Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical

Site Investigation Report

Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: 77 Lawn Road, London NW3 2XB

Client: Laura Bolohan

Report Date: March 2016

Project Reference: J12507

Southern Testing Head Office
East Grinstead
Tel: 01342 333100
enquiries@southerntesting.co.uk

ST Consult Midlands
Northampton
Tel: 01604 500020
creaton@stconsult.co.uk

ST Consult North West
Warrington
Tel: 01925 661 700
warrington@stconsult.co.uk

ST Consult South West
Swindon
Tel: 01793 441 522
swindon@stconsult.co.uk

SUMMARY

The site, which is located at 77 Lawn Road, currently comprises an existing residential property. It is proposed to construct a single storey basement extension extending beyond the full footprint of the existing structure.

Geological records indicate the site to be underlain by London Clay.

A historical Ordnance Survey map search was carried out and indicates that the site has a history of residential use.

A single phase of intrusive investigation was carried out.

The soils encountered comprised Made Ground overlying London Clay.

To date, groundwater levels of between 0.31m and 0.97m (bgl) have been measured within the monitoring wells installed within the boreholes (WS1 & WS2).

The sulphate content of the made ground and natural soil was found to fall within Class DS-2. The ACEC classification for the site is AC-1s.

The proposed development includes a basement structure which is to be constructed using conventional underpinning methods and parameters for retaining wall design are given.

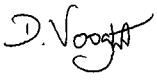
The design of the new basement foundation system should take into account the nature of the existing/adjacent foundations and their condition.

The results of the contamination testing, which were carried out, mainly for waste classification purposes, but also to assist with the site health and safety assessment, are also included. Soil analysis has indicated that the Made Ground and underlying natural soils tested were largely free from significant contamination, with the exception of elevated concentrations of lead within the Made Ground. In our experience, this is fairly typical of Made Ground material in London. The results should be sent to the groundworks contractor, for their health and safety appraisal, and the prospective landfill operator, for waste classification purposes.

A discovery strategy should be put in place to deal with any significant contamination that comes to light during the development works.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Laura Bolohan and the appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.



D Vooght MSc
(Countersigned)

S Marshall BSc FGS
(Signed)

For and on behalf of Southern Testing Laboratories Limited

STL: J12507
2 March 2016

TABLE OF CONTENTS

A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a completed Project Order Form dated 2nd February 2016 from Enric Torner of Torner Architects on behalf of the client Laura Bolohan.

2 Location

The site is located 180m east of Belsize Park Underground station. The approximate National Grid Reference of the site is TQ 275 850.

3 Proposed Construction

It is proposed to construct a single storey basement extension, extending beyond the full footprint of the existing structure onsite.

For the purposes of the contamination risk assessment, the proposed development land use is classified as **Residential with plant uptake (CLEA model[1]). The gas sensitivity of the site is rated as High (CIRIA C665[2])**

4 Object

This is a geotechnical investigation. However, limited contamination testing was undertaken, primarily for waste classification purposes and to assess potential risks to groundworkers who may come in contact during construction.

The object of the investigation was to assess foundation bearing conditions and other soil parameters relevant to the proposed development, and to assess the likely nature and extent of soil contamination on the site.

5 Scope

This report presents our exploratory hole logs and test results and our interpretation of these data.

A formal phase 1 desk study was outside of the scope of this investigation, however, a limited geotechnical desk study has been undertaken.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing

[1] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[2] CIRIA C665 (2006) Assessing risks posed by hazardous ground gases to buildings.

Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Laura Bolohan and the appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

B DESK STUDY & WALKOVER SURVEY

6 Desk Study

A formal desk study was outside of the scope of this investigation; however, a limited geotechnical desk study has been carried out. Reference has been made to the following information sources.

- Geological Maps
- Groundwater Vulnerability maps
- Historical Maps, freely available on the internet
- Environment Agency website
- Bomb Maps
- BRE Radon Atlas[3]

6.1 Geology

The British Geological Survey Map of the area (No. 256 - North London) indicates that the site geology consists of London Clay.

London Clay

London Clay is a well-known stiff (high strength) blue-grey, fissured clay, which weathers to a brown colour near the surface. It contains thin layers of nodular calcareous mudstone - "claystone" - from place to place, and crystals of water clear calcium sulphate (selenite) are common.

6.2 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

[3] BR 211 (2007) 'Radon: guidance on protective measures for new buildings'

Data		Remarks
Aquifer Designation	Superficial Deposits	There are no superficial deposits mapped onsite.
	Bedrock	The Bedrock (London Clay) mapped beneath the site is classified as Unproductive Strata - Rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Source Protection Zones		The site is not located within a Source Protection Zone.
Surface Water Features		A series of ponds/lakes are located approximately 1km to the north on Hampstead Heath.
Fluvial Flood Risk		The "Risk of Flooding from Rivers" mapping on the Environment Agency website (February 2016) shows the site to be within an area of Very Low Risk. Very Low Risk means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
Surface Water Flood Risk		The "Risk of Flooding from Surface Water" mapping on the Environment Agency website (February 2016) shows the site to be within an area of Very Low Risk. Very Low Risk means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
Reservoir Flood Risk		On the basis of the Environment Agency mapping (February 2016), the site lies within an area not at risk from reservoir flooding.

6.3 Historical Map Search

A review of Historical maps freely available on the internet was carried out. On the earliest mapping (1871-1873) until the 1954 mapping the subject site is shown to be undeveloped land, within the ground of Haverstock Lodge, which is directly to the south west of the site. Directly to the west of the site/on site is a small embankment/earthworks structure associated with landscaping within the grounds of Haverstock Lodge. Lawn road is shown to be present in its present configuration from the earliest mapping onwards. The surrounding area appears to become increasingly developed throughout the course of the mapping, primarily with residential properties. Haverstock Lodge is not shown after 1915.

From the 1954 mapping onwards the site and surrounding area appears similar to its current configuration.

6.4 Bomb Map

The London County Council Bomb Damage Maps (1939-1945) are made up of 110 hand-coloured 1:2,500 Ordnance Survey base sheets, which were originally published in 1916 but updated by the London County Council to 1940. The colouring applied to the maps record a scale of damage to London's built environment during the war caused by aerial bombardment.

The published bomb map for the area (map No. 37), shows the site suffered general blast damage- not structural (shown in orange). The map also shows a building to north suffered damage beyond repair (shown in purple) and a series of buildings to the south east suffered total destruction (shown in black), please refer to Figure A in Appendix E.

The maps have been reviewed for information purposes only and should not be perceived as part of a formal UXO desk study or risk assessment as detailed in CIRIA C681 "Unexploded Ordnance (UXO) – A guide for the Construction Industry".

6.5 Radon Risk

With reference to BRE guidance: no radon protection is required on this site.

7 Walkover Survey

A walkover survey was carried out on 6th January 2016 at the time of the investigation.

7.1 General Description and Boundaries

The site comprises a two storey semi-detached residential structure. The site includes a sloping front garden area and drive leading to a side garage and a two tiered garden area at the rear.

No. 77 Lawn Road is a semi-detached property of masonry brick construction bounded on either side by similar properties believed to be of a similar age. The rear (west) of the site is bounded by similar two storey residential properties of Downside Crescent.

The topography of the site slopes down from the west towards Lawn road and the eastern site boundary. A 1m tall retaining wall is present along the eastern site boundary and the subject property (77 Lawn Road) is approximately 1.5m higher than Lawn Road.

A number of semi-mature to mature trees/shrubs including sycamore, cherry and eucalyptus were indentified both on site and in the surrounding area/adjacent garden areas.

The majority of the neighbouring properties appear to comprise residential dwellings. A number of properties on the opposite side of Lawn road appear to have lower ground floors. Commercial properties are present to the west and south west of the site along Haverstock Hill.

C SITE INVESTIGATION

8 Method

The strategy adopted for the intrusive investigation comprised the following:

- 2 No 5.3-5.7m deep boreholes were drilled using hand held window sampler equipment (WS1 & WS2).
- Groundwater monitoring wells were installed within WS1 & WS2 for groundwater monitoring purposes.
- A series of 4 foundation inspection pits (TP1-4) were excavated by hand to establish existing foundation conditions.

Exploratory hole locations are shown in Figure 1 in Appendix A.

9 Weather Conditions

The fieldwork was carried out on 6th January 2016 at which time the weather was generally slightly overcast but dry.

The preceding month of December was neither wetter nor drier than average in the South East of England, with approximately 100% of the normal rainfall. November was slightly drier than average with approximately 90% of the normal, while October was drier than average with only approximately 65% of the normal rainfall.

10 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground over London Clay. A summary is given below.

Depth (m bgl)	Soil Type	Description
GL – 0.5/1.6	Made Ground	Firm, greyish brown to reddish brown, silty, sandy, gravelly, CLAY, with occasional to frequent roots and rootlets. Gravel comprises fine to medium, angular to sub-angular flint, brick, concrete and ash fragments (MADE GROUND).
0.5/1.6 – 5.3/5.7+	London Clay	Firm to stiff, thinly laminated, yellowish brown to pale grey, CLAY, with occasional selenite crystals.

10.1 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of significant contamination was noted during the investigation.

Made Ground was noted in a number of exploratory holes, which included some fragments of brick, concrete and ash. Such soils often contain elevated contaminant concentrations (e.g. heavy metals, Polyaromatic Hydrocarbons, asbestos etc.)

10.2 Existing Foundations

A series of 4 No. foundation inspection pits were excavated by hand to establish the existing foundation conditions. Drawn sections recording the foundation detail together with photographs are presented within Appendix A.

11 Groundwater Strikes

While siteworks were in progress no groundwater was encountered within the exploratory holes.

The site was revisited on two separate occasions to carry out measurements of the standing water levels within the two standpipes installed in the window sample boreholes. The reader is referred to Section 14 for the results of these measurements.

D FIELD TESTING AND SAMPLING

The following in-situ test and sampling methods were employed. Descriptions are given in Appendix B together with the test results.

- Disturbed Samples
- Hand Penetrometer Tests

E GEOTECHNICAL LABORATORY TESTS

The following tests were carried out on selected samples. Test method references and results are given in Appendix C.

