl. Ash and clinker was also noted within the Made Ground.

3.1.1.2 Drift Deposits

No superficial deposits were encountered within any of the intrusive locations.

3.1.1.3 Bedrock

London Clay Formation

London Clay Formation was encountered at a depth of 3.50mbgl within BH101 only and persisted to a maximum depth of 29.50m bgl. The unit generally comprised stiff light brown mottled blue grey thinly laminated CLAY becoming very stiff dark grey thinly laminated CLAY with frequent selenite and mica crystals with infrequent pockets of yellow sand. Selenite and mica crystals were noted to be present from depths of 7.00m bgl to 28.00 mbgl.

No olfactory or visual evidence of potential contamination was noted within this stratum.

Lambeth Group (Woolwich and Reading Beds)

Woolwich and Reading beds of the Lambeth Group were encountered within BH101 at a depth of 29.50 persisting to a depth >40.00m bgl. The full thickness of this stratum was not proven during the investigation. This stratum typically comprised blue grey and grey very stiff grey brown silty CLAY.

No olfactory or visual evidence of potential contamination was noted within this stratum.

3.1.1.4 Obstructions and Services Encountered

A number of obstructions and services were encountered during the works which will need to be considered for the proposed development. Details are summarised in Table 3.2 below:

Table 3.2 Details of Obstructions and Services Encountered

Hole No.	Details
BH101	Mudstone band encountered between 20.00 and 20.20mbgl, although no chiselling was required in order to progress the hole.
WS101	Concrete slab encountered at 0.30mbgl.
WS102	Concrete slab encountered at 0.30mbgl.
WS103	Hole terminated due to a refusal at 4.0mbgl, likely to be a brick cobble.
WS104A	Hole terminated at 0.70mbgl due to a concrete slab encountered.
WS104B	Hole terminated at 0.70mbgl due to a concrete slab encountered.
WS104C	Hole terminated at 0.70mbgl due to a concrete slab encountered.
WS104D	Hole terminated at 0.70mbgl due to a concrete slab encountered.
WS104E	Hole terminated at 0.70mbgl due to a concrete slab encountered.
WS105	Possible underground service encountered at 0.80mbgl. High reading given on the down-the-hole magnetometer probe.

3.1.2 In-situ Testing

Undrained shear strength values of the fine grained soils were determined using in-situ SPT testing using the empirical correlation using SPT N value x 4.5 and quick undrained laboratory triaxial tests. Results of these tests are presented in Table 3.3 below.

Table 3.3 Determination of Undrained Shear Strength (Cu)

Hole No.	Depth (m bgl)	Material Field Description	SPT "N" Value	Soil Strength (BS5930)	Quick Undrained Triaxial Test Results (Cu)	Undrained Shear Strength derived from SPTs (kN/m^2)
BH101	1.20	MG	7	Low strength	N/A	32
	2.00	MG	1	Extremely low strength	N/A	5
	3.00	MG	6	Low strength	N/A	27
	4.00	LCF	8	Low strength	N/A	36
	5.00	LCF	N/A	Medium strength	54	N/A
	6.50	LCF	18	Medium strength	N/A	81
	8.00	LCF	22	High strength	N/A	99
	9.50	LCF	N/A	Very High strength	158	N/A
	11.00	LCF	27	High strength	N/A	122
	12.50	LCF	26	High strength	N/A	117
	14.00	LCF	29	High strength	N/A	131

	17.00	LCF	32	High strength	N/A	144
	18.50	LCF	31	High strength	N/A	140
	21.00	LCF	N/A	High strength	106	N/A
	22.50	LCF	42	High strength	N/A	189
	24.00	LCF	39	High strength	N/A	176
	25.50	LCF	N/A	Very high strength	214	N/A
	27.00	LCF	36	High strength	N/A	162
	28.50	LCF	38	High strength	N/A	171
	31.50	LG	47	Very high strength	N/A	212
	33.00	LG	>50	Very high strength	N/A	>225
	34.50	LG	N/A	Very high strength	274	N/A
	36.00	LG	>50	Very high strength	N/A	>225
	37.50	LG	>50	Very high strength	N/A	>225
WS103	1.20	MG	11	Medium strength	N/A	50
	2.00	MG	3	Very low strength	N/A	14
	3.00	MG	6	Low strength	N/A	27
	4.00	MG	13	Medium strength	N/A	59

Key; MG – Made Ground, LCF – London Clay Formation, LG – Lambeth Group, N/A – Not applicable

The results above indicate a broad linear increase of undrained shear strength (Cu) and depth with the London Clay Formation and Lambeth Group which is consistent with solid geology of this type. Undrained shear strengths of the solid geology determined from SPT results ranged between 36kN/m^2 at 4.0mbgl and >225kN/m^2 at 37.50mbgl. Undrained shear strength determined from laboratory tests were generally higher than those determined from SPT data, ranging between 54kN/m^2 at 5.0mbgl and 274kN/m^2 at 34.50mbgl. Both of these indicate the London Clay and Lambeth Group to range between medium and very high strength.

3.1.3 pH and Sulphate

Chemical analyses for pH and soluble sulphate content contained in Appendix VII (summarised below in Table 3.4), shows that the soils at the site generally meet Class DS-4, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3s in accordance with BRE Special Digest 1 (2005) as calculations for total potential sulphate indicates that pyrite is likely to be present if the ground is disturbed.

Table 3.4 Summary of pH and Sulphate Data

Location	Depth (m)	SO_4 in 2:1 water / soil (g/l)	pH Value	Total SO_4 (%)	Total Sulphur (%)	Total Potential Sulphate	Oxidisable Sulphides (%)	DS and ACEC Class
BH101	9.95 – 10.00	2.60	7.4	0.95	0.29	0.58	0.29	DS-3 / AC-2s
BH101	20.50	0.89	8.0	0.27	0.52	1.56	1.04	DS-4 / AC-3s
BH101	30.45 – 30.50	0.87	7.7	0.27	0.52	1.56	1.04	DS-4 / AC-3s
BH101	39.50	0.12	9.1	0.02	0.02	0.06	0.04	DS-1 / AC1s

3.1.4 Soil Plasticity

Atterberg Limits determinations, summarised in Table 3.5 below, indicate the clay to be of high to very high plasticity and moderate to high volume change potential.

Table 3.5 Summary of Plasticity Index Test Results

Location	Depth (m)	Natural Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Plasticity Index (%)	Percentage passing 425µm sieve (%)	Volume Change Potential
BH101	5.00-5.45	28	29	70	41	100	High
BH101	9.50-9.95	24	30	73	43	100	High
BH101	25.50-25.95	24	27	63	36	100	Moderate
BH101	34.50-34.95	22	26	63	37	100	Moderate

3.2 Groundwater Conditions

Groundwater was encountered during the intrusive works as minor seepages within the Made Ground in BH101 only.

In addition to this, the railway lines to the east of the site are likely to have had extensive drainage installed during the construction of CTRL and this would have aided drainage in the vicinity of the site.

3.3 Land Gas and Groundwater Monitoring

Land gas and groundwater monitoring is being carried out on site and will be reported as an addendum.

4.0 TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

REC has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying pose an unacceptable level of risk to the identified receptors.

4.1 Human Health Risk Assessment

At a Tier 1 stage the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published by the EA (Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV)) and where absent, Generic Assessment Criteria (GACs) published by LQM/CIEH (2^{nd} edition). Given the proposed development on the site it has been assumed that there will be no areas of soft landscaping, with all areas capped with building footprint of hard standing.

The results of this comparison have been summarised within Table 4.1 (overleaf).

At the end of March 2014, the Department for Environment and Rural Affairs (DEFRA) issued details of the outcome of a “Category 4 Screening Levels Project” which is aimed at providing a simple test for deciding when land is “suitable for use” from a human health perspective and more specifically for defining when land is definitely not contaminated land. Category 4 Screening Levels (C4SL's) were published for six substances which were selected based upon their ubiquity in contaminated land risk assessment and because they covered a range of exposure pathways and toxicological effects. C4SL's have been published for these six substances in relation to various land uses, namely residential (both with and without home-grown produce), allotments, commercial and two alternative types of Public Open Space.

The Category 4 Screening Levels (C4SL’s) in effect update the current approach to the assessment of contaminated land risk in relation to Part IIa but will also influence the assessment of land affected by contamination that is dealt with through the planning process. At some stage these new levels may replace the current SGV’s albeit that they prescribe different levels of risk. As the C4SL’s describe a higher level of risk than the current SGVs it suggests in general that higher levels of contamination may be acceptable before remediation is required. However, the risk posed by any particular substance is specific to any given site and its environmental setting and therefore dependent upon the outcome of site specific risk assessment.

For the purpose of this report REC has based the assessment on the current SGV's and associated CLEA approach, albeit that C4SL's, where published, have also been taken into account. In situations where SGV’s and/or C4SL's are exceeded and particularly where remediation measures are potentially required we recommend that the site is discussed with the Local Authority, and the Environment Agency where necessary, in order that definitive solutions can be agreed.

It should be noted that these changes do not apply to the assessment of risk to Controlled Waters.

Table 4.1 Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use

Determinand	Units	GAC V3	n	MC	Loc. of Ex	Pathway	Assessment
Arsenic	mg/kg	32	10	20	N/A	1	No Further Assessment
Cadmium	mg/kg	10	10	1.2	N/A	1	No Further Assessment
Lead(ii)	mg/kg	225	10	**700**	**WS103 @0.7m, 0.9m & 3.6m WS104C @0.6m BH101 @1.0m & 2.5m**	**1**	**Further Assessment**
Mercury	mg/kg	11	10	1.6	N/A	2	No Further Assessment
Nickel	mg/kg	130	10	41	N/A	1	No Further Assessment
Selenium	mg/kg	350	10	<3	N/A	1	No Further Assessment
Copper(ii)	mg/kg	2330	10	170	N/A	1	No Further Assessment
Zinc(ii)	mg/kg	3750	10	430	N/A	1	No Further Assessment
Naphthalene	mg/kg	1.5	10	0.5	N/A	2	No Further Assessment
Acenaphthylene	mg/kg	170	10	<0.1	N/A	3	No Further Assessment
Acenaphthene	mg/kg	210	10	<0.1	N/A	1	No Further Assessment
Fluorene	mg/kg	160	10	<0.1	N/A	1	No Further Assessment
Phenanthrene	mg/kg	92	10	1.2	N/A	3	No Further Assessment
Anthracene	mg/kg	2300	10	0.2	N/A	3	No Further Assessment
Fluoranthene	mg/kg	260	10	1.7	N/A	3	No Further Assessment
Pyrene	mg/kg	560	10	1.6	N/A	3	No Further Assessment
Benzo(a)Anthracene	mg/kg	3.1	10	1.2	N/A	3	No Further Assessment
Chrysene	mg/kg	6	10	2.0	N/A	3	No Further Assessment
Benzo(b/k)Fluoranthene (i)	mg/kg	5.6	10	3.1	N/A	3	No Further Assessment
Benzo(a)Pyrene	mg/kg	0.83	10	**1.8**	**WS103 @1.3m**	3	**Further Assessment**
Indeno(123-cd)Pyrene	mg/kg	3.2	10	1.7	N/A	3	No Further Assessment
Dibenzo(a,h)Anthracene	mg/kg	0.76	10	0.8	N/A	3	Further Assessment
Benzo(ghi)Perylene	mg/kg	44	10	2.0	N/A	3	No Further Assessment
TPH C_5-C_6 (aliphatic)*	mg/kg	30	10	<0.10	N/A	2	No Further Assessment
TPH C_6-C_8 (aliphatic)*	mg/kg	73	10	0.29	N/A	2	No Further Assessment
TPH C_8-C_{10} (aliphatic)*	mg/kg	19	10	5.7	N/A	2	No Further Assessment
TPH C_{10}-C_{12} (aromatic)*	mg/kg	69	10	<2	N/A	2	No Further Assessment
TPH C_{12}-C_{16} (aromatic)*	mg/kg	140	10	<2	N/A	1	No Further Assessment
TPH C_{16}-C_{21} (aromatic)*	mg/kg	250	10	14	N/A	1	No Further Assessment
TPH C_{21}-C_{35} (aromatic)*	mg/kg	890	10	75	N/A	1	No Further Assessment

Notes
Main Exposure Pathways: 1 = Soil Ingestion, 2 = Vapour Inhalation (indoor), 3 = Dermal Contact & Ingestion, 4 = Dust Inhalation.
Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.
* The Tier 1 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. REC has utilised the Tier 1 values for aliphatic compounds for the volatile and semi volatile fractions (C_5-C_{12}) and the Tier 1 values for aromatic compound for the non volatile fractions (C_{12}-C_{35}). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.
(i) Benzo (b) Fluoranthene (100mg/kg) Benzo (k) Fluoranthene (140mg/kg)

(ii) GAC based on human health criteria. Ecotoxicological assessment will be made using EA guidance (EPR 8.01) on soil spreading (Cu 135mg/kg, Zinc 200mg/kg, Pb 300mg/kg)

Referring to Table 4.1, the results of the direct comparison show that screening values have been exceeded for the following determinants:

- Lead, and;
- Benzo(a)Pyrene;

Asbestos was not detected within the four near surface soils submitted for analysis.

