EPR/QP3108ST/A001
April 2021

SITE CONDITION REPORT

Completed using Environment Agency H5 *SCR guidance found below:*

https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

INSTRUCTIONS FOR USE:

Sections 1-3 have been completed as part of the application for an environmental permit (April 2021)

Sections 4-7 are to be maintained during the life of the permit

At surrender: a new doc reference is to be added in section 1 and sections 8-10 are to be completed; & submitted to the environment agency with the surrender application.

1.0 Site Details

Name of the applicant	SOF-11 Docklands DC UK BIDCO Ltd. (EPR/QP3108ST/A001)
Activity address	Units 1, 2 and 4 Greenwich View Place Isle of Dogs London E14 9NN
National grid reference	TQ 37672 79263

Document reference and dates for Site Condition Report at permit application and surrender	**Application**: Site Condition Report v1.pdf (April 2021) **Surrender**:

Document references for site plans (including location and boundaries)	Drainage plan - UAP3439_A Site Plan & Emissions Points GLA16145_EC_Aerial_Photo GLA16145_EC_Neighbourhood GLA16145_EC_Town GLA16145_EC_VML

2.0 Condition of the land at permit issue

Table 1 - Environmental setting

Condition area	Source of information	Description
Geology	• Ground Investigation report - June 2016 (see Appendix A) • Soil Investigation report - April 2017 (see Appendix B) • Envirocheck database • Online geological mapping at www.bgs.ac.uk	The underlying geology of the site is Lambeth Group with very dense brown fine to medium sand, overlain by Alluvium (Upper Thames Valley Formation). The Alluvium is composed of Stiff grey cohesive soil with varying amounts of sand over, Medium dense brown sand and/or gravel (Thames Gravel). The Alluvium is overlain by Made Ground. The made ground is predominantly brown granular soil with varying amounts of brick, metal, clinker, plastic, wood and concrete.
Hydrogeology	• Aquifer designation mapping available at www.magic.gov.uk, • Envirocheck database	The Department for Environment Food & Rural Affairs (DEFRA) “MAGIC map” tool shows that the soil scape is naturally wet and lime rich to moderate. The MAGIC map tool also classifies the soil base as rich in loam (moistened clay, silt and sand) and clayey soils. The Bedrock Aquifer Designation of the site is Secondary A aquifer. With the Superficial Aquifer Designation of the site classed as Secondary Undifferentiated Strata association and therefore has only a minor value. The site is also not in a Source Protection Zone.
Hydrology	• Envirocheck database • Environmental Agency Flood map for planning	Due to the location of the site in the Isle of dogs being surrounded with the Thames to the East, South and West the flood mapping shows the potential for extreme flooding from rivers or sea without defences. However, the whole of the Isle of dogs benefits from flood defences. The JBA Flood maps show no significant risk of pluvial or fluvial onsite. From the JBA 100-year return flood map there is a risk of a large area of fluvial flooding approximately 50-350m to the north west of the site. From the 200 year return flood map areas surrounding the site begin to show signs of small localised pluvial flooding. The maps do not indicate a risk of flooding from groundwater at the site.
Ecological Designated Sites	• Envirocheck database • Environment Agency	The site is located approximately 300m from Mudchute Park and Farm which is designated as a Local Nature Reserve.

Table 2 - Pollution history:

Condition area	Source of information	Description
Pollution incidents	• Envirocheck database	*Recorded Pollution Incidents* According to Envirocheck's database there have been no historic pollution incidents recorded on the site. The closest Major pollution incident occurred 891 metres north from the site in September 1989 for Pollution 'oils – unknown'. This was a category 1 – major incident. In addition to the above there has been twelve other instances of pollution incidents to controlled waters recorded on the Envirocheck Database. These incidents all pre-date the use of the site as a data centre with the latest being in March 1998 which occurred 984 meters north of the site. *Contaminated Land Register Entries* None recorded within 2km of the site. *Prosecutions or Enforcement Actions* None recorded within 2km of the site.
Historical land-uses and associated contaminants	• Envirocheck database	The historical mapping shows the site remained was developed around 1896 when the site comprises of several building labelled as Warehouses. Capewell Horse Nail Works is located on the north-western Site boundary. With a Granary located immediately north of the site. By 1916, the site remains mostly unchanged apart from the addition of cranes on the east of the site. The adjacent iron works is now a cooperage and the granary is denoted simply as warehouses. The 1949 the warehouse covering most of the north of the site is listed as ruin. The rest of the site remains unchanged. The cooperage to the east has been replaced with Dunbar house and a Granolithic works is located ~100m from the site boundary. Between 1940 and 1967 the smaller warehouses have been demolished and two large warehouses cover almost the entirety of the site as well as ~100m to the north has been erected. In the late 60s the surrounding area begins to be developed into residential and commercial properties. A works is present to the south west of the beginning around 100m from the site boundary.

Condition area	Source of information	Description
		By 1991 the warehouses have been demolished and several smaller buildings are now located onsite. The point into the docks has also been constructed. The surrounding area remains unchanged. The site remained as three separate buildings and the point into the dock until approximately 2016 when works began to redevelop the site into its current footprint. The historical data map shows that there is potentially contaminative land from historical uses. The surrounding area has supported various industrial and potentially contaminative land uses as describes above.
Waste management facilities	• Envirocheck database	*Landfill Sites* There are two Historical Landfill sites recorded in the Envirocheck Database within 1km of the site: • Millwall Outer Dock Entrance, 394 metres to the west of the site. • Western Dock, 875 meters to the north west of the site. No further details are provided on the above historic landfills. There are also no active landfill sites listed within the 2km search radius on the Envirocheck database. *Licensed Waste Management Facilities* There is one Licensed Waste Management Facility within 1km of the site: • 572 meters north, Operator: Dredging, Environment And Marine Engineering (D E M E) N V, Licensed issued 15th June 2011 for mobile plant. *Waste Treatment Sites* There is one Waste Treatment or Disposal Site within 1km of the site: • 379 meters west, Licence Holder: Robert Deards Ltd, Incineration, No known restriction on source of waste, dated 1dt March 1997, Licence lapsed/cancelled/defunct/not applicable/surrendered/Cancelled.