- Atterberg Limit Tests
- Moisture Content
- Soluble Sulphate and pH

F DISCUSSION OF GEOTECHNICAL TEST RESULTS AND RECOMMENDATIONS

12 Soil Classification and Properties

Soil Type	Depth	Compressibility	VCP	Permeability	Frost Susceptible	CBR	Remarks
Made Ground	GL to 0.5/1.6m	N/A	N/A	Low but seepages from more permeable horizons are anticipated	Yes	N/A	Not suitable for foundations
London Clay	0.5/1.6m to 5.3/5.7m+	Medium	High	Very low/impermeable, but seepages from fissures can occur	No	Poor	

13 Swelling and Shrinkage

Shrinkable soils are subject to changes in volume as their moisture content is altered. Soil moisture contents vary from season to season and can be influence by a number of factors including the action of roots. The resulting swelling or shrinkage of the soils can cause subsidence or heave damage to foundations, the structures they support and services.

The designer should be aware that precautions regarding swelling and shrinkage are applicable. Chapter 4.2 of the NHBC Standards 2016 "Building Near Trees" provides a helpful guide with respect to minimum foundation depths and deepening precautions particularly within the zone of influence of trees.

Assessment of foundation depths should take into account not only those, trees, shrubs or hedgerows which have or are to be removed, but also those remaining or proposed which may be allowed to reach maturity.

Atterberg Limit tests were carried out on 6 No. samples of the natural London Clay soils, with plasticity indices in the range 46-54%; the samples tested were classified as being CV (clays of very high plasticity. All 6 No. samples are classified as being NHBC HIGH Volume Change Potential (VCP). Therefore, on the basis of the testing undertaken to date a classification of NHBC **HIGH** VCP would be appropriate as an overall site classification.

Given the anticipated depth of the proposed basement construction (3.5m), no specific precautions are considered necessary with respect to further foundation deepening within the influence of trees. However, where shallower foundations are proposed foundation precautions and deepening in accordance with NHBC High Volume Change precautions will be required.

14 Groundwater Levels

Groundwater levels vary considerably from season to season and year to year, often rising close to the ground surface in wet or winter weather, and falling in periods of drought. Long-term monitoring from boreholes or standpipes is required to assess the ground water regime and this was not possible during the course of this site investigation.

While siteworks were in progress, no groundwater entries were noted within the Made Ground or underlying London Clay within the window sample holes.

The standing water levels from the groundwater monitoring visits to date are shown in the table below. It is believed that the presence of a standing water level reflects a perched groundwater table within the Made Ground.

Hole ID	Date	Standing water level (m bgl)
WS1	06/01/2016 (during siteworks)	Dry
	22/01/2016	0.31
	09/02/2016	0.92
WS2	06/01/2016 (during siteworks)	Dry
	22/01/2016	0.95
	09/02/2016	0.97

On the basis of the observations made while siteworks were in progress and the measurements to date, groundwater ingress is not expected to be a significant problem in terms of dewatering issues etc during construction. Allowances for some dewatering, however, should be made from perched sources e.g. within the made ground, in the form of intermittent pumping from strategically placed collector sumps.

For the longer term condition, seepage entries from fissure flow within the clays and any perched water from within the overlying Made Ground should be allowed for in the design of the basement area e.g. provision of waterproofing measures, and also for hydrostatic uplift of the basement floor slab.

Published data for the permeability of the London Clay indicates the horizontal permeability to generally range between 1 x 10^{-9} m/s and 1x 10^{-14} m/s, with an even lower vertical permeability. Accordingly, the groundwater flow rate is anticipated to be extremely low to negligible.

Any groundwater flows that take place will likely follow the local/regional topography which in this instance comprises local falls predominantly to the north/east. Given the very low/impermeable nature of the underlying clay materials, there is negligible risk of the proposed basement walls causing a "damming effect" or mounding of water on the upstream faces.

On the basis of the observations/comments above, it is concluded that the proposed development will not result in any specific issues relating to the hydrogeology of the site.

15 Sulphates and Acidity

The measured pH of the made ground and natural soils ranged between 7.0 and 8.0.

The soluble sulphate levels recorded within the made ground ranged between 20-590mg/l and within the underlying natural soils soluble sulphate concentrations ranged between 20-979mg/l.

On the basis of the above measurements, we would recommend that BRE Class DS-2 precautions are adopted for the subsurface concrete, together with an ACEC Class of AC-1s.

16 Bearing Capacity

We understand that it is proposed to construct the basement, possibly using conventional underpinning methods.

Where it is necessary to construct spread foundations or bases to retaining walls/underpinned sections as part of the proposed works, all foundations should clearly penetrate any made ground and be formed on the underlying natural Clay materials. For basement foundations formed on these materials, an allowable bearing capacity of 125kPa may be adopted.

17 Basement Construction

We would anticipate that the proposed basement will be constructed using a form of conventional underpinning methods. Based on the findings of the boreholes (WS1 & WS2) and the soil types encountered, the following soil parameters are suggested for design of basement retaining walls:

Soil Type	Bulk density γ_b (kN/m^3)	Undrained Shear Strength (Temporary Condition)	Long Term "Drained" Condition	
			c' (kN/m^2)	φ^o
Made Ground	19	N/A	0	25
London Clay	20	C_u=70kPa	0	25

Due to the stress relief following the removal of existing soils to form the basement structure, both immediate (undrained) and long term (drained) heave displacements can be expected to occur in the underlying London Clay.

The immediate (undrained) heave displacements will occurs as excavation of the basement takes place and before the construction of basement elements e.g. slabs etc. Accordingly, only the long term (drained) heave displacements will need to be catered for in design, to overcome the problem of uplift pressures forming. This is normally overcome by installing appropriate void forming materials beneath the basements elements.

Analysis of the heave (and settlement) displacements within the London Clay should be carried out at a future stage, when the basement configuration has been finalised and the structural loads have been calculated.

For the analysis of heave movements, the following stiffness parameters after Burland and Kalra (1986)[4] are suggested for the London Clay:

Undrained Young's Modulus (E_u) = (10+5.2z) (MN/m^2)

Undrained Poisson Ratio (ν_u) =0.5

Drained Young's Modulus (E_d) = (7.5+3.9z) (MN/m^2)

Drained Poisson Ratio (ν_d) =0.2

Where z (m) is taken from the surface of the London Clay

18 Excavations and Trenching

Statutory lateral earth support will be required in all excavations where men must work. Instability of the sides of any excavations carried out must be expected. Accordingly, measures should be taken at all times to ensure that excavations undertaken during underpinning operations are adequately supported.

Given the presence of the existing/adjacent foundations, close attention in design of temporary and permanent propping is required of the underpinning works at all times to prevent settlement or excessive lateral yielding of the excavation/foundations.

[4] Burland J.B. and Kalra J.C. (1986) Queen Elizabeth Conference Centre: geotechnical aspects, Proc. Inst. Civ. Engnrs, Part 1,80,1479-1503

Providing good levels of construction are employed and close attention is taken to temporary/permanent propping measures as noted above, it is unlikely that the proposed construction will result in any specific issues relating to land stability issues, however monitoring of the adjacent properties are likely to be required while the works are in progress.

Allowances should be made for breaking out subsurface obstructions, e.g. old footings, drain runs etc. associated with the existing development on the site.

G LAND QUALITY

19 Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model[5] provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH[6] S4UL's and CL:AIRE[7] generic assessment criteria. In addition, in March 2014, DEFRA[8] published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

The values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

[5] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[6] The LQM/CIEH S4ULs for Human Health Risk Assessment. (2014).
[7] The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2009).
[8] SP1010 Development of Category 4 Screening Levels foe Assessment of Land Affected by Contamination. DEFRA, 2014.

20 Site Investigation – Soil

20.1 Sampling Regime

The number of sample locations was limited and was targeted to provide general coverage. Access was partly restricted by the presence of existing buildings and buried services.

20.2 Testing

The potential for contamination by Made Ground was identified by observations made on site. No visual or olfactory evidence of hydrocarbon contamination was noted on site and as such no testing for such has been undertaken.

Therefore, the following tests were selected.

Test Suite	Number of Samples	Soil Tested
STL Key Contaminant Suite	3 1	Made Ground Natural Soil (CLAY)
Asbestos Identification	3	Made Ground

The test results are presented in full in Appendix D. A summary and discussion of the significance of the results and identified contamination sources is given below.

20.3 Test Results and Identified Contamination Sources

20.3.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. The samples have been grouped into 2 populations comprising Made Ground and natural CLAY. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix D. The screening values and source notes are presented in Table 1 "Tier 1 Screening Values" at the front of Appendix D.

Soil Type: Made Ground

Contaminants	Units	No of Samples Tested	Range	Sample Mean	Residential with Homegrown Produce Consumption Tier 1 Screening Value
Arsenic (As)	mg/kg	3	14-17	16.3	37
Cadmium (Cd)	mg/kg	3	<0.1-0.3	0.17	11
Total Chromium (Cr)	mg/kg	3	24-53	34.7	910
Hexavalent Chromium (CrVI)	mg/kg	3	<1	<1	6
Lead (Pb)	mg/kg	3	21-**460**	**213.7**	200
Mercury (Hg)	mg/kg	3	<1.0-1.8	1.27	7.6-11
Selenium (Se)	mg/kg	3	<3	<3	250
Nickel (Ni)	mg/kg	3	15-60	30.7	130
Copper (Cu)	mg/kg	3	28-57	39.7	2400
Zinc (Zn)	mg/kg	3	62-230	123.7	3700
Phenol	mg/kg	3	<1	<1	120-380
Benzo[a]pyrene	mg/kg	3	<0.1-0.1	0.1	1.7-2.4
Naphthalene	mg/kg	3	<0.1	<0.1	2.3-13
Total Cyanide (CN)	mg/kg	3	<1	<1	/
Acidity (pH value)	Units	3	7.0-8.0	7.57	/
Soil Organic Matter	%	3	0.3-4.7	3.03	/

A total of three samples of Made Ground taken from across the site were sent for testing. With the exception of a single elevated Lead result, all the results fall below the corresponding Tier 1 assessment criterion for Residential with Plant Uptake.

Elevated concentrations of Lead (460mg/kg in TP4 @0.3m) was reported in one of the three samples analysed, compared with a screening value of 200mg/kg. In our experience high concentrations of Lead are fairly typical of Made Ground in London and is not considered significant in terms of the development proposals and the likely risk to the site works (assuming good, basic, health and safety measures are adopted) and the end users. Furthermore given that the site is underlain by London Clay, there is no aquifer risk.