Elevated concentrations were identified within the made ground at three intrusive locations. Reference to the geological logs indicates the presence of clinker or ash material within these locations and as such, and with reference to industry guidance is considered to be the source of the concentrations.

The main pollution linkage in relation to the risk to human health from the identified concentrations is soil ingestion in the case of lead, and dermal contact and ingestion in the case of benzo(a)pyrene. Upon review of the identified depths of concentrations and the proposed development with the site capped with areas of hard standing, it is considered that the pollution linkage will be inactive. As such it is considered that the elevated concentrations will not present a significant risk to future residents.

The identified concentrations do however have the potential to present a significant risk to construction workers.

4.2 Controlled Waters

It is considered that the site does not present a significant risk to controlled waters due to the following:

- Classification of the underlying geology (London Clay) as unproductive strata; and
- Absence of groundwater during ground investigation.

4.3 Ground Gas

Land gas and groundwater monitoring is being carried out on site and will be assessed upon completion, presented within an addendum report.

4.4 Revised Conceptual Model

Following the completion of the intrusive site investigation, chemical analysis and risk assessment the conceptual model shown in Table 4.2 has been prepared for the site.

Table 4.2 Revised Conceptual Site Model

Source	Exposure Pathway	Potential Receptor	Probability of Exposure	Discussion of Pollutant Linkage
Human Health and Controlled Waters				
Localised concentrations within the made ground: - Lead - Benzo(a)Pyrene	Dermal contact and ingestion	Future Residents	Low	Given the proposed hardstanding across the site any potential pollution linkage will be inactive.
		Construction Workers	Low	Consideration of the risk should be undertaken during the COSHH assessment for site developments. Measures should include good site hygene and PPE.

5.0 GEOTECHNICAL ASSESSMENT

5.1 Proposed Development

It is understood that TWCL are considering purchasing the site and constructing an 8 to 12 storey residential tower. No other details, (i.e. such as proposed loadings), were provided at the time of writing. Albeit, it has been assumed that the proposed development will be piled and is likely to comprise a basement for car parking.

5.2 Summary of Ground Conditions

In summary, ground conditions encountered comprised Made Ground to a depth of circa 3.50mbgl overlying London Clay formation to a depth of 29.50mbgl overlying the Woolwich and Reading Beds of the Lambeth Group to depths of >40.00mbgl.

Groundwater was encountered during the intrusive works only as a minor seepages within the Made Ground.

5.3 Foundation Conditions

Piled Foundations

Given the proposed number of storeys for the proposed development a piled foundation solution is likely to be adopted for the proposed scheme.

In consideration of prevailing ground conditions alone, a choice of pile type of various lengths and diameters can be designed to bear into the strata encountered beneath the site. However general site conditions, environs and proximity to adjacent extant structures and foundations are all influential in the choice of piling system.

It should be noted that for CFA piles there are certain practical constraints when considering the incorporation of large amounts of pile reinforcement and also their emplacement in the ground with potential obstructions. There is also the risk of collapse or necking of the pile bore should the flights be withdrawn and the hole left unsupported. For these reasons it is recommended that a competent and experienced specialist piling contractor undertakes all piling works, adopting appropriate controls and that their advice should be sought at the earliest opportunity.

For preliminary purposes the following initial pile carrying capacities have been calculated in Table 5.1. When undertaking these preliminary calculations the following parameters have been used:

- Undrained shear strength (Cu) derived from SPT's and quick undrained triaxial tests as summarised in Tables 3.3, ranging between 54kN/m^2 at 5.0mbgl and >2225kN/m^2 at 37.50mbgl;
- Assumed ground conditions of Made Ground to 3.50mbgl, overlying London Clay Formation to 29.50mbgl, overlying the Woolwich and Reading Beds to a depth greater than >40.00mbgl;
- No positive or negative skin friction attributed from the Made Ground;
- Adhesion Factor of 0.45 for CFA piles;
- Factors of safety of 1.5 on side resistance and 3 on base resistance; and,
- Global Factor of safety of 2.5.

Table 5.1 Preliminary Pile Carrying Capacity

Depth	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
10.0	115	190	280
20.0	340	540	750
30.0	650	1020	1400
40.0	1050	1620	2230

On the basis of the illustrative calculations, settlements are likely to be within permissible tolerances. Working capacities for pile groups should be assessed when final design details are known, although for preliminary design purposes it is likely that piles spaced at least 3 x pile diameter from other piles in any group will behave as single piles.

The above calculated values are presented for indicative purposes only. Where preliminary and working pile load tests are undertaken it may be appropriate to reduce Safety Factors. Pile design should be undertaken by a specialist contractor in order to confirm the indicative capacities detailed above and in order to select the most efficient piling method for ground conditions of this type. The piling contractor should be made aware that the cable percussive borehole was cased to a depth of 4.00mbgl due to collapse of the Made Ground.

A mudstone band was identified within the cable percussive borehole at a depth of 20.00mbgl and was approximately 0.20m in thickness. The piling contractor should be made aware of potential obstructions in the ground at the earliest opportunity in the design process.

5.4 Ground Floor Slabs

Given the presence of high volume changed potential soils encountered in the near surface, a significant thickness of Made Ground and that piled foundations are likely to be utilised, a suspended floor slab should be adopted. This would also negate the possibility of differential settlements between the floor and the shell of the proposed development.

5.5 Basements

Given the ground conditions encountered it is likely that any basement structure will pass through the Made Ground and bear onto the London Clay Formation encountered at a depth of 3.50mbgl in BH101. Given that the near surface London Clay Formation has been identified as medium to high volume change potential consideration should be given to the potential heave effect of the London Clay Formation caused by the release of overburden pressure within the Made Ground. However, applied loads are likely to reduce this affect.

The depth to which heave effects would occur and the timing of such movements in consideration of any proposed construction programme should be carefully and fully considered as associated movements may be a key design consideration for basement floor slabs and piles within the area of influence.

Based on current groundwater level data, it is unlikely that basements will encounter significant groundwater. Albeit, that some minor seepages and perched water maybe encountered in the Made Ground.

Given that limited construction area is available, consideration will need to be given to the adoption of retaining structures to resist lateral soil pressures in the short term. This is more pertinent given the location of the railway to the east of the site and the canal and towpath to the south of the site.

5.6 Concrete Durability

Based upon the results of the chemical analyses summarised in Table 3.4 it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-4, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3s in accordance with the recommendations provided in BRE Special Digest 1 (2005).

5.7 Excavations

Site observations indicated that excavations should be feasible within the near surface with normal machinery, albeit obstructions may need to be broken out and services re-routed. The Made Ground was variable in composition so may need to be supported.

It is recommended that where man entry into excavations deeper than 1.20m is required that either; excavations are shored or that the sides of excavations are battered to a safe angle of repose.

Excavations for structures such as basements should be protected during construction in order to avoid potentially excessive softening caused by wet weather or potential shrink and swell caused by periods of hot weather.

5.8 Construction Activity and Inspection

The following activities and inspections should be incorporated in to the site works:

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations;
- Consideration should be given to the location of the railway and Thameslink Tunnel situated to the east of the site and the canal and towpath situated to the south. It will therefore be necessary to notify regulators of your intention to develop the site;
- Consideration should be given to the potential of unexploded ordnance within the site area and we would recommend that a full UXO desk top study is carried out prior to commencement of works;
- Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA 97 utilised; and
- The presence of potential contamination and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan and should include measures to design out the risks, reduce their impact and finally the use of Personnel Protective Equipment (PPE).

END OF REPORT

APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Ltd and the Client as indicated in Section 1.2.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. In addition to the above REC Ltd note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Additional contamination may be identified following the removal of the buildings or hard standing.

7. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

8. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

9. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

10. This report presents an interpretation of the geotechnical information established by excavation, observation and testing. Whilst every effort is made in interpretative reporting to assess the soil conditions over the Site it should be noted that natural strata vary from point to point and that man made deposits are subject to an even greater diversity. Groundwater conditions are dependent on seasonal and other factors. Consequently there may be conditions present not revealed by this investigation.

11. REC can not be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.

12. Rather, this investigation has been undertaken to provide a preliminary characterisation of the existing sub-surface geotechnical characteristics and make up and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

13. This investigation has been undertaken to reasonably characterise existing sub-surface conditions and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY

TERMS

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
Sp.TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

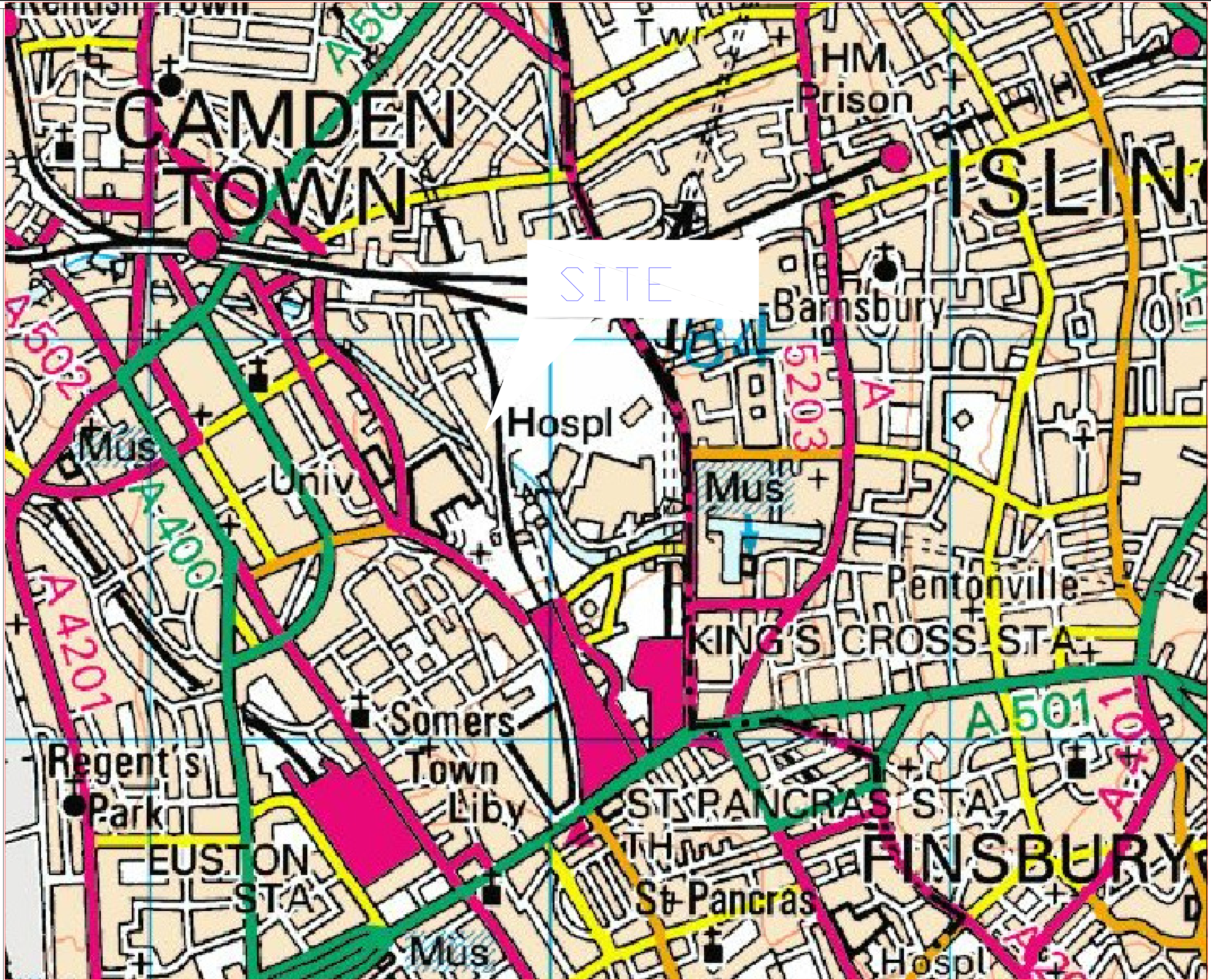
m	Metres
km	Kilometres
%	Percent
%v/v	Percent volume in air
mb	Milli Bars (atmospheric pressure)
l/hr	Litres per hour
µg/l	Micrograms per Litre (parts per billion)
ppb	Parts Per Billion
mg/kg	Milligrams per kilogram (parts per million)
ppm	Parts Per Million