Soil Type: Natural Soils

Contaminants	Units	No of Samples Tested	Result	Residential with Homegrown Produce Consumption Tier 1 Screening Value
Arsenic (As)	mg/kg	1	19	37
Cadmium (Cd)	mg/kg	1	<0.1	11
Total Chromium (Cr)	mg/kg	1	49	910
Hexavalent Chromium (CrVI)	mg/kg	1	<1	6

Lead (Pb)	mg/kg	1	17	200
Mercury (Hg)	mg/kg	1	<1.0	7.6-11
Selenium (Se)	mg/kg	1	<3	250
Nickel (Ni)	mg/kg	1	61	130
Copper (Cu)	mg/kg	1	26	2400
Zinc (Zn)	mg/kg	1	70	3700
Phenol	mg/kg	1	<1	120-380
Benzo[a]pyrene	mg/kg	1	<0.1	1.7-2.4
Naphthalene	mg/kg	1	<0.1	2.3-13
Total Cyanide (CN)	mg/kg	1	<1	/
Acidity (pH value)	Units	1	7.8	/
Soil Organic Matter	%	1	0.3	/

One sample of natural soil, from WS2 @ 2.0m was submitted for testing. The results all fall below the Tier 1 screening value for Residential with Plant Uptake.

20.3.2 Asbestos

During the course of the investigation from visual assessment the garage roof of No. 77 Lawn Road was suspected to contain asbestos cement. No asbestos containing materials were detected in the soil samples analysed and none were observed in the exploratory holes. Although, it should be noted that the exploratory holes are of small diameter/the investigation was constrained by site usage and the samples obtained may not reflect the full composition of the soils on the site. Therefore, there is always the potential for pockets of asbestos or for asbestos containing materials to be present, which have not been detected in the sampling.

It is also our experience that asbestos containing materials are quite often encountered in buried pockets and beneath slabs (sometimes adhering to the concrete) on older sites.

21 Waste Classification

Preliminary Waste Acceptance Criteria (WAC) testing has been undertaken on one sample of Made Ground and one sample of the underlying natural clay.

The WAC testing and other chemical analysis appended will provide initial information to assist in classifying any soils to be removed from site to landfill as part of the ground works.

We would advise that care is taken during excavation to ensure that the differing soil types/ wastes are segregated during excavation in order to minimise waste disposal costs. Different guidelines and charges will apply to different waste classifications.

The developer, as waste producer, will ultimately be responsible for the material removed from site. The contents of this report should be forwarded to tip operators for their own assessment, to confirm classification of the soils for off-site disposal, and whether they can accept the material.

Should any more significant contamination be encountered during the ground works, then this may alter the waste classification.

22 Discussion and Conclusions

At the time of writing it is unclear whether the approved planning will be subject to contaminated land planning conditions.

On the basis of the observations made during the investigation and the results of the contamination testing to date, the risk to the site users and ground works is considered to be low, assuming that good, health and safety and site practices are adopted (in the case of the site workers).

Notwithstanding the above, elevated Lead has been reported within TP4 @0.3mbgl. High concentrations of Lead are fairly typical of Made Ground in London. It is believed that the source of the lead may be associated with the construction of the existing property.

It is anticipated that the Made Ground soils in area of trial hole TP4 will either be removed from site as part of the foundation/basement constructions, or some material may possibly remain beneath the proposed structure and so pose a low level of risk to future site occupants.

On the basis of these results it appears that good general site practice, such as appropriate PPE and basic hygiene measures, will be sufficient to mitigate any minor risk to the ground workers. As with the waste management facility, these results should be provided to the ground works for their own appraisal.

During the investigation it was also noted the garage roof, contained asbestos cement. If it is proposed to remove this building allowance should be made for carrying out an asbestos survey prior to its demolition. A careful watch should be maintained during demolition/ground works so that any suspect materials can be spotted and analyses as necessary.

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a **discovery strategy** must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site.

23 General Guidance

Allowance should be made for experienced verification of any remedial works.

It may be that specific local requirements apply to this site, of which we are not aware at this time.

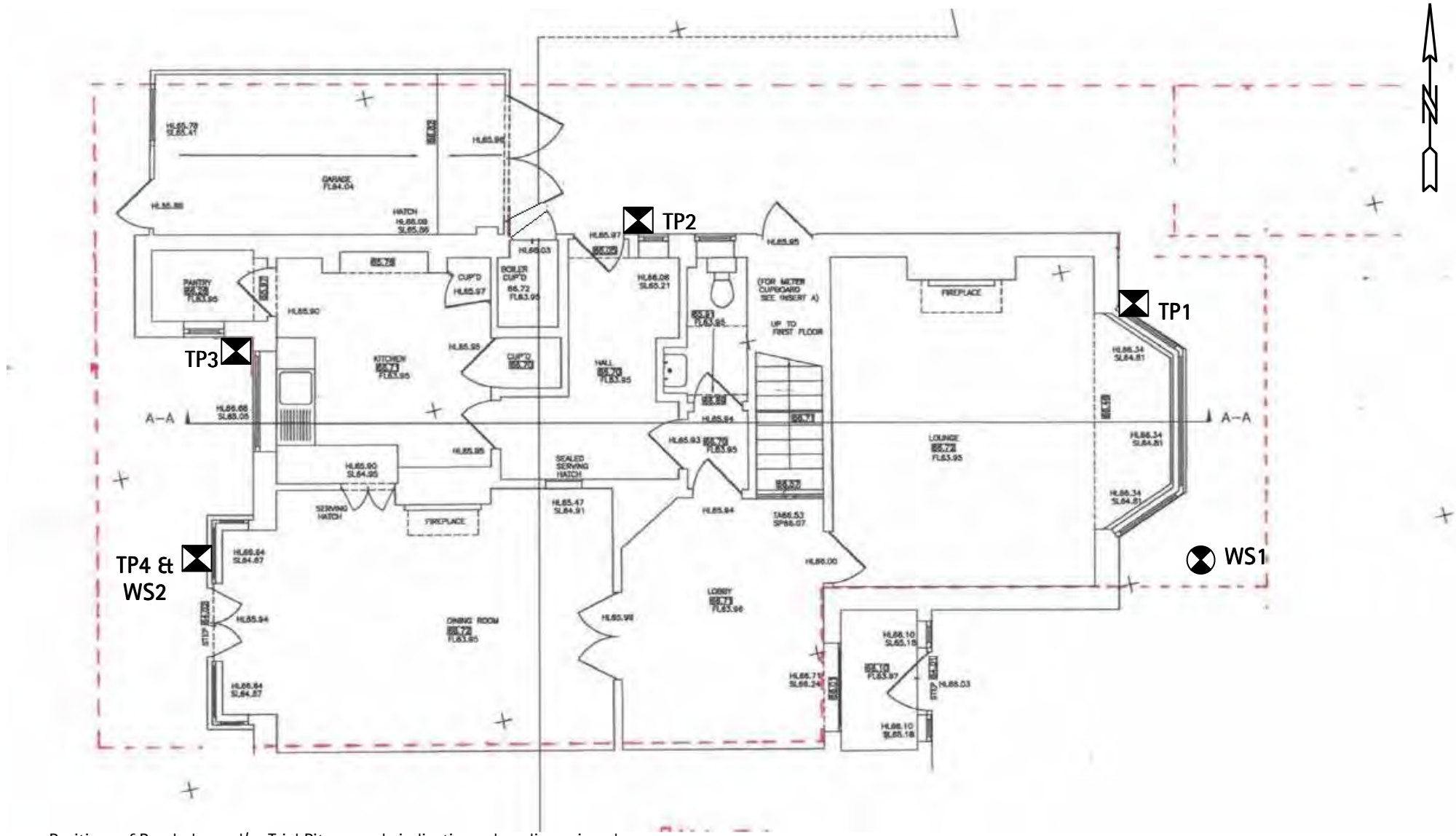
In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

It should be noted that organic contaminants present in the soils could affect plastic underground service pipes (such as the types used by water and gas supply companies). Guidance should be sought from the relevant companies regarding any proposed plant in the affected area.

Many water supply companies now require higher specification pipe on contaminated sites, even following remediation.

APPENDIX A

Site Plans and Exploratory Hole Logs



NB: Positions of Boreholes and/or Trial Pits are only indicative unless dimensioned

Site: 77 Lawn Road, London NW3	STL: J12507	Fig No: 1
Date: 6th January 2016	1. Site plan showing approximate exploratory hole locations.	

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult

Key to Exploratory Hole Logs

General

All soil & rock descriptions in general accordance with BS5930:1999+A2:2010, BS EN ISO 14688 & BS EN ISO 14689
The Geology Code only entered where positive identification of the sampled strata has been made

Sampling

ES	Environmental Sample (taken in appropriate sampling container)
D	Disturbed Sample
B	Bulk Sample
LB	Large Bulk for Earthworks testing
C	Core Sample
U	Undisturbed Sample (number of blows indicated in results column)
SPTLS	SPT Liner Sampler
P	Piston Sample
W	Water Sample

Insitu Tests

SPT	Standard Penetration Test in accordance with BS EN ISO 22476-3:2005+A1:2011
SPT (C)	Cone Penetration Test in accordance with BS EN ISO 22476-3:2005+A1:2011
PT	Penetration Test - STL documented equivalent SPT N Value
PPT	Perth Penetration Test - STL in house documented method (N Value)
UCS (⊥)	Unconfined Compressive Strength measure by hand penetrometer (kN/m^2)
IVN	Hand Vane (kPa)
PID	Photo Ionisation Detector Results (ppm)
MEXE	Mexecone CBR Result

Drilling Records

Depth to standing water level	▼
Depth to water strike	▽
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Index (%)
FI	Fracture Index

Backfill Symbols

Arisings

Concrete

Blacktop

Bentonite Seal

Gravel Filter

Sand Filter

Pipe Symbols

Plain Pipe

Slotted Pipe

Filter Tip

Principal Soil Types

Topsoil

Made Ground

Clay

Silt

Sand

Gravel

Peat

Principal Rock Types

Mudstone/Claystone

Siltstone

Sandstone

Limestone

Chalk

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date	Project ID:	Hole Type:	WS1
06/01/2016	J12507	WS	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level:	Logger:
					SM
Location:	London NW3	1. Borehole dry upon completion.			
Client:	Mr Eric Torner	2. Refusal at 5.7m (bgl) on stiff clay.			

Backfill	Water Strikes	Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
		0.20	ES			(0.30)		0.30	Dark greyish brown, sandy, gravelly, CLAY, with frequent roots and rootlets. Gravel comprises fine to medium, angular to sub-angular flint, chalk, brick and concrete (MADE GROUND).
		1.00	ES			(1.30)			Pale greyish brown, silty, gravelly, CLAY, with occasional roots, rootlets and fragments of fine brick. Gravel comprises fine to medium, flint (MADE GROUND).
		1.50	D					1.60	
		1.50	ES						Firm, pale yellowish brown mottled grey, CLAY.
		2.00	D						
		2.00	HP	UCS(kPa)=130					
		2.50	HP	UCS(kPa)=170		(1.90)			
		3.00	D						
		3.00	HP	UCS(kPa)=230					
		3.40	HP	UCS(kPa)=270					
		3.50	D					3.50	
		4.00	D						Firm to stiff, thinly laminated, pale grey, CLAY, with occasional selenite crystals.
		4.00	HP	UCS(kPa)=280					
		4.50	D						
		4.50	HP	UCS(kPa)=250		(2.20)			
		5.00	D						
		5.00	HP	UCS(kPa)=270					
		5.50	D						
		5.50	HP	UCS(kPa)=400				5.70	
									End of borehole at 5.70m

Hole Details		Casing Details		Water Strike (m bgl)				Readings (m bgl)			Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth	Casing	Sealed	Rose to:	Time (min)	Remarks	From	To	Time	Remarks

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date	Project ID:	Hole Type:	WS2
06/01/2016	J12507	WS	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level:	Logger:
					SM
Location:	London NW3	1. Borehole undertaken through base of TP4.			
Client:	Mr Eric Torner	2. Borehole dry upon completion.			
		3. Refusal at 5.3m (bgl) on stiff clay.			

Backfill	Water Strikes	Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
		Depth (m bgl)	Type	Results					
						(0.05)		0.05	Paving Slab.
						(0.09)		0.14	CONCRETE.
						(0.36)		0.50	Firm, dark greyish brown to reddish brown, sandy, CLAY, with occasional fragments of brick, ash and rootlets (MADE GROUND).
		0.70	HP	UCS(kPa)=90		(0.50)			Firm, yellowish brown, CLAY.
		1.50	D					1.00	Firm to stiff, pale brown, CLAY.
		1.50	HP	UCS(kPa)=110					
		2.00	D						
		2.00	ES						
		2.00	HP	UCS(kPa)=130					
		2.50	D						
		2.50	HP	UCS(kPa)=180					
		3.00	D						
		3.00	HP	UCS(kPa)=230		(4.30)			
		3.50	D						
		3.50	HP	UCS(kPa)=210					
		4.00	D						
		4.00	HP	UCS(kPa)=260					
		4.50	D						
		4.50	HP	UCS(kPa)=300					
		5.00	D						*[5.0 5.3m Occasional selenite crystals.]*
		5.00	HP	UCS(kPa)=330					
		5.30	D					5.30	End of borehole at 5.30m
		5.30	HP	UCS(kPa)=350					

Hole Details		Casing Details		Water Strike (m bgl)				Readings (m bgl)			Standing/Chiselling (m bgl)			
Depth (m bgl)	Dia. (mm)	Depth (m bgl)	Dia. (mm)	Date	Depth	Casing	Sealed	Rose to:	Time (min)	Remarks	From	To	Time	Remarks

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date:	Project ID:	Machine Type:	TP1
06/01/2016	J12507	Hand Dug	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
					SM
Location:	London NW3	1. Trial pit dry upon completion.			
Client:	Mr Eric Torner				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.5	ES			(0.95)		0.95	Greyish brown to brown, clayey, slightly gravelly SAND, with occasional roots, rootlets and fragments of ash. Gravel comprises fine to medium, flint, brick and concrete (MADE GROUND).
							Pit terminated at 0.95m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.60		
Length:	0.65		
Depth:	0.95		

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date:	Project ID:	Machine Type:	TP2
06/01/2016	J12507	Hand Dug	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
					SM
Location:	London NW3	1. Trial pit dry upon completion.			
Client:	Mr Eric Torner				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
				(0.20)			CONCRETE.
						0.20	
0.4 0.4	D ES			(0.40)			Pale brown gravelly, clayey, SILT, with occasional rootlets. Gravel comprises fine to medium, sub-angular to rounded, flint.
						0.60	Pit terminated at 0.60m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.35		
Length:	0.60		
Depth:	0.60		

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

Start - End Date:	Project ID:	Machine Type:	TP3
06/01/2016	J12507	Hand Dug	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
					SM
Location:	London NW3	1. Trial pit dry upon completion.			
Client:	Mr Eric Torner				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
				(0.05)		0.05	Paving slab.
0.2	ES			(0.25)			Dark grey to black, clayey, gravelly SAND, with occasional fragments of glass, ash, patches of reworked clay, roots and rootlets. Gravel comprises fine to medium, flint and brick (MADE GROUND).
				(0.30)		0.30	Firm, dark greyish brown to reddish brown, sandy CLAY, with occasional fragments of brick, ash and rootlets (MADE GROUND).
				(0.20)		0.60	Firm, pale yellowish brown, CLAY, with occasional roots and rootlets.
0.8	D					0.80	Pit terminated at 0.80m.
0.8	HP	UCS(kPa)=140					

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.42		
Length:	0.73		
Depth:	0.80		

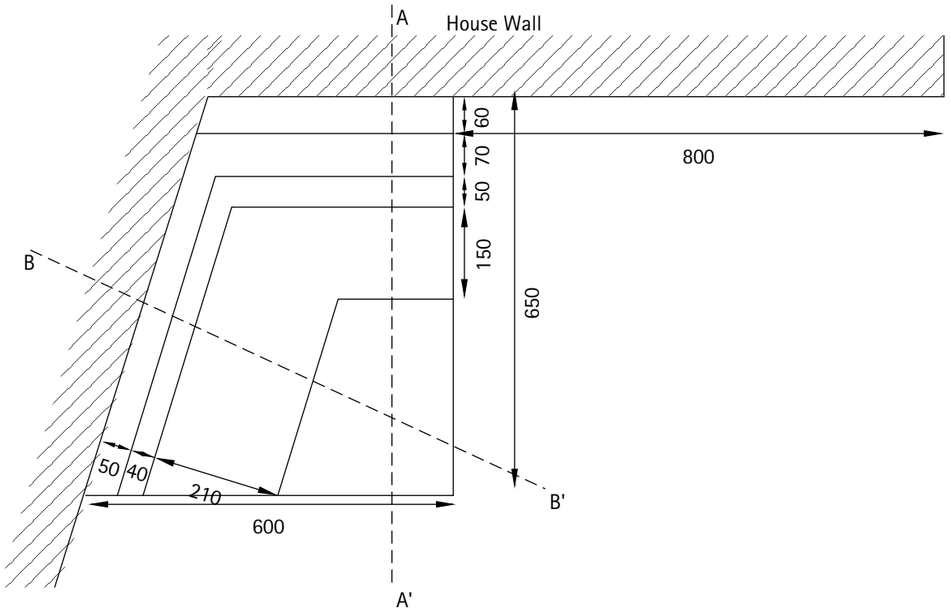
Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP4
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	06/01/2016	J12507	Hand Dug	Sheet 1 of 1

Project Name:	77 Lawn Road	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
					SM
Location:	London NW3	1. Trial pit dry upon completion.			
Client:	Mr Eric Torner				

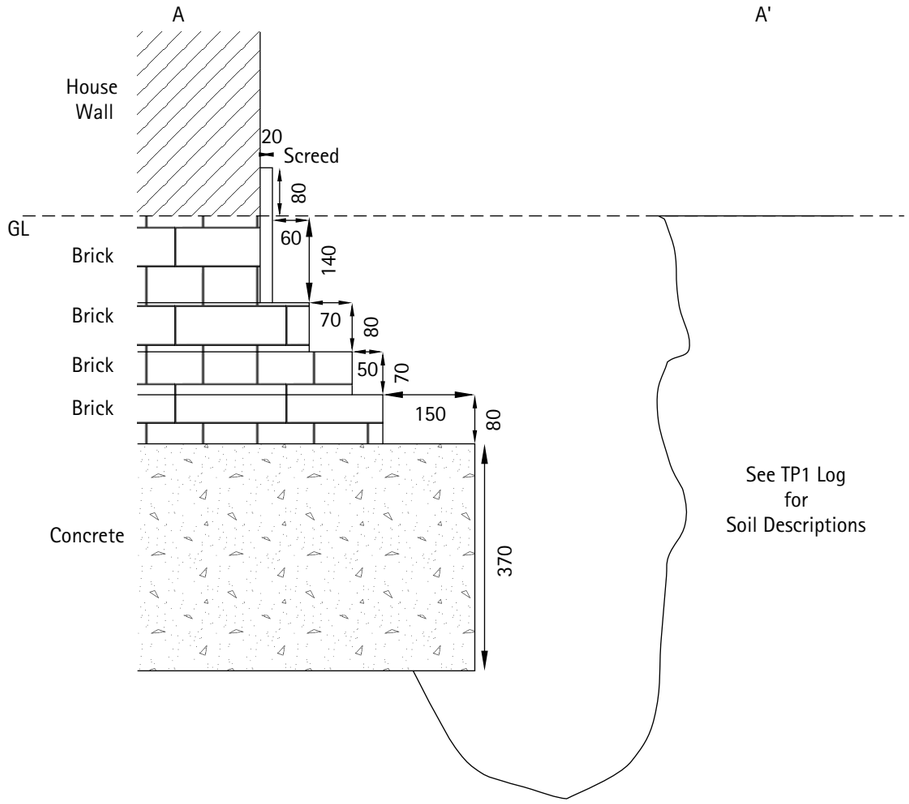
Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
				(0.05)		0.05	Paving slab.
				(0.09)		0.14	CONCRETE
0.3	ES			(0.36)		0.50	Firm, dark greyish brown to reddish brown, sandy, CLAY, with occasional fragments of brick, ash and rootlets (MADE GROUND).
0.7	D			(0.30)		0.80	Firm, yellowish brown, CLAY.
0.7	HP	UCS(kPa)=90					Pit terminated at 0.80m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.30		
Length:	0.50		
Depth:	0.80		