mg/m^3	Milligram per metre cubed
m bgl	Metres Below Ground Level
m bcl	Metre Below Cover Level
mAOD	Metres Above Ordnance Datum (sea level)
kN/m^2	Kilo Newtons per metre squared
µm	Micro metre

APPENDIX III

FIGURES

Key



N

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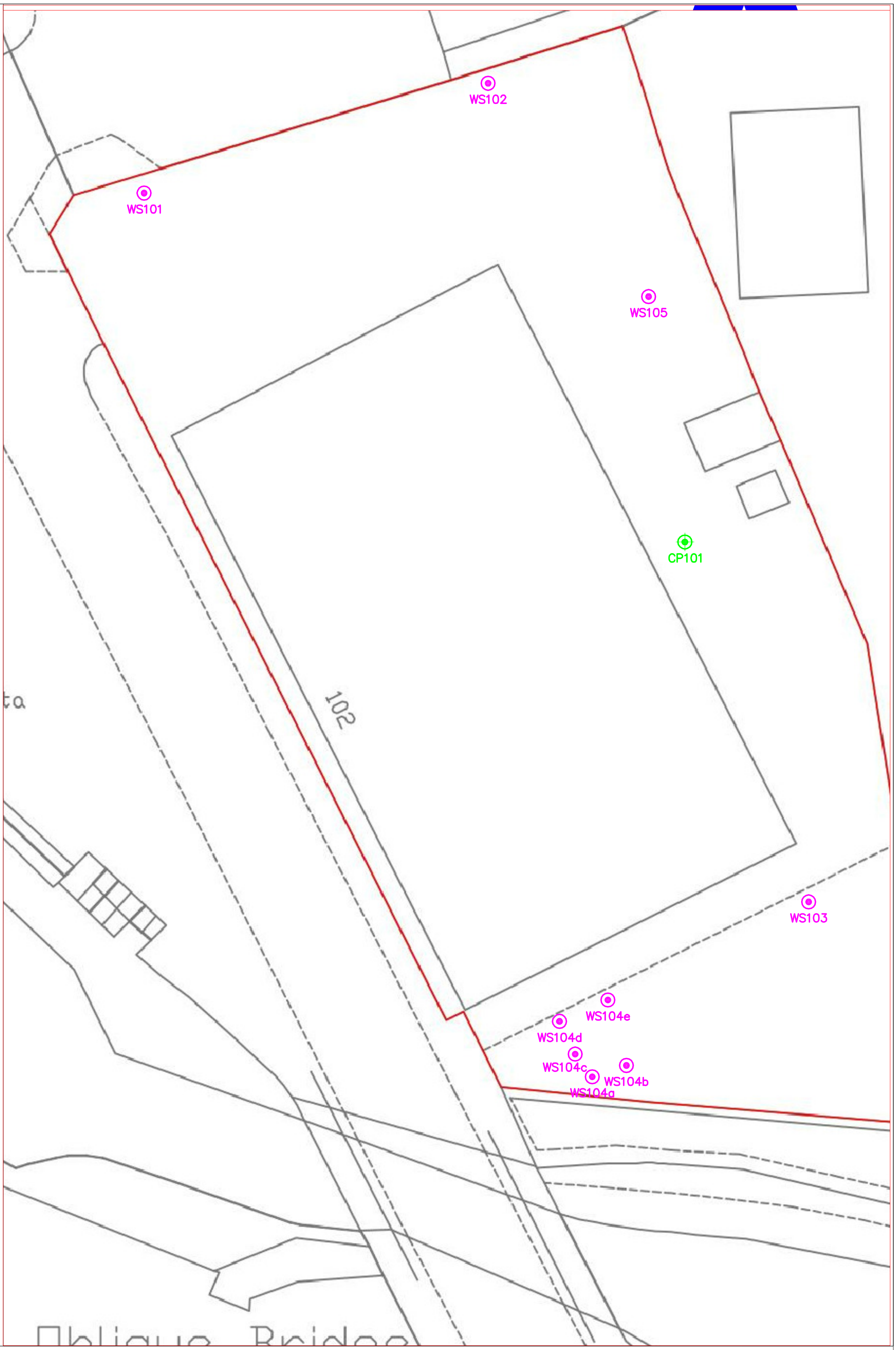
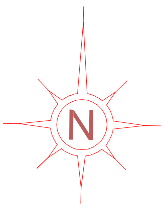
Job Title:	Client:	Job No: 20698	Date:	Notes:	Drawing Title:
102 Camley Street, Camden	Taylor Wimpey (Central London)	Drawn by: W.Spraggs	20-05-14		Figure 1 - Site Location Plan
		Approved by: S.Phillips			
		Scale: NTS			

Key

WS101
Approximate Window Sample Probehole Location

CP101
Approximate Cable Percussive Borehole Location





Job Title:	Client:		DATE	Drawing Title:
102 Camley Street, Camden	Taylor Wimpey (Central London)	Job No: 20698	20-05-14	Figure 2 - Site Plan
		Drawn by: W.Spraggs		
		Approved by: S.Phillips		
		Scale: 1:1000 @ A4		

Notes:

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APPENDIX IV

REC EXPLORATORY HOLE LOGS

Borehole Log

Borehole No.	**BH101**	Sheet 1 of 4	
Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Hole Type: CP
Location: Camden		Level:	Scale: 1:50
Client: Taylor Wimpey (Central London)		Dates: 14/04/2014 - 17/04/2014	Logged By: **WS**

Samples and In Situ Testing

Depth (m)	Type	Results	Depth (m)
			0.20
0.40	ES		
0.50	D		
			0.80
1.00	D		
1.00	ES		
1.20	S	N=7 (2,1/2,2,2,1)	1.20
1.20	D		1.30
1.50	D		
1.80	ES		
2.00	D		2.00
2.00	S	N=1 (1,0/1,0,0,0)	
2.50	ES		2.50
3.00	S	N=6 (1,1/1,1,2,2)	3.00
3.00	D		3.00
3.10	ES		
3.50	D		3.50
		HVP=60	
4.00	S	N=8 (1,1/1,2,3,2)	4.00
4.00	D		
4.50	D		
		HVP=80	
5.00	U	Ublow=35	
5.45	D		
		HVP=120	5.50
6.00	D		
		HVP=90	
6.50	D		6.50
6.50	S	N=18 (2,2/4,4,5,5)	
		HVP=120	7.00
7.50	D		
8.00	D		8.00
8.00	S	N=22 (2,4/4,6,6,6)	
		HVP=110	
9.50	U	Ublow=55	
9.95	D		

Stratum Description

Concrete hardstanding.
(MADE GROUND)

Red-brown gravelly SAND. Sand is fine to coarse. Gravel of angular to rounded, fine to coarse flint, concrete, brick and occasional clinker.
(MADE GROUND)

Red-brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel of angular to rounded, fine to coarse brick, flint, clinker and occasional black organic matter.
(MADE GROUND)

Soft dark yellow-brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel of angular to rounded, fine to coarse flint, brick, clinker with low cobble content and occasional organic matter.
(MADE GROUND)

Very soft slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel of angular fine to coarse bricks, flint and frequent cobble sized brick.
(MADE GROUND)

Soft to firm dark-yellow to blue-grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel of angular, fine to medium brick and clinker with occasional black organic matter.
(MADE GROUND)

Firm brown mottled light grey thinly laminated CLAY with occasional yellow cemented sand grains. At 4.5m firm to stiff.
(LONDON CLAY FORMATION)

..... at 5.0m bgl becoming stiff and medium strength.

Stiff light brown mottled blue-grey thinly laminated CLAY.
(LONDON CLAY FORMATION)

Stiff brown thinly laminated CLAY with frequent fine to medium selenite and mica crystals.
(LONDON CLAY FORMATION)

....at 9.50m bgl, becoming very high strength.

Continued on next sheet

Remarks
Groundwater seepage encountered at 2.0m bgl, probably perched. No chiselling carried out. 50mm diameter installation at 3.0m bgl. 200mm diameter to 40.0m bgl. Cased to 4.20m bgl.

Borehole Log

REC Resource & Environmental Consultants Ltd			Borehole No. **BH101** Sheet 2 of 4
Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Hole Type CP
Location: Camden		Level:	Scale 1:50
Client: Taylor Wimpey (Central London)		Dates: 14/04/2014 - 17/04/2014	Logged By **WS**

Depth (m)	Type	Results	Depth (m)	Level (m)	Stratum Description
10.00	D				
		HVP=115			
11.00	D		11.00		Stiff mid grey-brown thinly laminated CLAY with frequent fine to medium selenite and mica crystals, rare yellow sand pockets. (LONDON CLAY FORMATION)
11.00	S	N=27 (5,5/6,6,7,8)	11.00		
		HVP=105			
11.50	D				
		HVP=110			
12.50	D		12.50		
12.50	S	N=26 (3,3/5,6,8,7)			
		HVP=130	13.00		Very stiff dark grey thinly laminated CLAY with frequent fine selenite crystals and rare pockets of yellow fine sand. From 18.5m no pockets of yellow fine sand. (LONDON CLAY FORMATION)
13.00	D				
		HVP=130			
14.00	S	N=29 (3,5/6,6,7,10)	14.00		
14.00	D				
14.50	D				
15.50	U	Ublow=45			
15.95	D				
16.00	D				
		HVP=130			
17.00	D		17.00		
17.00	D				
17.00	S	N=32 (4,5/7,8,8,9)			
17.50	D				
		HVP=130			
18.50	D		18.50		
18.50	S	N=31 (4,5/7,8,8,8)			
19.50	D				
20.00	D		20.00		

Continued on next sheet

Remarks
Groundwater seepage encountered at 2.0m bgl, probably perched. No chiselling carried out. 50mm diameter installation at 3.0m bgl. 200mm diameter to 40.0m bgl. Cased to 4.20m bgl.

Borehole Log

Borehole No.	BH101
Sheet	Sheet 3 of 4
Project Name	102 Camley Street
Project No.	20698
Co-ords	-
Hole Type	CP
Location	Camden
Level	
Scale	1:50
Client	Taylor Wimpey (Central London)
Dates	14/04/2014 - 17/04/2014
Logged By	WS

Samples and In Situ Testing

Depth (m)	Type	Results
20.50	D	
21.00	U	Ublow=50
21.45	D	
22.00	D	
22.50	D	
22.50	S	N=42 (6,8/10,9,11,12)
23.50	D	
24.00	D	
24.00	S	N=39 (3,5/8,9,10,12)
25.00	D	
25.50	U	Ublow=60
25.95	D	
26.50	D	
27.00	S	N=36 (5,6/8,8,10,10)
27.00	D	
28.00	D	
28.50	D	
28.50	S	N=38 (6,7/8,9,10,11)
29.50	D	
30.00	U	Ublow=75

Strata

Depth (m)	Level (m)	Stratum Description
		Strong dark grey very fine grained MUDSTONE with frequent fine selenite crystals. (LONDON CLAY FORMATION)
20.20		Very stiff dark grey thinly laminated CLAY with frequent fine selenite crystals. (LONDON CLAY FORMATION) ... at 21.0m bgl becoming high strength. .... at 25.50 becoming very high strength.
22.50		
24.00		
27.00		
28.00		Very stiff dark grey silty CLAY with occasional fine white shells and fine selenite crystals. (LONDON CLAY FORMATION)
28.50		
29.50		Very stiff dark blue-grey slightly sandy very silty CLAY with frequent fine mica crystals. (WOOLWICH AND READING BEDS)

Scale: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Continued on next sheet

Remarks
Groundwater seepage encountered at 2.0m bgl, probably perched. No chiselling carried out. 50mm diameter installation at 3.0m bgl. 200mm diameter to 40.0m bgl. Cased to 4.20m bgl.

Borehole Log

Borehole No. **BH101** Sheet 4 of 4			
Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Hole Type CP
Location: Camden		Level:	Scale 1:50
Client: Taylor Wimpey (Central London)		Dates: 14/04/2014 - 17/04/2014	Logged By WS

Back fill / Well	Water Strikes	Depth (m)	Type	Results	Depth (m)	Level (m)	Stratum Description	
		30.45	D					
		31.00	D					31
		31.50 31.50	S D	N=47 (7,9/10,11,12,14)	31.50			
								32
		32.50	D					
		33.00 33.00	D S	N=50 (8,10/10,14,14,12)	33.00			33
		34.00	D		34.00		Very stiff, very high strength dark grey blue CLAY with frequent mica crystals and selenites. (WOOLWICH AND READING BEDS)	34
		34.50	U	Ublow=90				
		34.95	D					35
		35.80	D		35.80		Very stiff brown mottled grey slightly silty CLAY. (WOOLWICH AND READING BEDS)	
		36.00 36.00	D S	N=50 (5,10/12,14,16,8)	36.00 36.00		Very stiff blue-grey thinly laminated silty CLAY. (WOOLWICH AND READING BEDS)	36
		37.00	D					37
					37.20		Very stiff grey mottled brown orange silty CLAY. (WOOLWICH AND READING BEDS)	
		37.50 37.50	D S	N=50 (6,8/12,14,20,4)	37.50			
								38
		38.50	D					
		39.00	U					39
		39.45	D	Ublow=75				
					40.00		End of borehole at 40.00 m	40

Remarks
Groundwater seepage encountered at 2.0m bgl, probably perched. No chiselling carried out. 50mm diameter installation at 3.0m bgl. 200mm diameter to 40.0m bgl. Cased to 4.20m bgl.

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Borehole No. **WS101** Sheet 1 of 1
Location: Camden		Level:	Hole Type WS
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014	Scale 1:25
			Logged By **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.15			Concrete hardstanding. (MADE GROUND)
					0.30			Red-sandy GRAVEL. Sand is fine to coarse. Gravel of angular fine to coarse brick and occasional cobble sized bricks. (MADE GROUND)
					0.40			Flat Concrete Slab. (MADE GROUND)
								End of borehole at 0.40 m

1
2
3
4
5

Remarks
Location terminated due to concrete slab, unable to progress due to potential services. No groundwater encountered.

Borehole Log

Borehole No.	WS102
Sheet	1 of 1
Project Name:	102 Camley Street
Project No.	20698
Co-ords:	-
Hole Type	WS
Location:	Camden
Level:	
Scale	1:25
Client:	Taylor Wimpey (Central London)
Dates:	11/04/2014 - 11/04/2014
Logged By	WS

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.15			Concrete hardstanding. (MADE GROUND)
					0.30			Red-sandy GRAVEL. Sand is fine to coarse. Gravel of angular fine to coarse brick and occasional cobble sized bricks. (MADE GROUND)
					0.40			Flat Concrete Slab. (MADE GROUND)

End of borehole at 0.40 m

Remarks
Location terminated due to concrete slab, unable to progress due to potential services. No groundwater encountered.

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -
Location: Camden		Level:
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014

Borehole No. **WS103**
Sheet 1 of 1
Hole Type: WS
Scale: 1:25
Logged By: **WS**

Samples Depth (m)	Type	Results	Depth (m)	Level (m)	Stratum Description
			0.20		Very soft brown slightly clayey sandy SILT. Sand is fine to medium grained. (MADE GROUND)
0.50	ES				
			0.60		Soft brown slightly silty slightly sandy gravelly CLAY. Sand is fine to medium. Gravel of angular, fine to coarse brick and clinker. (MADE GROUND)
0.70	ES				
0.90	ES		0.90		Red-brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel of angular, fine to coarse brick, metal and ash. (MADE GROUND)
1.20	S	N=11 (3,3/5,4,1,1)	1.20		
1.30	ES		1.20		Soft grey slightly silty slightly gravelly sandy CLAY. Sand is fine to medium. Gravel of angular fine to coarse brick, flint, clinker, ash, clay pipe and rare cobble sized siltstone. (MADE GROUND)
1.80	ES				
2.00	S	N=3 (1,0/1,1,0,1)	2.00		
			2.30		Soft to firm light grey sandy gravelly CLAY. Sand is fine to coarse. Gravel of angular, fine to coarse brick, ash and clinker. A layer of ash at 1.8-1.9m. (MADE GROUND)
2.50	ES				
3.00	S	N=6 (1,0/1,2,1,2)	3.00		
3.60	ES				
4.00	S	N=13 (3,3/3,3,3,4)	4.00		
			4.00		Very soft black-grey sandy CLAY with occasional fine brick and frequent ash, clinker and organic matter. Sand is fine to coarse. Strong hydrocarbon odour at 3.6m. (MADE GROUND)
					End of borehole at 4.00 m

Remarks
Hole terminated due to a brick refusal at 4.0m bgl. No groundwater encountered.

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Borehole No. **WS104A** Sheet 1 of 1
Location: Camden		Level:	Hole Type WS
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014	Scale 1:25
			Logged By **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			Grass cover - Soft light brown slightly clayey sandy SILT with occasional rootlets. Sand is fine. (MADE GROUND)
					0.70			Brown slightly clayey slightly silty gravelly SAND. Sand is fine to coarse. Gravel of angular, fine to coarse flint, clinker and brick. (MADE GROUND)
					0.70			Flat Concrete Slab. (MADE GROUND)
								End of borehole at 0.70 m

1
2
3
4
5

Remarks
Hole terminated at 0.70m bgl due to a concrete slab encountered. No groundwater encountered. Re-setup on WS104B,

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Borehole No. **WS104B** Sheet 1 of 1
Location: Camden		Level:	Hole Type WS
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014	Scale 1:25
			Logged By **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								Grass cover - Brown slightly clayey silty SAND. Sand is fine to medium with occasional rootlets and fine, flint and clinker. (MADE GROUND)
					0.45			Light brown-yellow slightly silty gravelly SAND. Sand is fine to coarse. Gravel of angular, fine to coarse brick, flint, clinker and ash. (MADE GROUND)
					0.70			Flat Concrete Slab. (MADE GROUND)
					0.70			End of borehole at 0.70 m

Remarks
Concrete slab encountered at 0.70m bgl, hole terminated, moved onto WS104C. No groundwater encountered.

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -
Location: Camden		Level:
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014

Borehole No. **WS104C**
Sheet 1 of 1
Hole Type: WS
Scale: 1:25
Logged By: **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.40	ES		0.40			Grass cover - soft brown slightly sandy silty CLAY. Clay is friable. Sand is fine to medium grained with occasional rootlets and angular coarse brick and flint. (MADE GROUND)
		0.60	ES		0.70			Brown - black slightly clayey silty gravelly SAND. Sand is fine to medium. Gravel of angular, fine to coarse flint, brick, clinker and concrete. (MADE GROUND)
					0.70			Flat Concrete Slab.
								End of borehole at 0.70 m

Remarks
Concrete slab encountered at 0.70m bgl, hole terminated. Moved onto WS104D. No groundwater encountered.

REC Resource & Environmental Consultants Ltd	Borehole Log	Borehole No. **WS104D** Sheet 1 of 1

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -	Hole Type WS
Location: Camden		Level:	Scale 1:25
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014	Logged By **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			Grass cover - Soft light brown slightly clayey sandy SILT with occasional rootlets. Sand is fine. (MADE GROUND)
					0.70			Brown slightly clayey slightly silty gravelly SAND. Sand is fine to coarse. Gravel of angular, fine to coarse flint, clinker and brick. (MADE GROUND)
					0.70			Flat Concrete Slab. (MADE GROUND)
								End of borehole at 0.70 m

1

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4

5

Remarks

Concrete slab encountered at 0.70m bgl, hole terminated. Moved onto WS104E. No groundwater encountered.

Borehole Log

Project Name: 102 Camley Street	Project No. 20698	Co-ords: -
Location: Camden		Level:
Client: Taylor Wimpey (Central London)		Dates: 11/04/2014 - 11/04/2014

Borehole No. **WS104E**
Sheet 1 of 1
Hole Type: WS
Scale: 1:25
Logged By: **WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			Grass cover - Soft light brown slightly clayey sandy SILT with occasional rootlets. (MADE GROUND)
					0.70			Brown slightly clayey slightly silty gravelly SAND. Sand is fine to coarse. Gravel of angular, fine to coarse flint, clinker and brick. (MADE GROUND)
					0.70			Flat Concrete Slab. (MADE GROUND)
								End of borehole at 0.70 m

Depth scale: 1, 2, 3, 4, 5

Remarks
Concrete slab encountered at 0.70m bgl, hole terminated. No groundwater encountered.

Borehole Log

Borehole No.	**WS105**
Sheet	1 of 1
Project Name:	102 Camley Street
Project No.	20698
Co-ords:	-
Hole Type	WS
Location:	Camden
Level:	
Scale	1:25
Client:	Taylor Wimpey (Central London)
Dates:	11/04/2014 - 11/04/2014
Logged By	**WS**

Back fill / Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.15			Concrete hardstanding. (MADE GROUND)
					0.30			Red-sandy GRAVEL. Gravel of angular fine to coarse brick. Sand is fine. (MADE GROUND)
		0.40	ES		0.60			Black gravelly SAND. Sand is coarse. Gravel of sub-angular to sub-rounded fine to coarse ash and clinker. (MADE GROUND)
		0.70	ES		0.80			Soft brown slightly sandy gravelly CLAY. Sand is fine to coarse grained. Gravel of angular, fine to coarse flint, brick and clinker. MADE GROUND

End of borehole at 0.80 m

1
2
3
4
5

Remarks
Service encountered at 0.80m bgl, location terminated. No groundwater encountered.