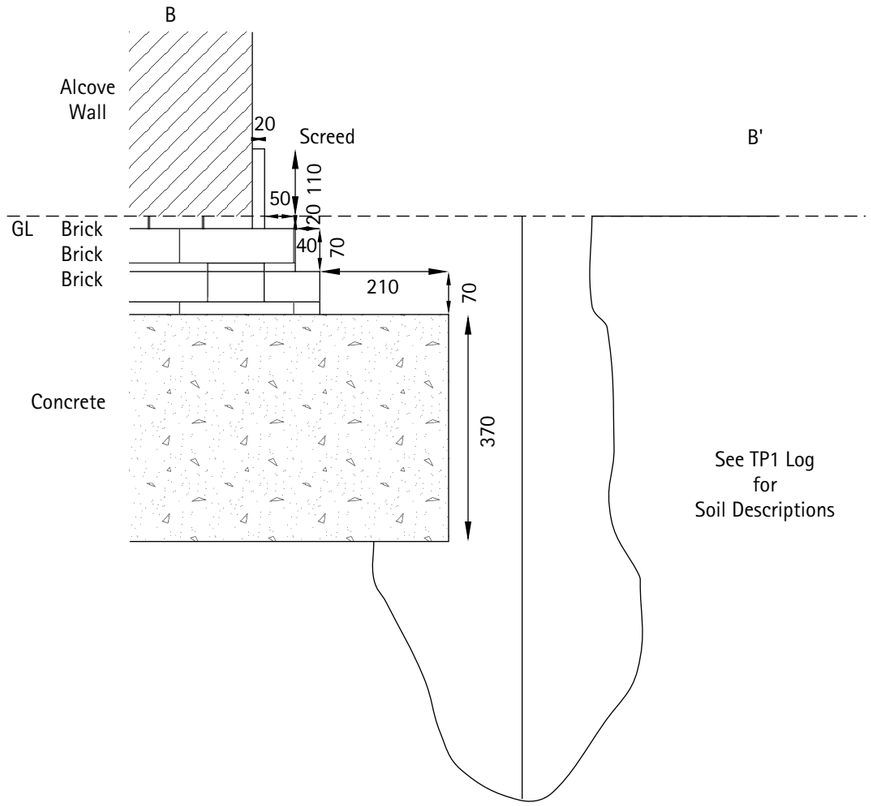
TP1 Plan View:



TP1 Section A to A'



TP1 Section B to B'



Notes

1. All dimensions in mm unless stated otherwise.

Southern Testing
Environmental & Geotechnical

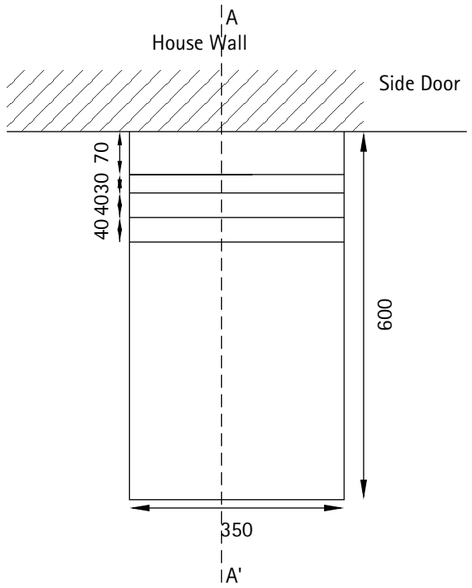
Keeble House, Stuart Way, East Grinstead, West Sussex. RH19 4QA

Tel: 01342 333100 Fax: 01342 410321

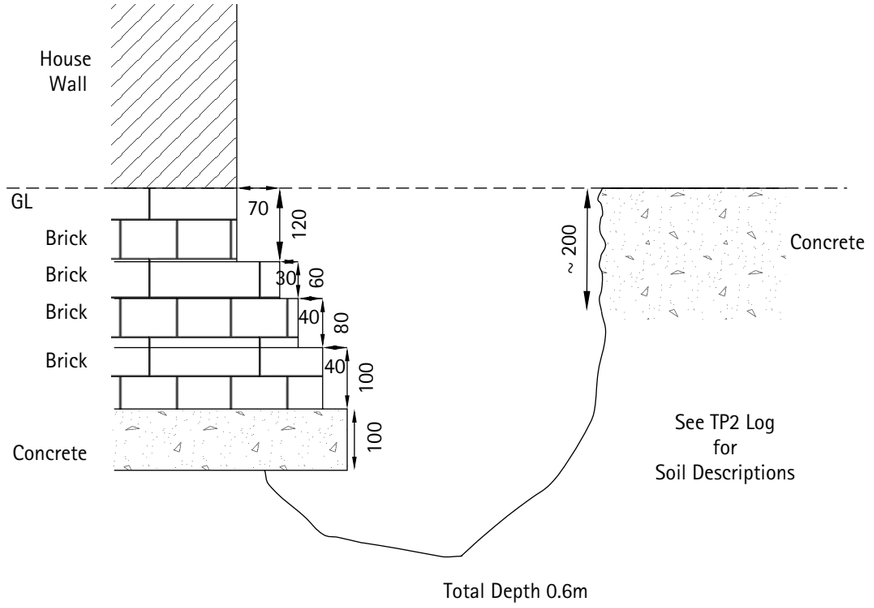
www.southerntesting.co.uk

Client: Mr Eric Torner	
Job Title: 77 Lawn Road, London NW3	
Description: Trial Pit Sections	
Drawing No: TP1	
Scale: 1:100	Paper Size: A3
Drawn by: SM	Checked by: DV
Date: 06/01/2015	

TP2 Plan View:



TP2 Section A to A'



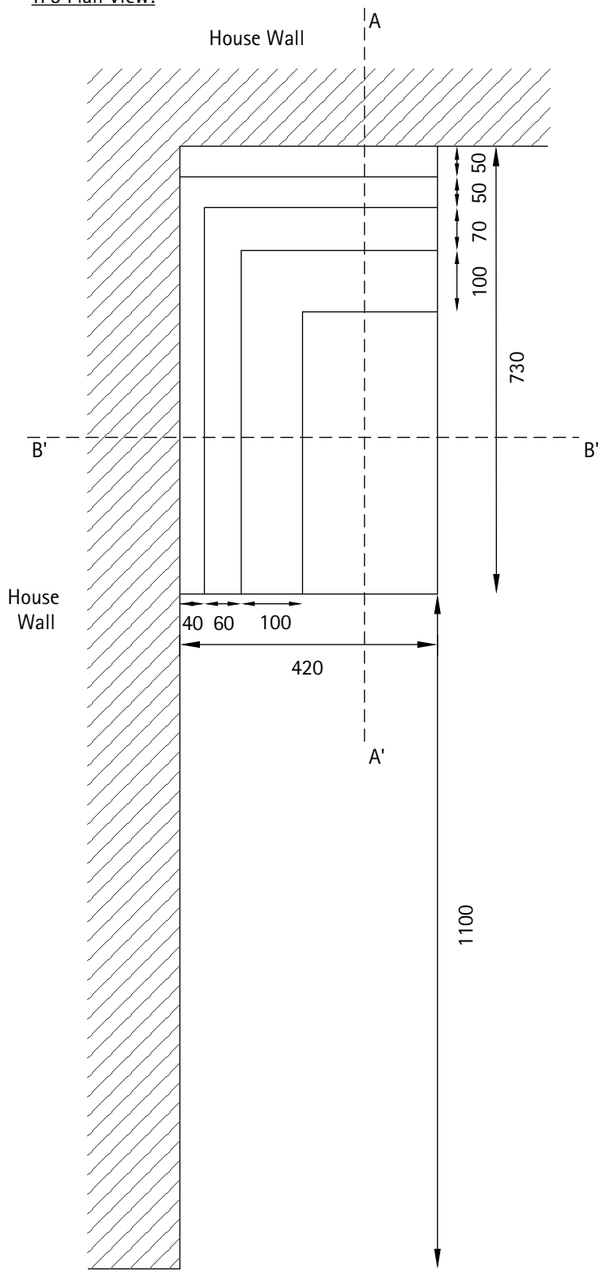
Notes

1. All dimensions in mm unless stated otherwise.

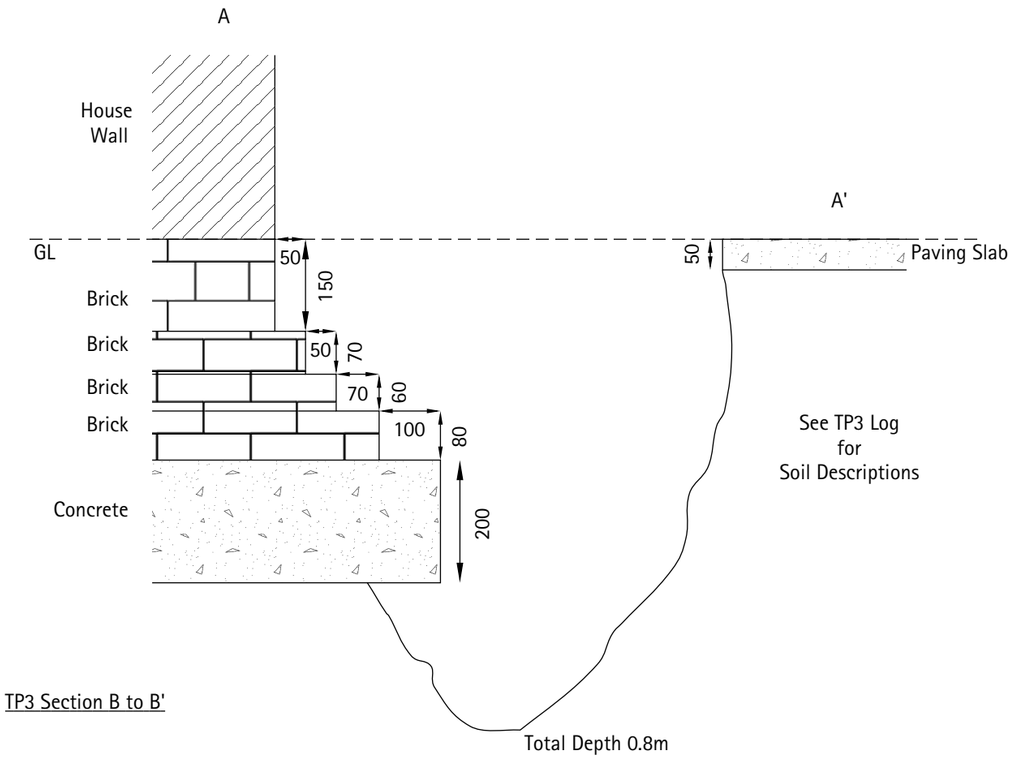
Southern Testing
Environmental & Geotechnical
Keeble House, Stuart Way, East Grinstead, West Sussex. RH19 4QA
Tel: 01342 333100 Fax: 01342 410321
www.southerntesting.co.uk

Client: Mr Eric Torner	
Job Title: 77 Lawn Road, London NW3	
Description: Trial Pit Sections	
Drawing No: TP2	
Scale: 1:100	Paper Size: A3
Drawn by: SM	Checked by: DV
Date: 06/01/2015	