APPENDIX V

CHEMICAL TESTING RESULTS

Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: 389314-1 Supplement 1

Date of Report: 14-May-2014

Customer: Resource Environmental Consultants Ltd
Environment House
Segensworth Business Centre
Segensworth Road (West)
Fareham
PO15 5RQ

Customer Contact: Mr Will Spraggs

Customer Job Reference: 20698
Customer Site Reference: 102 Camley Street, Camden
Date Job Received at SAL: 15-Apr-2014
Date Analysis Started: 28-Apr-2014
Date Analysis Completed: 01-May-2014

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

UKAS TESTING
1650

Report checked
and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Mr Ben Wilding
Laboratory Manager

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
REC002 (SE)

				SAL Reference	389314 001	389314 002	389314 003	389314 004	389314 005
				Customer Sample Reference	WS103 @ 0.70m	WS103 @ 0.90m	WS103 @ 1.30m	WS103 @ 2.50m	WS103 @ 3.60m
				Date Sampled	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Arsenic	T257	A40	2.0	mg/kg	**20**	**17**	**18**	**17**	**15**
Cadmium	T257	A40	0.1	mg/kg	**0.2**	**0.1**	**0.2**	**0.1**	**0.1**
Chromium	T257	A40	0.5	mg/kg	**20**	**18**	**23**	**20**	**27**
Copper	T257	A40	2	mg/kg	**100**	**72**	**41**	**55**	**69**
Lead	T257	A40	2	mg/kg	**700**	**460**	**91**	**570**	**410**
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	**1.4**	**1.6**
Nickel	T257	A40	0.5	mg/kg	**22**	**21**	**25**	**22**	**23**
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T257	A40	2	mg/kg	**110**	**99**	**89**	**100**	**100**
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
pH	T7	A40			**8.1**	**8.1**	**8.2**	**7.9**	**7.7**
SO4(Total)	T102	A40	0.01	%	**0.13**	**0.12**	**0.11**	**0.16**	**0.15**
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	**0.03**	**0.09**	**0.02**	**0.30**	**0.39**
Phenols(Mono)	T4	AR	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
REC002 (SE)

				SAL Reference	389314 006	389314 007	389314 008	389314 009	389314 010
				Customer Sample Reference	WS104C @ 0.60m	WS105 @ 0.40m	BH101 @ 1.0m	BH101 @ 3.10m	BH101 @ 2.50m
				Date Sampled	11-APR-2014	11-APR-2014	14-APR-2014	14-APR-2014	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Arsenic	T257	A40	2.0	mg/kg	**14**	**11**	**19**	**16**	**20**
Cadmium	T257	A40	0.1	mg/kg	**0.4**	**0.3**	**1.2**	**0.2**	**0.2**
Chromium	T257	A40	0.5	mg/kg	**21**	**9.3**	**29**	**32**	**25**
Copper	T257	A40	2	mg/kg	**170**	**69**	**140**	**53**	**71**
Lead	T257	A40	2	mg/kg	**240**	**48**	**260**	**150**	**240**
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	**19**	**33**	**41**	**26**	**25**
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T257	A40	2	mg/kg	**170**	**350**	**430**	**110**	**110**
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	<1
pH	T7	A40			**8.2**	**8.6**	**10.1**	**7.9**	**8.2**
SO4(Total)	T102	A40	0.01	%	**0.14**	**0.07**	**0.21**	**0.20**	**0.17**
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	**0.02**	**0.06**	**0.34**	**0.46**	**0.13**
Phenols(Mono)	T4	AR	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
Suite C

				SAL Reference	389314 001	389314 002	389314 003	389314 004	389314 005
				Customer Sample Reference	WS103 @ 0.70m	WS103 @ 0.90m	WS103 @ 1.30m	WS103 @ 2.50m	WS103 @ 3.60m
				Date Sampled	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
TPH (C5-C6)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C6-C8)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	**0.29**	<0.10
TPH (C8-C10)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	**5.7**	**0.13**
TPH (C10-C12)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C12-C16)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C16-C21)	T219	AR	2	mg/kg	<2	<2	**14**	<2	<2
TPH (C21-C35)	T219	AR	2	mg/kg	<2	<2	**75**	<2	<2

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
Suite C

				SAL Reference	389314 006	389314 007	389314 008	389314 009	389314 010
				Customer Sample Reference	WS104C @ 0.60m	WS105 @ 0.40m	BH101 @ 1.0m	BH101 @ 3.10m	BH101 @ 2.50m
				Date Sampled	11-APR-2014	11-APR-2014	14-APR-2014	14-APR-2014	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
TPH (C5-C6)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C6-C8)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C10-C12)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C12-C16)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C16-C21)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2
TPH (C21-C35)	T219	AR	2	mg/kg	<2	<2	<2	<2	<2

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE)

				SAL Reference	389314 001	389314 002	389314 003	389314 004	389314 005
				Customer Sample Reference	WS103 @ 0.70m	WS103 @ 0.90m	WS103 @ 1.30m	WS103 @ 2.50m	WS103 @ 3.60m
				Date Sampled	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.5**	**0.2**	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.2**	**0.3**	<0.1
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.2**	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.7**	**0.2**	<0.1
Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.6**	**0.1**	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.2**	**0.1**	<0.1
Chrysene	T16	AR	0.1	mg/kg	<0.1	<0.1	**2.0**	**0.1**	<0.1
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	**3.1**	**0.2**	<0.1
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.8**	<0.1	<0.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	**1.7**	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.8**	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	<0.1	**2.0**	<0.1	<0.1
PAH(total)	T16	AR	0.1	mg/kg	<0.1	<0.1	**18**	**1.1**	<0.1

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil

Total and Speciated USEPA16 PAH (SE)

				SAL Reference	389314 006	389314 007	389314 008	389314 009	389314 010
				Customer Sample Reference	WS104C @ 0.60m	WS105 @ 0.40m	BH101 @ 1.0m	BH101 @ 3.10m	BH101 @ 2.50m
				Date Sampled	11-APR-2014	11-APR-2014	14-APR-2014	14-APR-2014	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	**0.1**	<0.1	<0.1	<0.1	<0.1
Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T16	AR	0.1	mg/kg	**0.5**	<0.1	<0.1	<0.1	<0.1

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil

PCBs EC7 (SE)

				SAL Reference	389314 008
				Customer Sample Reference	BH101 @ 1.0m
				Date Sampled	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
PCB BZ#101	T16	AR	20	µg/kg	<20
PCB BZ#118	T16	AR	20	µg/kg	<20
PCB BZ#138	T16	AR	20	µg/kg	<20
PCB BZ#153	T16	AR	20	µg/kg	<20
PCB BZ#180	T16	AR	20	µg/kg	<20
PCB BZ#28	T16	AR	20	µg/kg	<20
PCB BZ#52	T16	AR	20	µg/kg	<20

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil

Miscellaneous

				SAL Reference	389314 002	389314 006	389314 007	389314 008
				Customer Sample Reference	WS103 @ 0.90m	WS104C @ 0.60m	WS105 @ 0.40m	BH101 @ 1.0m
				Date Sampled	11-APR-2014	11-APR-2014	11-APR-2014	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**				
Asbestos ID	T27	A40			Asbestos not detected -	Asbestos not detected -	Asbestos not detected -	Asbestos not detected -

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
BTEX

				SAL Reference	389314 002	389314 004	389314 005	389314 006	389314 007	389314 010
				Customer Sample Reference	WS103 @ 0.90m	WS103 @ 2.50m	WS103 @ 3.60m	WS104C @ 0.60m	WS105 @ 0.40m	BH101 @ 2.50m
				Date Sampled	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014	11-APR-2014	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**						
Benzene	T54	AR	1	µg/kg	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
EthylBenzene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	**3**	**2**	<1	**1**	<1
O Xylene	T54	AR	1	µg/kg	<1	**1**	<1	<1	**1**	<1
Toluene	T54	AR	1	µg/kg	<1	**1**	<1	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1	<1	<1	<1

SAL Reference: 389314
Project Site: 102 Camley Street, Camden
Customer Reference: 20698

Soil Analysed as Soil
BRE SD1 (SE)

				SAL Reference	389314 011
				Customer Sample Reference	BH101 @ 1.80m
				Date Sampled	14-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l	<0.01
(Water soluble) Cl-	T710	A40	0.01	g/l	**0.01**
Magnesium	T112	A40	1	mg/l	**1**
(Water soluble) NO3	T710	A40	0.01	g/l	<0.01
pH	T7	A40			**9.2**
SO4(Total)	T102	A40	0.01	%	**0.10**
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	**0.09**
Sulphur (total)	T6	A40	0.01	%	**0.05**

Index to symbols used in 389314-1 Supplement 1

Value	Description
A40	Assisted dried < 40C
AR	As Received
13	Results have been blank corrected.
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Report re-issued to amend Customer Reference
Samples for TPH, PAH, PCB and Phenol analysis have been analysed exceeding recommended holding times. It is possible therefore that the results provided may be compromised

Method Index

Value	Description
T4	Colorimetry
T102	ICP/OES (HCl extract)
T245	ICP/OES(Aqua Regia Extraction)
T112	ICP/OES (SIM)(Water Extract)
T16	GC/MS
T27	PLM
T82	ICP/OES (Sim)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T710	2:1 Extraction / Discrete Analyser
T54	GC/MS (Headspace)
T257	ICP/OES (SIM) (Aqua Regia Extraction)

T7	Probe
T219	GC/FID (SE)
T6	ICP/OES

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Arsenic	T257	A40	2.0	mg/kg	U	001-010
Cadmium	T257	A40	0.1	mg/kg	U	001-010
Chromium	T257	A40	0.5	mg/kg	U	001-010
Copper	T257	A40	2	mg/kg	U	001-010
Lead	T257	A40	2	mg/kg	U	001-010
Mercury	T245	A40	1.0	mg/kg	U	001-010
Nickel	T257	A40	0.5	mg/kg	U	001-010
Selenium	T257	A40	3	mg/kg	U	001-010
Zinc	T257	A40	2	mg/kg	U	001-010
Chromium VI	T82	A40	1	mg/kg	N	001-010
pH	T7	A40			U	001-011
SO4(Total)	T102	A40	0.01	%	U	001-011
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	U	001-011
Phenols(Mono)	T4	AR	0.5	mg/kg	U	001-010
Cyanide(Total)	T4	AR	1	mg/kg	U	001-010
TPH (C5-C6)	T54	AR	0.10	mg/kg	N	001-010
TPH (C6-C8)	T54	AR	0.10	mg/kg	N	001-010
TPH (C8-C10)	T54	AR	0.10	mg/kg	N	001-010
TPH (C10-C12)	T219	AR	2	mg/kg	U	001-010
TPH (C12-C16)	T219	AR	2	mg/kg	U	001-010
TPH (C16-C21)	T219	AR	2	mg/kg	U	001-010
TPH (C21-C35)	T219	AR	2	mg/kg	U	001-010
Naphthalene	T16	AR	0.1	mg/kg	U	001-010
Acenaphthylene	T16	AR	0.1	mg/kg	U	001-010
Acenaphthene	T16	AR	0.1	mg/kg	U	001-010
Fluorene	T16	AR	0.1	mg/kg	U	001-010
Phenanthrene	T16	AR	0.1	mg/kg	U	001-010
Anthracene	T16	AR	0.1	mg/kg	U	001-010
Fluoranthene	T16	AR	0.1	mg/kg	N	001-010
Pyrene	T16	AR	0.1	mg/kg	N	001-010
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	001-010
Chrysene	T16	AR	0.1	mg/kg	U	001-010
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	U	001-010
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	001-010
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	001-010
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	001-010
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	001-010
PAH(total)	T16	AR	0.1	mg/kg	U	001-010
PCB BZ#101	T16	AR	20	µg/kg	U	008
PCB BZ#118	T16	AR	20	µg/kg	U	008
PCB BZ#138	T16	AR	20	µg/kg	U	008
PCB BZ#153	T16	AR	20	µg/kg	U	008
PCB BZ#180	T16	AR	20	µg/kg	U	008
PCB BZ#28	T16	AR	20	µg/kg	U	008
PCB BZ#52	T16	AR	20	µg/kg	U	008
Asbestos ID	T27	A40			SU	002,006-008
Benzene	T54	AR	1	µg/kg	U	002,004-007,010
EthylBenzene	T54	AR	1	µg/kg	U	002,004-007,010
M/P Xylene	T54	AR	1	µg/kg	U	002,004-007,010
O Xylene	T54	AR	1	µg/kg	U	002,004-007,010
Toluene	T54	AR	1	µg/kg	U	002,004-007,010
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	002,004-007,010
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l	N	011
(Water soluble) Cl-	T710	A40	0.01	g/l	N	011
Magnesium	T112	A40	1	mg/l	N	011
(Water soluble) NO3	T710	A40	0.01	g/l	N	011
Sulphur (total)	T6	A40	0.01	%	U	011