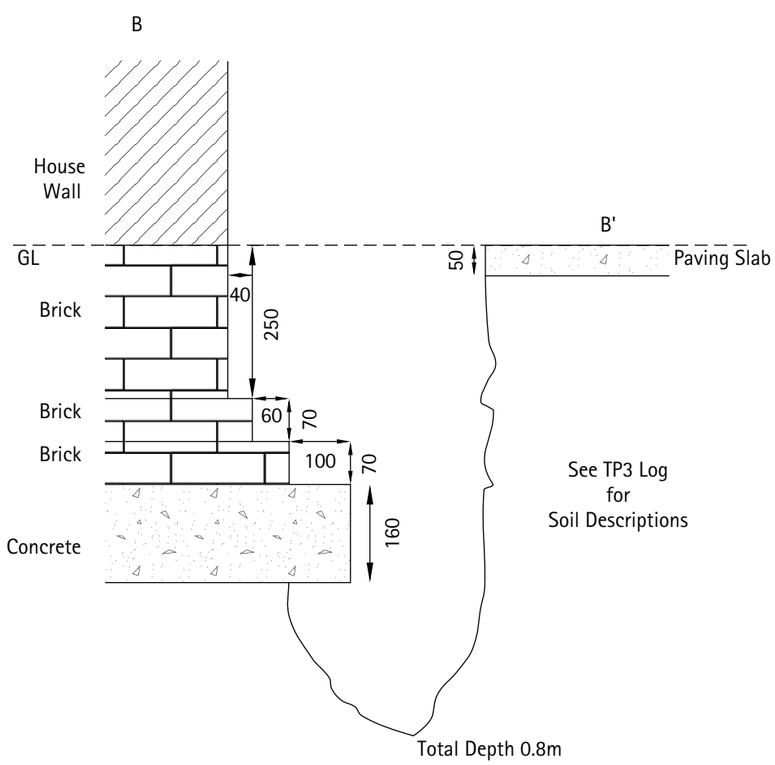
TP3 Plan View:



TP3 Section A to A'



TP3 Section B to B'



Notes

1. All dimensions in mm unless stated otherwise.

Southern Testing
Environmental & Geotechnical

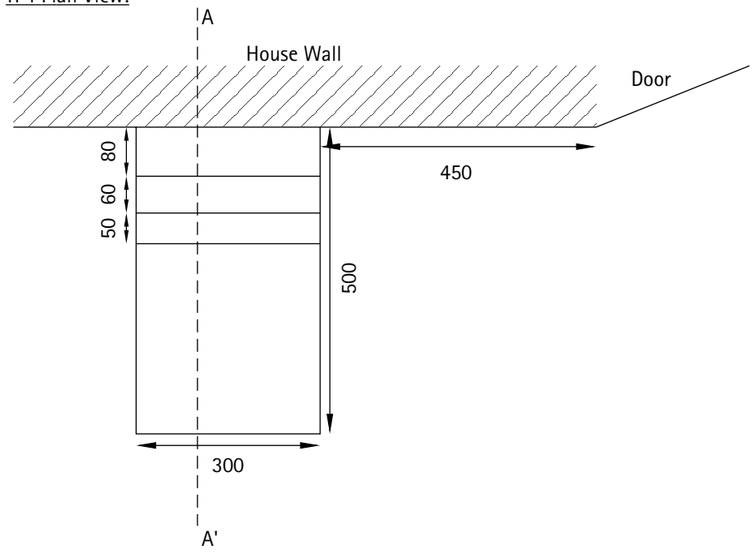
Keeble House, Stuart Way, East Grinstead, West Sussex. RH19 4QA

Tel: 01342 333100 Fax: 01342 410321

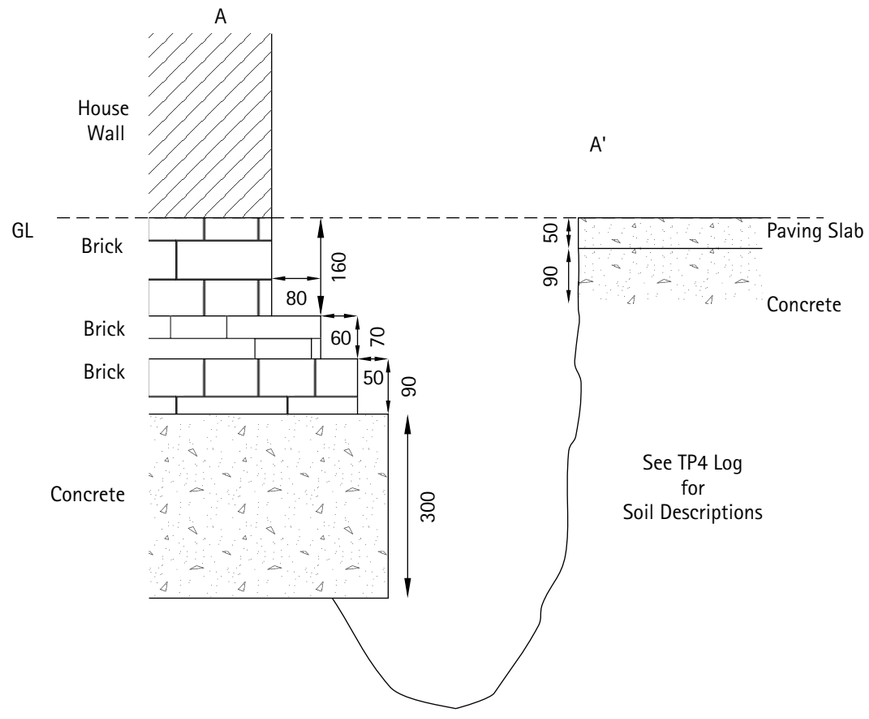
www.southerntesting.co.uk

Client: Mr Eric Torner	
Job Title: 77 Lawn Road, London NW3	
Description: Trial Pit Sections	
Drawing No: TP3	
Scale: 1:100	Paper Size: A3
Drawn by: SM	Checked by: DV
Date: 06/01/2015	

TP4 Plan View:



TP4 Section A to A'



Total Depth: 0.8m

Notes

1. All dimensions in mm unless stated otherwise.

Southern Testing
Environmental & Geotechnical

Keeble House, Stuart Way, East Grinstead, West Sussex. RH19 4QA

Tel: 01342 333100 Fax: 01342 410321

www.southerntesting.co.uk

Client: Mr Eric Torner	
Job Title: 77 Lawn Road, London NW3	
Description: Trial Pit Sections	
Drawing No: TP4	
Scale: 1:100	Paper Size: A3
Drawn by: SM	Checked by: DV
Date: 06/01/2015	

TP1

TP2

TP3

TP4

APPENDIX B

Field Sampling and in-situ Test Methods & Results

Field Sampling and in-situ Test Methods

Disturbed Samples

Disturbed samples were taken from the trial holes at intervals and stored in sealed glass jars and polythene bags, as appropriate.

Hand Penetrometer Test

The hand penetrometer consists of a spring loaded and calibrated plunger which is forced into the soil. A reading of unconfined compression strength (equal-twice cohesion) is given on a calibrated scale. In common with other hand methods of strength assessment (eg. the shear vane) it does not give an accurate indication of bearing capacity in stiff or fissured soils, because of the small test area. The figures are used for strength classification according-the table below.

Hand Penetrometer Value (kPa)	Undrained Shear Strength cu (kPa)	Undrained Shear Strength of Clays
<20	<10	Extremely Low
20 40	10-20	Very Low
40-80	20-40	Low
80-150	40-75	Medium
150-300	75-150	High
300-600	150-300	Very High
600>	300>	Extremely High

APPENDIX C

Geotechnical Laboratory Test References & Results

Southern Testing | ST Consult

Atterberg and Moisture Content Summary

To BS1377-2:1990(2003) cl.3.2, 3.3, 4.2, 4.3

AGS

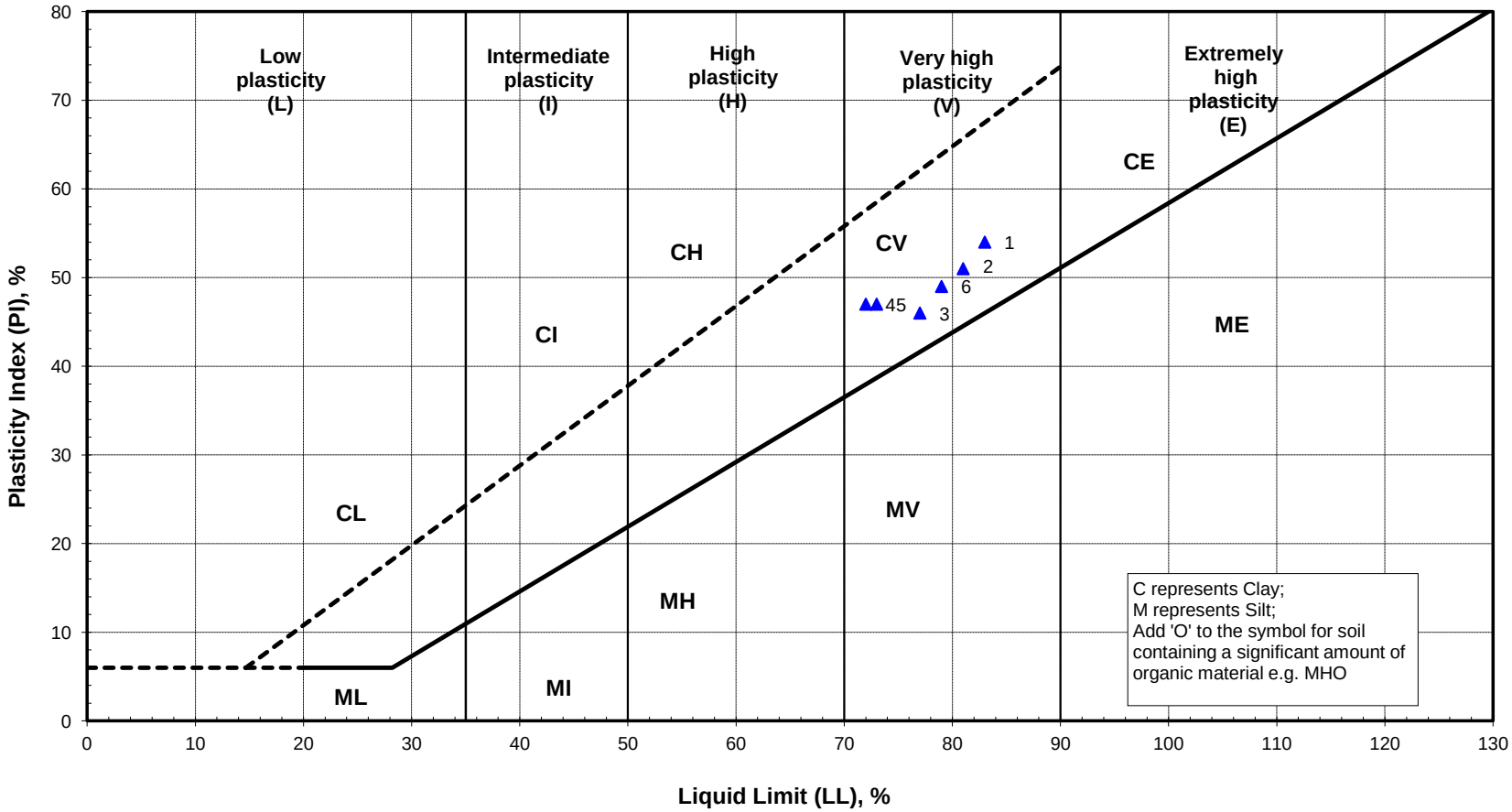
Project Name		*77 Lawn Road (London NW3)*					**Project Number**		*J12507*		
Client		*Mr Enric Torner (Architect)*			**PE**	*DV*	**Date Issued**		*23-Feb-16*		
Location	Depth m	Sample Type	Visual Description	Comments	Natural MC %	Liquid Limit %	Plastic Limit %	Plasticity Index	Classi-fication	Passing 425 micron %	
WS1	2.00	D	*Stiff light brown CLAY.*		*37*	*83*	*29*	*54*	*CV*	*100*	
WS1	4.00	D	*Very stiff light brown CLAY.*		*33*	*81*	*30*	*51*	*CV*	*100*	
WS1	5.00	D	*Very stiff brown grey CLAY.*		*33*	*77*	*31*	*46*	*CV*	*100*	
WS2	1.50	D	*Firm dark grey mottled yellow brown slightly gravelly CLAY. Gravel consists of fine rounded flint.*		*37*	*72*	*25*	*47*	*CV*	*98*	
WS2	2.50	D	*Firm brown slightly sandy CLAY.*		*31*	*73*	*26*	*47*	*CV*	*100*	
WS2	4.00	D	*Stiff light brown CLAY.*		*33*	*79*	*30*	*49*	*CV*	*100*	