APPENDIX VI

Geotechnical Testing Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

4043

Contract Number: PSL14/2054

Client's Reference: Report Date: 15 May 2014

Client Name: REC Fareham
Environment House
Segensworth Business Centre
Segensworth Road West
Fareham
PO15 5RQ

For the attention of: Will Spraggs

Contract Title: 102 Camley Street, Camden

Date Received: 28/4/2014
Date Commenced: 28/4/2014
Date Completed: 15/5/2014

Notes: **Observations and Interpretations are outside the UKAS Accreditation**

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	M Beastall (Laboratory Manager)
D Lambe (Senior Technician)	S Royle (Senior Technician)	

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH101		U	5.00-5.45	Firm brown mottled grey silty CLAY.
BH101		U	9.50-9.95	Very stiff brown silty CLAY.
BH101		U	21.00-21.45	Stiff dark grey silty CLAY.
BH101		U	25.50-25.95	Very stiff dark grey silty CLAY.
BH101		U	34.50-34.95	Very stiff dark grey silty CLAY.

PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		15/05/14		15/05/14		15/05/14
	102 CAMLEY STREET, CAMDEN.				Contract No:	PSL14/2054
					Client Ref:	20698

SUMMARY OF SOIL CLASSIFICATION TESTS

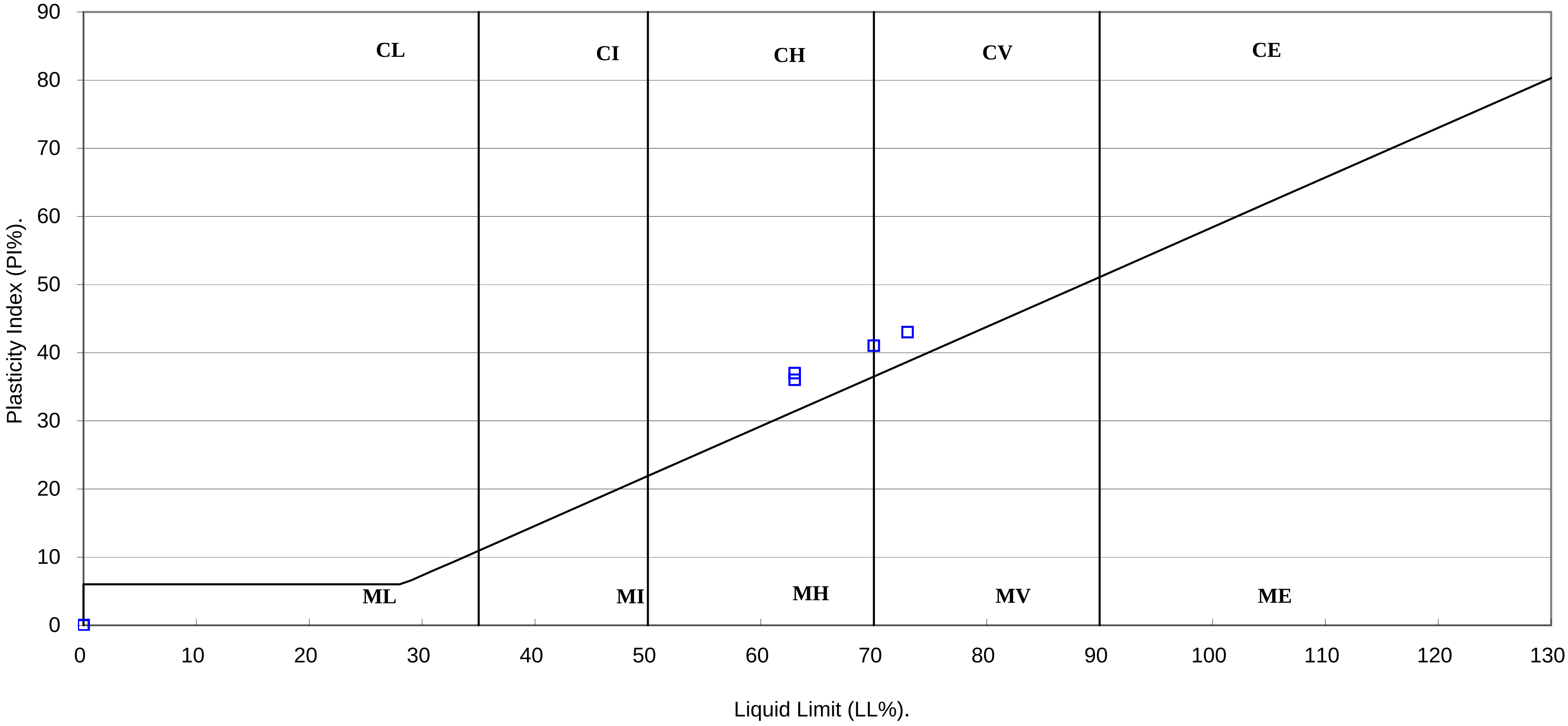
(B.S. 1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Depth (m)	Moisture Content % Clause 3.2	Bulk Density Mg/m^3 Clause 7.2	Dry Density Mg/m^3 Clause 7.2	Particle Density Mg/m^3 Clause 8.	Liquid Limit % Clause 4.3/4.4	Plastic Limit % Clause 5.	Plasticity Index % Clause 5.4	% Passing .425mm	Remarks
BH101		U	5.00-5.45	28				70	29	41	100	Very high plasticity CV.
BH101		U	9.50-9.95	24				73	30	43	100	Very high plasticity CV.
BH101		U	25.50-25.95	24				63	27	36	100	Very high plasticity CV.
BH101		U	34.50-34.95	22				63	26	37	100	High plasticity CH.

PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		15/05/14		15/05/14		15/05/14
	102 CAMLEY STREET, CAMDEN.				Contract No:	PSL14/2054
					Client Ref:	20698

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		15/05/14		15/05/14		15/05/14
	102 CAMLEY STREET, CAMDEN.				Contract No:	PSL14/2054
					Client Ref:	20698

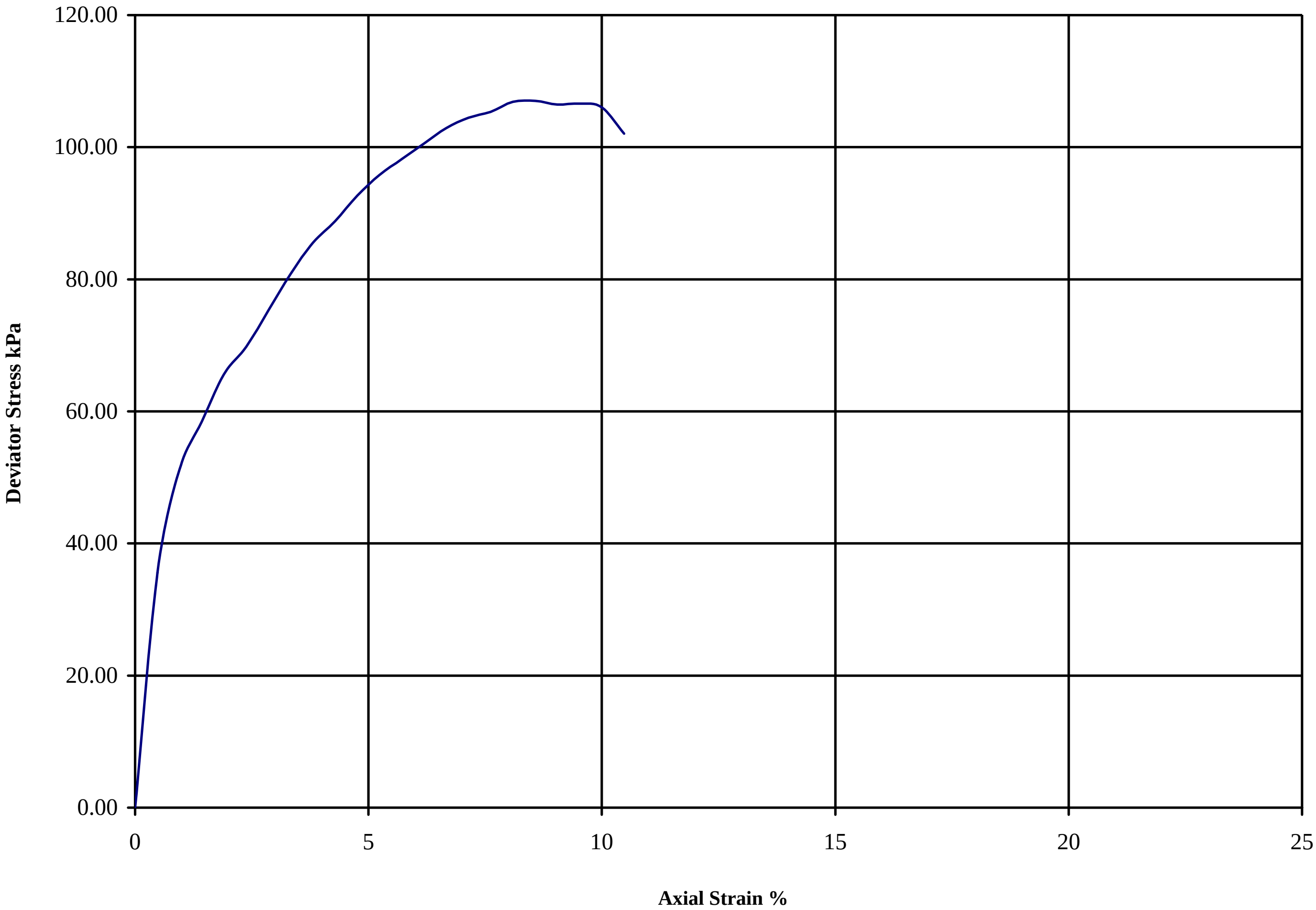
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH101 **Depth (m):** 5.00-5.45

Sample Number: **Sample Type:** U



Diameter (mm):	102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed			
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	28	1.97	1.54	100	107	54	8.6	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
[signature]	15/05/14	[signature]	15/05/14

PSL
Professional Soils Laboratory

102 CAMLEY STREET, CAMDEN.

Contract No: PSL14/2054

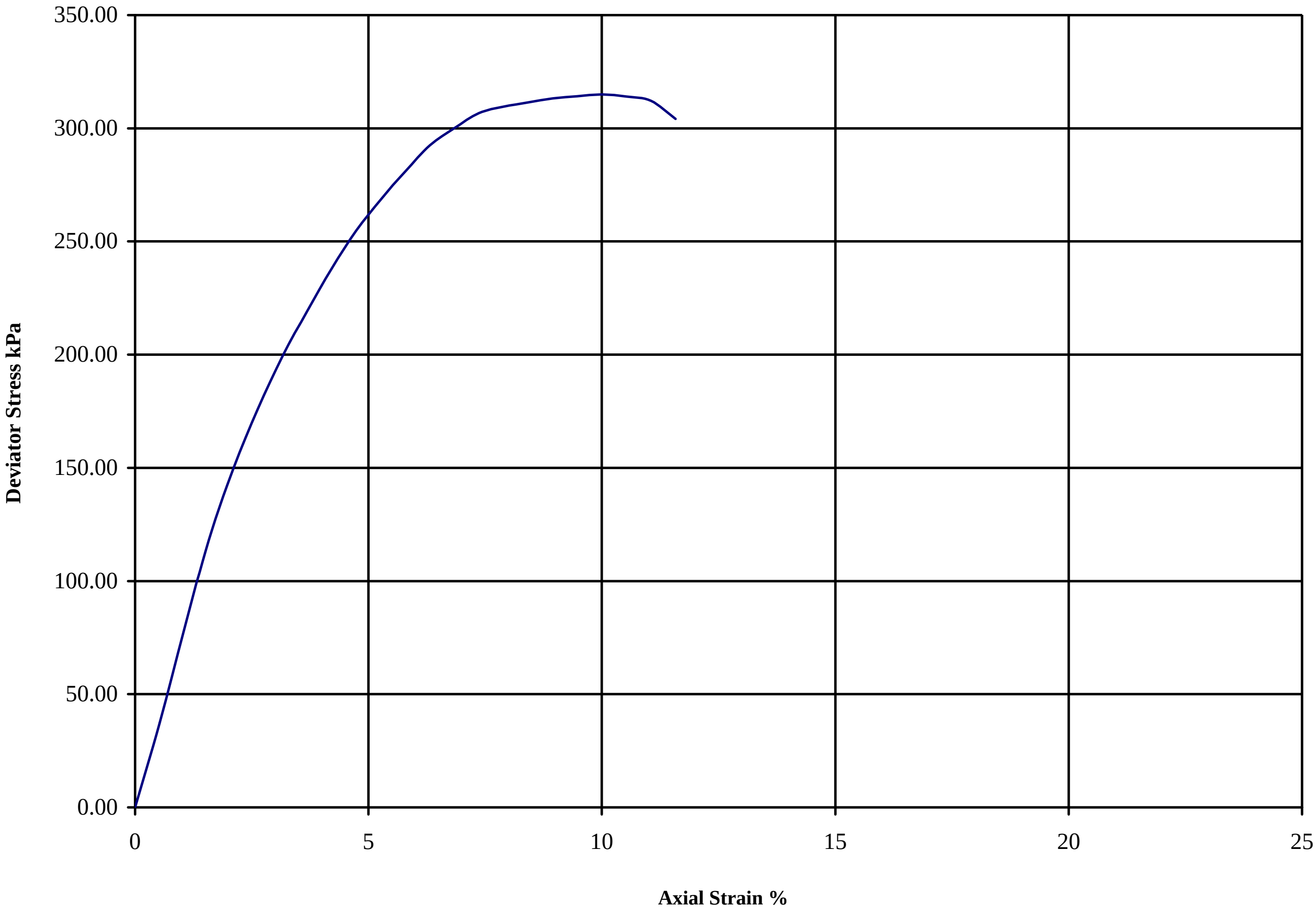
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH101** **Depth (m):** **9.50-9.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):	102.0	Height (mm):		190.0	Test:	100 mm Single Stage. Undisturbed			
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	1.94	1.57	190	315	158	10.0	Brittle	Sample taken from top of tube Rate of strain = 2.1 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	15/05/14		15/05/14

PSL Professional Soils Laboratory	**102 CAMLEY STREET, CAMDEN.**	**Contract No: PSL14/2054**

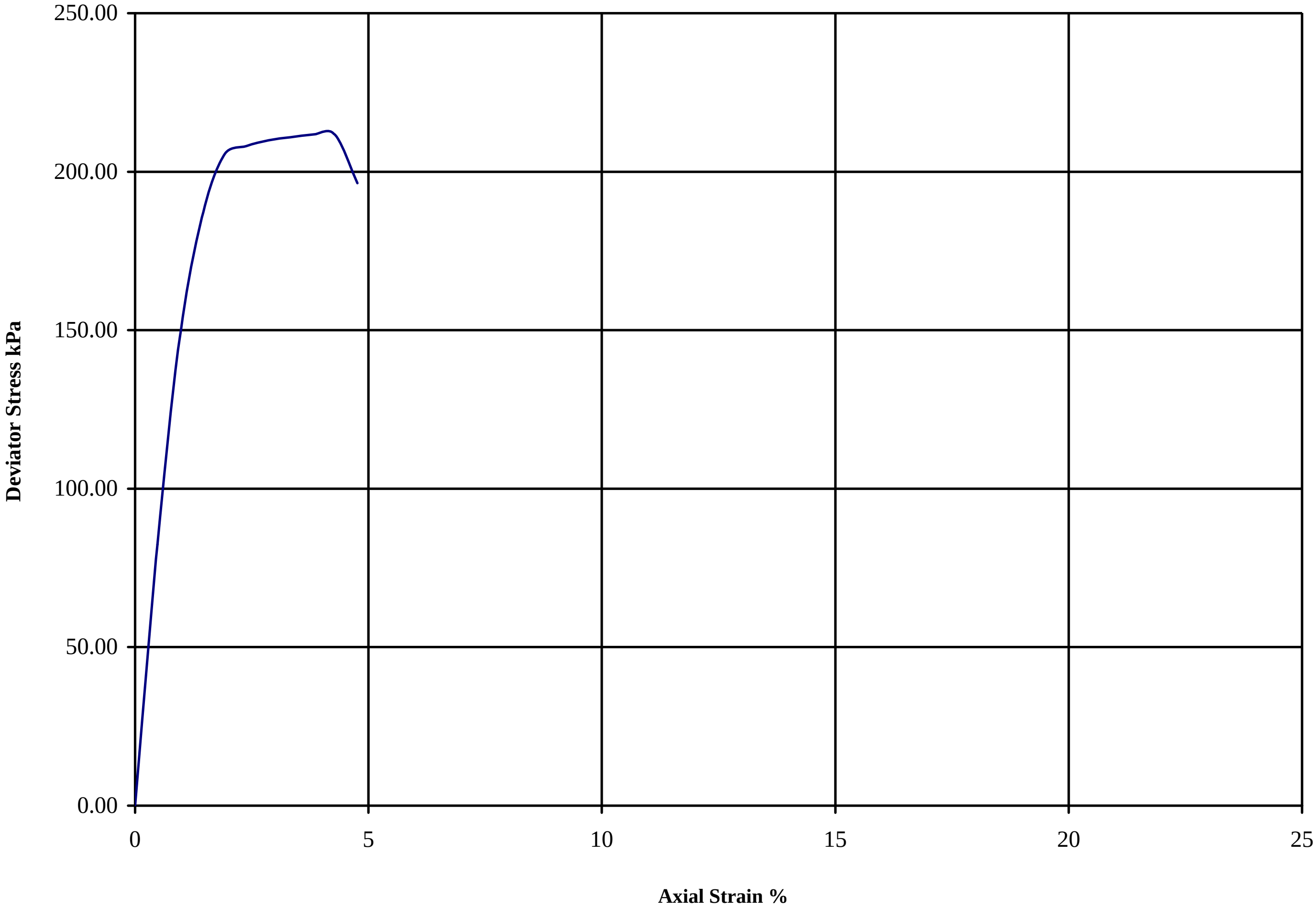
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH101 **Depth (m):** 21.00-21.45

Sample Number: **Sample Type:** U



Diameter (mm):	102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed			
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $\frac{1}{2}(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	28	1.95	1.53	420	212	106	3.8	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.37 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	15/05/14		15/05/14

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Professional Soils Laboratory

102 CAMLEY STREET, CAMDEN.

Contract No: PSL14/2054

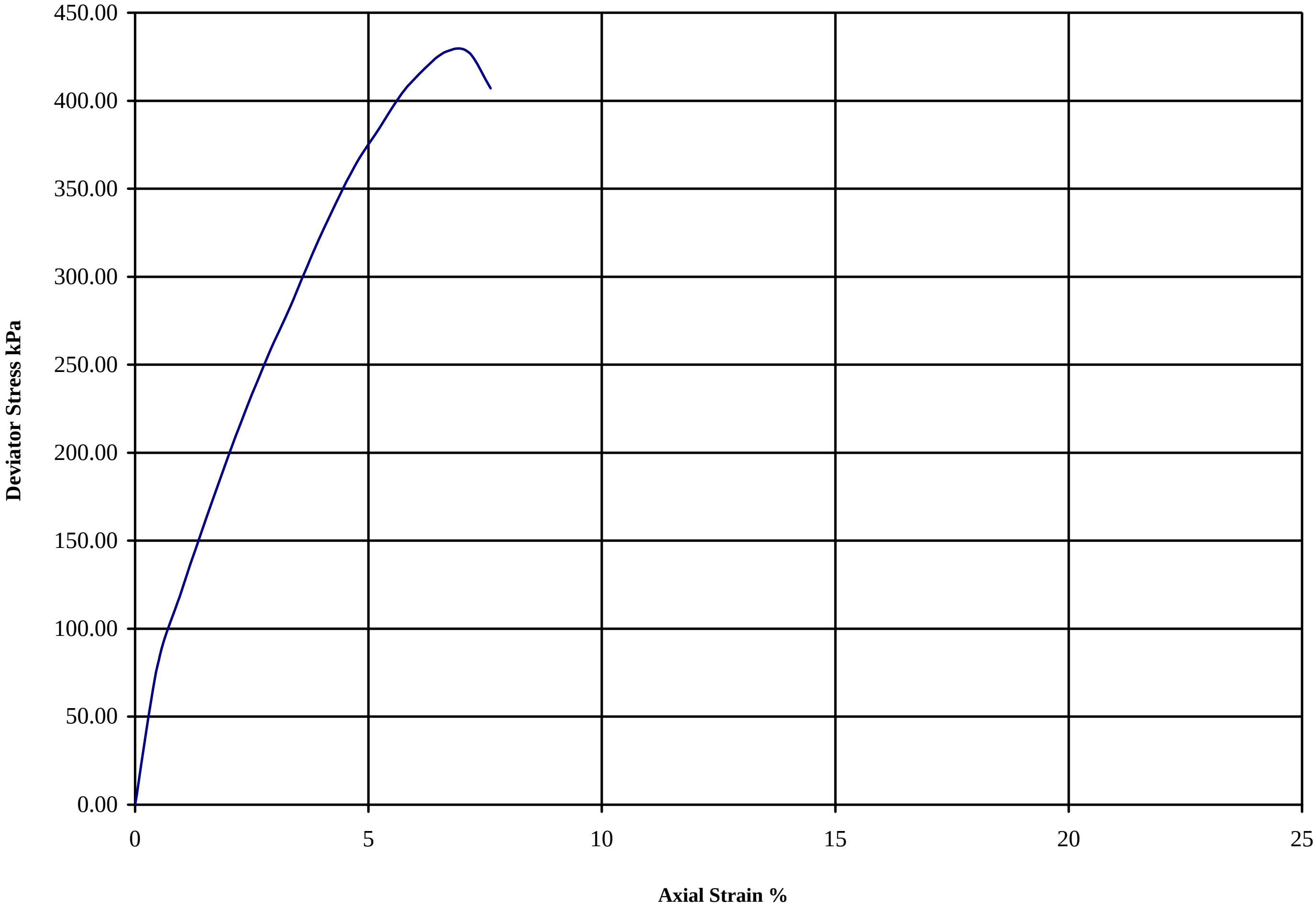
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH101 **Depth (m):** 25.50-25.95

Sample Number: **Sample Type:** U



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	1.94	1.57	510	428	214	6.7	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	15/05/14		15/05/14