Plasticity Chart for Atterberg Limit Tests

Project Name	*77 Lawn Road (London NW3)*			**Project Number**	*J12507*
Client Name	*Mr Enric Torner (Architect)*	**PE**	*DV*	**Date Issued**	*18-Jan-16*

Key

No.	TH No.	Depth
1	WS1	2.00
2	WS1	4.00
3	WS1	5.00
4	WS2	1.50
5	WS2	2.50
6	WS2	4.00



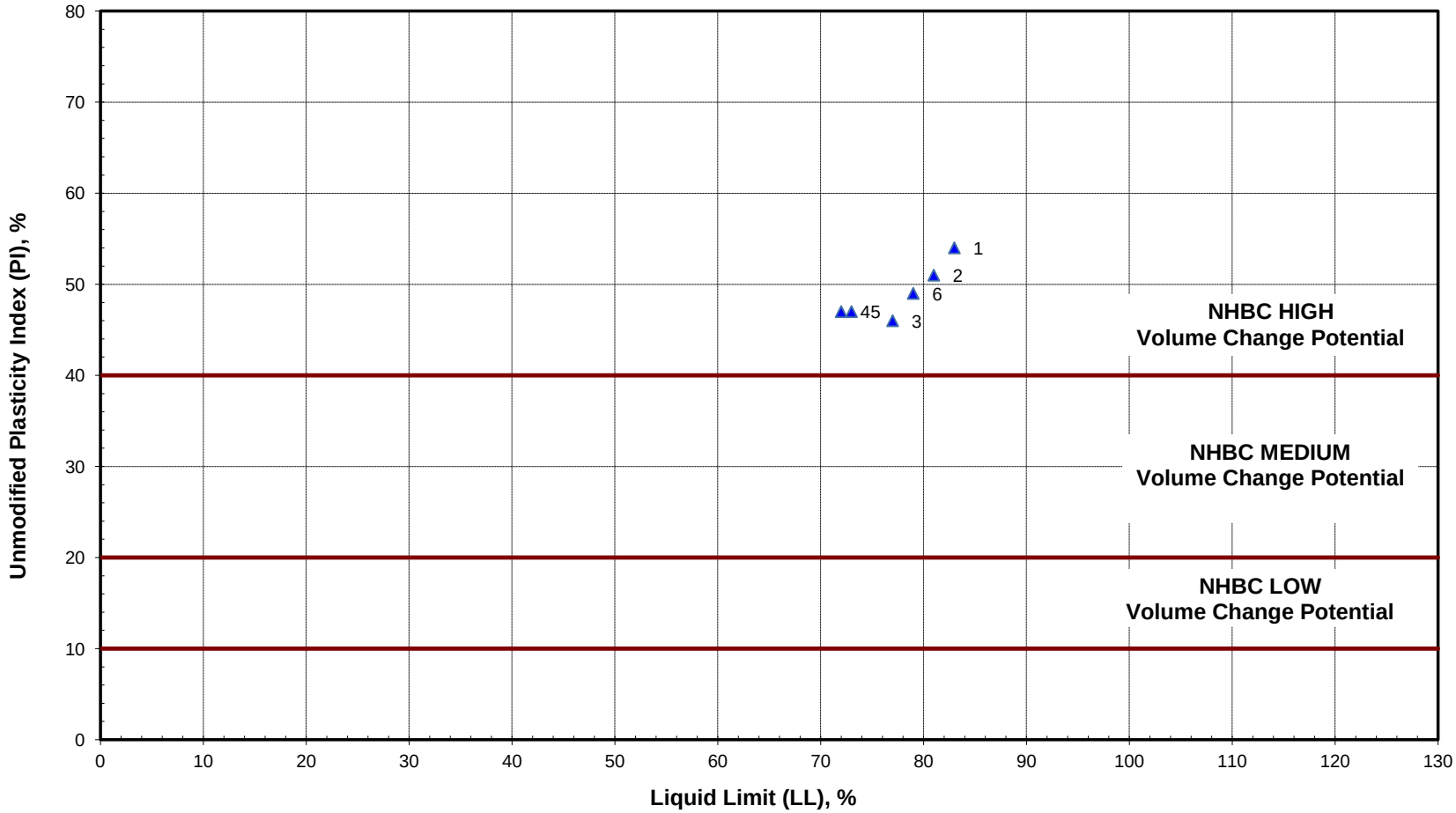
Liquid Limit		**Plastic Limit**		**Plasticity Index**	
Maximum Value	83	Maximum Value	31	Maximum Value	54
Minimum Value	72	Minimum Value	25	Minimum Value	46
Average Value	78	Average Value	29	Average Value	49

NHBC Classification for Volume Change Potential

Project Name	*77 Lawn Road (London NW3)*			**Project Number**	*J12507*
Client Name	*Mr Enric Torner (Architect)*	**PE**	*DV*	**Date Issued**	*18-Jan-16*

Key

No.	TH No.	Depth
1	WS1	2.00
2	WS1	4.00
3	WS1	5.00
4	WS2	1.50
5	WS2	2.50
6	WS2	4.00



Liquid Limit		**Plastic Limit**		**Unmodified Plasticity Index**	
Maximum Value	83	Maximum Value	31	Maximum Value	54
Minimum Value	72	Minimum Value	25	Minimum Value	46
Average Value	78	Average Value	29	Average Value	49

Southern Testing | ST Consult

CHEMICAL & ELECTROCHEMICAL TESTING SUMMARY

To BS1377-3:1990(2003) cl 5.6 & 9.5

AGS

Project Name	**77 Lawn Road (London NW3)**					**Project Number**	J12507
Client	**Mr Enric Torner (Architect)**			**PE**	*DV*	**Date Issued**	*18-Jan-16*

TH No.	Depth m	Sample Type	Visual Description	Comments	Passing 2mm %	pH Value	Soil Sulphate 2:1 Water Extract		Groundwater Sulphate	
							g/l SO_3	BRE mg/l SO_4	g/l SO_3	BRE mg/l SO_4
WS1	3.00	D	Very stiff light brown CLAY.		100.0	7.6	0.82	979		
WS2	2.00	D	Stiff light brown CLAY.		100.0	7.2	0.08	96		
WS2	3.50	D	Very stiff light brown CLAY.		100.0	7.5	0.35	422		

APPENDIX D

Contamination Laboratory Test Results

Table 1 - Tier 1 Screening Values

Contaminant	Units	Proposed Land Use					
		Residential with homegrown produce consumption	Residential without homegrown produce consumption	Open Space* (Residential)	Open Space* (Park)	Allotments	Commercial / Industrial
Arsenic (As) [2]	mg/kg	37	40	79	170	43	640
Cadmium (Cd) [2]	mg/kg	11	85	120	555	1.9	190
Trivalent Chromium (CrIII) [2]	mg/kg	910	910	1,500	33,000	18,000	8600
Hexavalent Chromium (CrVI) [2]	mg/kg	6	6	7.7	220	1.8	33
Lead (Pb) [3]	mg/kg	200	310	630	1300	80	2330
Mercury (Hg) [1,2,7]	mg/kg	7.6-11	9.2-15	40	68-71	6.0	29-320
Selenium (Se) [2]	mg/kg	250	430	1,100	1,800	88	12,000
Nickel (Ni) [2,4]	mg/kg	180	180	230	3,400	230	980
Copper (Cu) [2,4]	mg/kg	2,400	7,100	12,000	44,000	520	68,000
Zinc (Zn) [2,4]	mg/kg	3,700	40,000	81,000	170,000	620	730,000
Phenol [1,2]	mg/kg	120-380	440-1200	440-1300	440-1300	23-83	440-1300
Benzo[a]pyrene [1,5]	mg/kg	1.7-2.4	2.6	4.9	10	0.67-2.7	36
Naphthalene [1,2]	mg/kg	2.3-13	2.3-13	77-430^{+}	77-430^{+}	4.1-24	77-430^{+}
Total Cyanide (CN) [6]	mg/kg	/	/	/	/	/	/
Free Cyanide [6]	mg/kg	/	/	/	/	/	/
Complex Cyanides [6]	mg/kg	/	/	/	/	/	/
Thiocyanate [6]	mg/kg	/	/	/	/	/	/

Notes:

***** Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants the screening value is dependant on the Soil $^{+}$Organic Matter.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper, Zinc and Nickel may have phototoxic effects at the given concentrations. Alternative criteria should be adopted for importation of Topsoil or other soils for cultivation. BS3882:2007 and BS8601:2013 suggest values of 200 to 300mg/kg for Zn, 100 to 200mg/kg for Cu, and 60 to 110mg/kg for Ni, for topsoil and subsoil, depending on pH.

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

[6] Screening criteria derived on a site specific basis if test results indicate.

[7] S4UL for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental Mercury.

These screening values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

a CONCEPT LIFE SCIENCES company

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: 538797-1

Date of Report: 20-Jan-2016

Customer: Southern Testing Laboratories
Keeble House
Stuart Way
East Grinstead
West Sussex
RH19 4QA

Customer Contact: Mr David Vooght

Customer Job Reference: J12507
Customer Purchase Order: J12507_1 David
Customer Site Reference: 77 Lawn Road (London NW3)
Date Job Received at SAL: 12-Jan-2016
Date Analysis Started: 13-Jan-2016
Date Analysis Completed: 20-Jan-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
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 Section 25 of the SAL Quality Manual

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Chelsea Entwistle
Project Management

Issued by :
Chelsea Entwistle
Project Management

SAL Reference: 538797
Project Site: 77 Lawn Road (London NW3)
Customer Reference: J12507

Soil Analysed as Soil
STL Key Contamintion Suite

				SAL Reference	**538797 001**	**538797 002**	**538797 003**	**538797 004**
				Customer Sample Reference	**TP4 @ 0.30m**	**WS1 @ 1.00m**	**WS1 @ 1.50m**	**WS2 @ 2.00m**
				Date Sampled	**06-JAN-2016**	**06-JAN-2016**	**06-JAN-2016**	**06-JAN-2016**
				Type	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**				
Arsenic	T257	A40	2	mg/kg	**17**	**14**	**18**	**19**
Cadmium	T257	A40	0.1	mg/kg	**0.3**	**0.1**	<0.1	<0.1
Chromium	T257	A40	0.5	mg/kg	**24**	**27**	**53**	**49**
Copper	T257	A40	2	mg/kg	**57**	**34**	**28**	**26**
Lead	T257	A40	2	mg/kg	**460**	**160**	**21**	**17**
Mercury	T245	A40	1.0	mg/kg	**1.8**	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	**17**	**15**	**60**	**61**
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3
Zinc	T257	A40	2	mg/kg	**230**	**62**	**79**	**70**
Asbestos ID	T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected	-
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1
Fraction Organic Carbon - F(oc)	T917	A40	0.001	%	**0.027**	**0.024**	**0.002**	**0.002**
pH	T7	A40			**8.0**	**7.0**	**7.7**	**7.8**
Soil Organic Matter	T287	A40	0.1	%	**4.7**	**4.1**	**0.3**	**0.3**
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	**0.05**	**0.02**	**0.59**	**0.02**
Sulphide	T4	A40	10	mg/kg	<10	<10	<10	<10
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1
Moisture @105C	T162	AR	0.1	%	**24**	**17**	**23**	**26**
Retained on 2mm	T2	A40	0.1	%	<0.1	<0.1	<0.1	<0.1

SAL Reference: 538797
Project Site: 77 Lawn Road (London NW3)
Customer Reference: J12507

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

				SAL Reference	**538797 001**	**538797 002**	**538797 003**	**538797 004**
				Customer Sample Reference	**TP4 @ 0.30m**	**WS1 @ 1.00m**	**WS1 @ 1.50m**	**WS2 @ 2.00m**
				Date Sampled	**06-JAN-2016**	**06-JAN-2016**	**06-JAN-2016**	**06-JAN-2016**
				Type	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**				
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	**0.3**	<0.1	<0.1	<0.1
Pyrene	T16	AR	0.1	mg/kg	**0.2**	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	T16	AR	0.1	mg/kg	**0.1**	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<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
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<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
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
PAH(total)	T16	AR	0.1	mg/kg	**0.8**	<0.1	<0.1	<0.1

Index to symbols used in 538797-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos subcontracted to REC Limited
Retained on 2mm is removed before analysis
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis

Method Index

Value	Description
T27	PLM
T917	OX/IR (SE)
T4	Colorimetry
T921	Colorimetry (CF) (MCERT)
T2	Grav
T16	GC/MS
T162	Grav (1 Dec) (105 C)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T7	Probe
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T287	Calc TOC/0.58
T6	ICP/OES
T245	ICP/OES(Aqua Regia Extraction)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Arsenic	T257	A40	2	mg/kg	M	001-004
Cadmium	T257	A40	0.1	mg/kg	M	001-004
Chromium	T257	A40	0.5	mg/kg	M	001-004
Copper	T257	A40	2	mg/kg	M	001-004
Lead	T257	A40	2	mg/kg	M	001-004
Mercury	T245	A40	1.0	mg/kg	U	001-004
Nickel	T257	A40	0.5	mg/kg	M	001-004
Selenium	T257	A40	3	mg/kg	U	001-004
Zinc	T257	A40	2	mg/kg	M	001-004
Asbestos ID	T27	A40			SU	001-003
Chromium VI	T6	A40	1	mg/kg	N	001-004
Fraction Organic Carbon - F(oc)	T917	A40	0.001	%	N	001-004
pH	T7	A40			M	001-004
Soil Organic Matter	T287	A40	0.1	%	N	001-004
(Water Soluble) SO4-- expressed as SO4	T242	A40	0.01	g/l	M	001-004
Sulphide	T4	A40	10	mg/kg	N	001-004
Cyanide(Total)	T921	AR	1	mg/kg	M	001-004
Phenols(Mono)	T921	AR	1	mg/kg	M	001-004
Moisture @105C	T162	AR	0.1	%	N	001-004
Retained on 2mm	T2	A40	0.1	%	N	001-004
Naphthalene	T16	AR	0.1	mg/kg	U	001-004
Acenaphthylene	T16	AR	0.1	mg/kg	U	001-004
Acenaphthene	T16	AR	0.1	mg/kg	M	001-004
Fluorene	T16	AR	0.1	mg/kg	M	001-004
Phenanthrene	T16	AR	0.1	mg/kg	U	001-004
Anthracene	T16	AR	0.1	mg/kg	M	001-004
Fluoranthene	T16	AR	0.1	mg/kg	N	001-004
Pyrene	T16	AR	0.1	mg/kg	N	001-004
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	M	001-004
Chrysene	T16	AR	0.1	mg/kg	M	001-004
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	001-004
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	001-004
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	M	001-004
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	M	001-004

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	M	001-004
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	M	001-004
PAH(total)	T16	AR	0.1	mg/kg	U	001-004

a CONCEPT LIFE SCIENCES company

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: 538797-1 A

Date of Report: 20-Jan-2016

Customer: Southern Testing Laboratories
Keeble House
Stuart Way
East Grinstead
West Sussex
RH19 4QA

Customer Contact: Mr David Vooght

Customer Job Reference: J12507
Customer Purchase Order: J12507_1 David
Customer Site Reference: 77 Lawn Road (London NW3)
Date Job Received at SAL: 12-Jan-2016
Date Analysis Started: 13-Jan-2016
Date Analysis Completed: 20-Jan-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
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 Section 25 of the SAL Quality Manual

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Chelsea Entwistle
Project Management

Issued by :
Chelsea Entwistle
Project Management

Waste Acceptance Criteria

Customer Sample Reference : WS1 @ 1.50m
SAL Sample Reference : 538797 003
Project Site : 77 Lawn Road (London NW3)
Customer Reference : J12507
Test Portion Mass (g) : 87.5
Date Sampled : 06-JAN-2016
Type : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
pH	Probe			M	7.7		>6.0	
Loss on Ignition @450C	Ign 450C/Grav	0.1	%	M	5.4			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.2	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	23			
Retained on 2mm	Grav	0.1	%	N	<0.1			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	<0.14	1.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	<10	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0025	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.086	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	13	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.016	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	30	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	11	**10.0**	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.014	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0056	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	930	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	1900	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.023	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : WS2 @ 2.00m
SAL Sample Reference : 538797 004
Project Site : 77 Lawn Road (London NW3)
Customer Reference : J12507
Date Sampled : 06-JAN-2016
Test Portion Mass (g) : 87.5
Type : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
pH	Probe			M	7.8		>6.0	
Loss on Ignition @450C	Ign 450C/Grav	0.1	%	M	5.1			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.2	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	26			
Retained on 2mm	Grav	0.1	%	N	<0.1			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	<0.14	1.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	<10	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0050	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.067	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	17	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.015	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	70	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	9.3	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.015	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	27	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	400	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.036	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

SAL Reference: 538797
Project Site: 77 Lawn Road (London NW3)
Customer Reference: J12507

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

				SAL Reference	**538797 003**	**538797 004**
				Customer Sample Reference	**WS1 @ 1.50m**	**WS2 @ 2.00m**
				Test Sample	**AR**	**AR**
				Date Sampled	**06-JAN-2016**	**06-JAN-2016**
				Type	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Fluorene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Pyrene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Chrysene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	M	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1	<0.1

SAL Reference: 538797
Project Site: 77 Lawn Road (London NW3)
Customer Reference: J12507

Soil Analysed as Soil
BTEX

				SAL Reference	**538797 003**	**538797 004**
				Customer Sample Reference	**WS1 @ 1.50m**	**WS2 @ 2.00m**
				Test Sample	**AR**	**AR**
				Date Sampled	**06-JAN-2016**	**06-JAN-2016**
				Type	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10

SAL Reference: 538797
Project Site: 77 Lawn Road (London NW3)
Customer Reference: J12507

Soil Analysed as Soil
PCBs EC7 (SE)

				SAL Reference	**538797 003**	**538797 004**
				Customer Sample Reference	**WS1 @ 1.50m**	**WS2 @ 2.00m**
				Test Sample	**AR**	**AR**
				Date Sampled	**06-JAN-2016**	**06-JAN-2016**
				Type	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	M	<20	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	M	<20	<20

Index to symbols used in 538797-1 A

Value	Description
8:1	Leachate to BS EN 12457-3 (8:1)
A40	Assisted dried < 40C
2:1	Leachate to BS EN 12457-3 (2:1)
AR	As Received
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Retained on 2mm is removed before analysis
pH, LOI & TOC were performed on assisted dried samples (<40 degree centigrade). All other results relate to samples as received.
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except ANC

APPENDIX E

Bomb Map

Colour Key References
(for guidance only)

Black
Total destruction

Purple
Damaged beyond repair

Dark Red
Seriously damaged; doubtful if repairable

Light Red
Seriously damaged, but repairable at cost

Orange
General blast damage – not structural

Yellow
Blast damage, minor in nature

Light Blue
Clearance areas

Light Green
Clearance areas

V1 flying bomb

V2 long range rocket

Site: 77 Lawn Road, London NW3	STL: J12507	Fig No: A
Date: 01 March 2016	Bomb Map	