PSL

Professional Soils Laboratory

102 CAMLEY STREET, CAMDEN.

Contract No: PSL14/2054

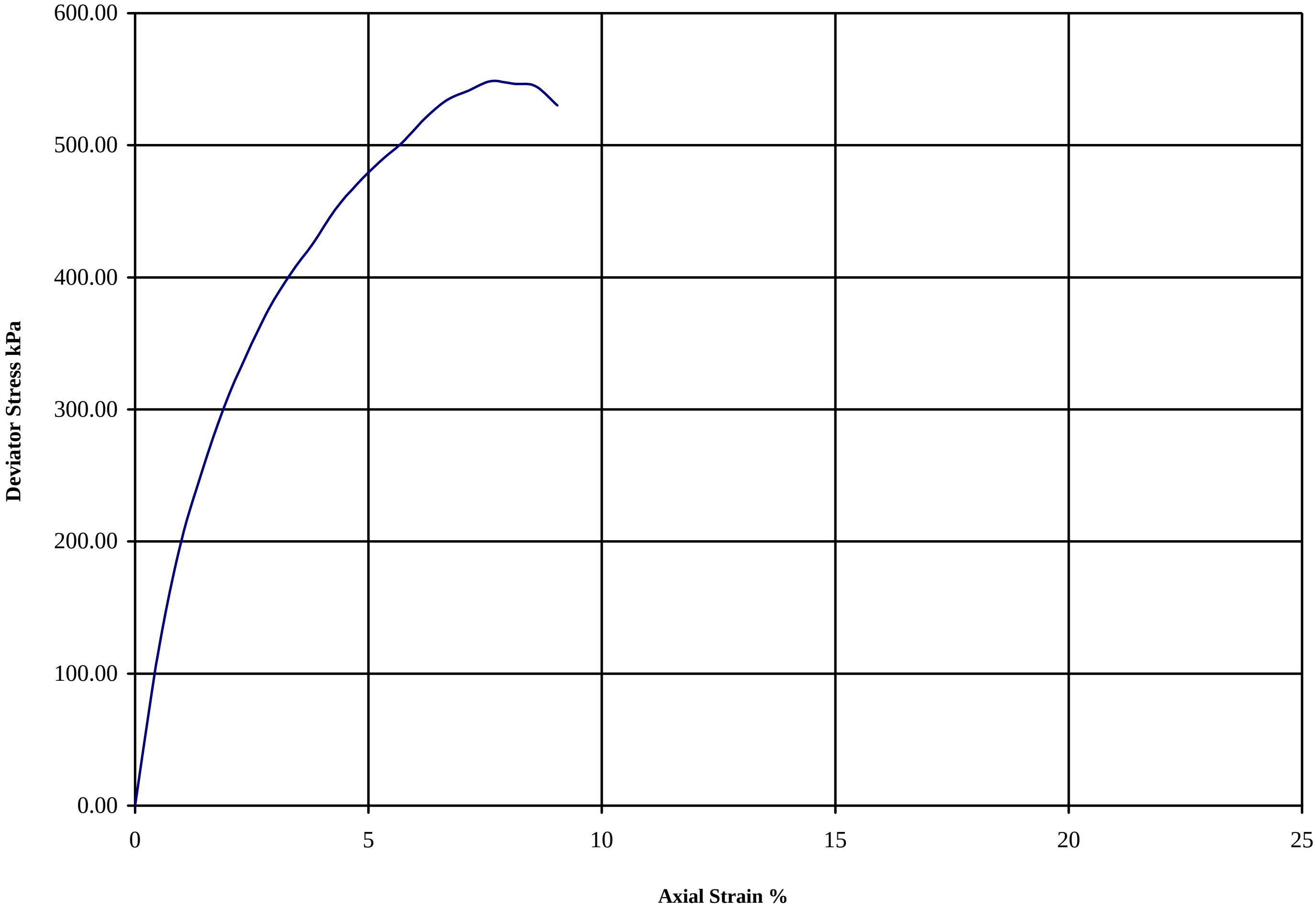
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH101 **Depth (m):** 34.50-34.95

Sample Number: **Sample Type:** U



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $\frac{1}{2}(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	22	2.01	1.65	690	549	274	7.6	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	15/05/14		15/05/14

PSL
Professional Soils Laboratory

102 CAMLEY STREET, CAMDEN.

Contract No: PSL14/2054

Scientific Analysis Laboratories is a limited company registered in England and Wales (No 2514788) whose address is at Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

3 Crittall Drive
Springwood Industrial Estate
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CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: 391707-1

Date of Report: 02-May-2014

Customer: Resource Environmental Consultants Ltd
Environment House
Segensworth Business Centre
Segensworth Road (West)
Fareham
PO15 5RQ

Customer Contact: Mr Will Spraggs

Customer Job Reference: 20698
Customer Site Reference: 102 Camley Street, Camden
Date Job Received at SAL: 28-Apr-2014
Date Analysis Started: 28-Apr-2014
Date Analysis Completed: 02-May-2014

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

UKAS TESTING
1650

Report checked and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Sarah Watt-Roy
Project Manager

SAL Reference:	391707
Project Site:	102 Camley Street, Camden
Customer Reference:	20698

Soil Analysed as Soil

BRE SD1 (SE)

					SAL Reference	391707 001	391707 002	391707 003	391707 004
					Customer Sample Reference	BH101 @ 9.95-10.00m	BH101 @ 20.50m	BH101 @ 30.45-30.50m	BH101 @ 39.50m
					Date Sampled	14-APR-2014	15-APR-2014	16-APR-2014	17-APR-2014
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l		<0.01	<0.01	<0.01	<0.01
(Water soluble) Cl-	T710	A40	0.01	g/l		**0.14**	**0.18**	**0.13**	**0.02**
Magnesium	T112	A40	1	mg/l		**330**	**54**	**35**	**29**
(Water soluble) NO3	T710	A40	0.01	g/l		<0.01	<0.01	<0.01	<0.01
pH	T7	A40				**7.4**	**8.0**	**7.7**	**9.1**
SO4(Total)	T102	A40	0.01	%		**0.95**	**0.27**	**0.27**	**0.02**
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l		**2.6**	**0.89**	**0.87**	**0.12**
Sulphur (total)	T6	A40	0.01	%		**0.29**	**0.52**	**0.52**	**0.02**

Index to symbols used in 391707-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T710	2:1 Extraction / Discrete Analyser
T6	ICP/OES
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T112	ICP/OES (SIM)(Water Extract)
T102	ICP/OES (HCl extract)
T7	Probe

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l	N	001-004
(Water soluble) Cl-	T710	A40	0.01	g/l	N	001-004
Magnesium	T112	A40	1	mg/l	N	001-004
(Water soluble) NO3	T710	A40	0.01	g/l	N	001-004
pH	T7	A40			U	001-004
SO4(Total)	T102	A40	0.01	%	U	001-004
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	U	001-004
Sulphur (total)	T6	A40	0.01	%	U	001-004

APPENDIX VII

ORIGIN OF GENERIC ASSESSMENT CRITERIA

ORIGIN OF REC TIER I VALUES

<table>
<tr><th>Constituent</th><th>Origin of Risk Assessment Value</th></tr>
<tr><td>Arsenic</td><td>2009 SGV</td></tr>
<tr><td>Cadmium</td><td>LQM CIEH 2nd Edition 2009</td></tr>
<tr><td>Chromium</td><td>LQM CIEH 2nd Edition 2009</td></tr>
<tr><td rowspan="2">Lead</td><td>Residential
Half 2003 EA SGV based on planned target blood lead level reduction to 5µg/l.</td></tr>
<tr><td>Commercial
Calculated using commercial exposure equation within lead SGV 2003 with revised input data from HPA and taking proposed blood lead levels into account.</td></tr>
<tr><td>Mercury</td><td>2009 SGV</td></tr>
<tr><td>Nickel</td><td>2009 SGV</td></tr>
<tr><td>Selenium</td><td>Soil guideline value, DEFRA/Environment Agency</td></tr>
<tr><td>Copper</td><td>LQM CIEH 2nd Edition 2009</td></tr>
<tr><td>Zinc</td><td>LQM CIEH 2nd Edition 2009</td></tr>
<tr><td>Cyanide - Total</td><td>CLEA 1.06 Derived Value</td></tr>
<tr><td>Phenols - Total.</td><td>LQM CIEH 2nd Edition 2009 – 1% SOM</td></tr>
<tr><td>Naphthalene</td><td rowspan="22">General Assessment Criteria (GAC) developed by CIEH / LQM the using CLEA 1-06 with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM</td></tr>
<tr><td>Acenaphthylene</td></tr>
<tr><td>Acenaphthene</td></tr>
<tr><td>Fluorene</td></tr>
<tr><td>Phenanthrene</td></tr>
<tr><td>Anthracene</td></tr>
<tr><td>Fluoranthene</td></tr>
<tr><td>Pyrene</td></tr>
<tr><td>Benzo(a)Anthracene(</td></tr>
<tr><td>Chrysene</td></tr>
<tr><td>Benzo(b/k)Fluoranthene [iii]</td></tr>
<tr><td>Benzo(a)Pyrene</td></tr>
<tr><td>Indeno(123-cd)Pyrene</td></tr>
<tr><td>Dibenzo(a,h)Anthracene</td></tr>
<tr><td>Benzo(ghi)Perylene</td></tr>
<tr><td>TPH C_5-C_6 (aliphatic)</td></tr>
<tr><td>TPH C_6-C_8 (aliphatic)</td></tr>
<tr><td>TPH C_8-C_{10} (aliphatic)</td></tr>
<tr><td>TPH C_{10}-C_{12} (aliphatic)</td></tr>
<tr><td>TPH C_{12}-C_{16} (aromatic)</td></tr>
<tr><td>TPH C_{16}-C_{21} (aromatic)</td></tr>
<tr><td>TPH C_{21}-C_{35} (aromatic)</td></tr>
</table>

REC Ltd is a multi-disciplinary health, safety, environmental and energy consultancy. Our national coverage enables our local experts to provide cost effective and pragmatic consultancy services in an efficient and sustainable manner.

REC Renewable Energy

- Feasibility Studies
- Ground Source Heat Pumps Installation
- Air Source Heat Pump Installation
- System Design and Maintenance
- Solar Photovoltaic (PV) Systems
- Combined Heat and Power Systems

REC Acoustics

- Sound Insulation Testing
- Noise at Work Assessment
- Development Related Noise / Vibration
- Environmental Noise / Vibration

REC Ecology

- Phase 1 Habitat Surveys
- Invasive Species
- Legally Protected Species Surveys
- Mitigation Schemes
- Ecological Impact Assessment (EcIA)
- BREEAM & Code 4 Sustainable Homes
- Habitat Management Plans
- Management planning and targeted Biodiversity Action Plan survey
- Environmental Impact Assessment

REC Asbestos

- Asbestos Management Surveys
- Demolition/Refurbishment Surveys
- Analysis of Asbestos in Soils and Bulk Samples
- Air Testing for Clearances and Reassurance
- Legionella Risk Assessment

REC Flood Risk

- Flood Risk & Consequence Assessment
- Strategic Flood Risk Assessment (SFRA)
- EIA Technical Chapters
- Assessment of Flood Levels
- Hydrology & Hydrogeology
- Flood Defence Structures
- Drainage Systems (SUDS) Design
- Mitigation Measures
- Soakaway Tests

REC Air Quality

- Air Quality Impact
- Odour Assessment
- Dispersion Modelling
- Stack Emission Testing
- Pollution Monitoring

REC Geo-Environmental

- Geotechnical Investigation & Assessment
- Contaminated Land Investigation & Assessment
- Waste Management
- Groundwater Testing
- Environmental Impact Assessment

REC Corporate Services

- Health, Safety & Environmental Management Systems
- Divestment / Acquisition Due Diligence Services
- Environment Permit Application & Support
- Compliance Auditing
- Carbon Reporting
- Waste Minimisation