Condition area	Source of information	Description
Environmental permits	• Envirocheck database	*Local Authority Air Pollution Control* The is one record of a local authority air pollution control within 2km of the site: • 287 meters south east, Asda Petrol Station, PG1/14 Petrol filling station, status – authorised *Local Authority Pollution Prevention and Control* There are six records of a local authority air pollution control within 2km of the site: • 300 meters west, West Ferry Printers Ltd, PG6/16 Printworks, status – permitted • 481 metres north west, State Express Cleaners & Launderette, PG6/46 Dry cleaning, status – permitted • 482 metres north west, State Express Cleaners & Launderette, PG6/46 Dry cleaning, status – permitted • 519 meters north east, Reliable Dry Cleaners, PG6/46 Dry cleaning, status – permitted • 691 meters south, Soleil Dry Cleaners, PG6/46 Dry cleaning, status – permitted • 878 meters north, Hanson, PG3/1Blending, packing, loading and use of bulk cement, status – authorisation revoked
Evidence of Historical Contamination	• Envirocheck database • Ground Investigation report - June 2016 (see Appendix A) • Soil Investigation report - April 2017 (see Appendix B)	The soil geo-chemistry maps do not show any significant elevated concentrations of heavy metals. Borehole and trial pit samples taken during ground investigations in 2016 found detectable concentrations of lead and benzo(a)pyrene to be present within the Made Ground but not in concentrations above the thresholds for commercial developments. There have been no historic pollution incidents recorded on the site or within the surrounding area.The soil contamination maps for the area show the heavy metal concentrations for the corresponding land use: Arsenic concentrations are estimated to be within 15 -25mg/kg, cadmium concentrations are less than 1.8 mg/kg and nickel concentrations are within 30-45 mg/kg. The chromium concentrations are estimated to be within 60 – 90 mg/kg and the lead concentrations are between 150 – 300. The ground investigation conducted in 2016 confirmed that detectable concentrations of analytes, such as lead and benzo(a)pyrene to be present within the Made Ground however this was not in significantly elevated concentrations compared to the threshold for commercial development. This report was expanded in in

Condition area	Source of information	Description
		April of 2017 which also detected benzo(a)pyrene and other hydrocarbons. Again, the report concluded that the risk of contamination to sensitive receptors remains low and no specific requirements for remediation are required. For full details please see the 2016 Ground investigation report in Appendix A and the Soil Investigation report in Appendix B. Both reports contain the laboratory results from the investigations and the ground report also contains the borehole and trail pit log.
Baseline soil and groundwater reference data	• Ground Investigation report - June 2016 (see Appendix A) • Soil Investigation report - April 2017 (see Appendix B) • Envirocheck database	Baseline soil and groundwater reference data has been obtained from the previous completed soil and groundwater reports (Appendix A & Appendix B). In relation to the permittable activities only diesel fuel and glycol are considered to be 'relevant hazardous substances' which will be in use at the site.
Supporting information and sources		• Ground Investigation report - June 2016 (see Appendix A) • Soil Investigation report - April 2017 (see Appendix B) • Envirocheck database • Publicly available online geological mapping at www.bgs.ac.uk • Aquifer designations available at www.magic.gov.uk • Environmental Agency Flood map for planning • Environment Agency - Pre-application Conservation Screening Report and Maps

3.0 Permitted activities

Table 3 - Permitted activities

Permitted activities	Schedule 1 ref 1.1 Part A (1) a) (i) combustion plant >50 MWth. Operation of standby diesel generators, with storage of diesel oil as Directly Associated Activities (DAA).
Non-permitted activities undertaken	The installation boundary is limited to the permitted activities. The internal data halls and office space is not part of the permitted activities. In normal conditions these will operate using electricity provided by the national grid.
Document references for: • plan showing activity layout; and • environmental risk assessment.	• Site Plan & Emissions Points • Environmental Risk Assessment v1

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4.0 Changes to the activity

Have there been any changes to the activity boundary?	
Have there been any changes to the permitted activities?	
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	
Checklist of supporting information	

5.0 Measures taken to protect land

Checklist of supporting information	

6.0 Pollution incidents that may have had an impact on land, and their remediation

Checklist of supporting information	

7.0 Soil gas and water quality monitoring (where undertaken)

Checklist of supporting information	

8.0 Decommissioning and removal of pollution risk

Checklist of supporting information	

9.0 Reference data and remediation (where relevant)

Checklist of supporting information	•

10.0 Statement of site condition

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Appendix A – GROUND INVESTIGATION REPORT

April 2021

geosphere environmental ltd

investigate design resolve

GROUND INVESTIGATION REPORT

FOR A PROPOSED COMMERCIAL DEVELOPMENT

AT

UNIT 1, THE POINT, GREENWICH VIEW PLACE, ISLE OF DOGS, LONDON E14 9NN

Prepared For

ARC:MC Limited
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Report Reference Number:	1580,GI - GEO/SG,JD/06.06.16/FINAL,V2
Project Number:	1580,GI
Issue Reference:	2
Issue Date:	16 June 2016




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DOCUMENT ISSUED RECORD

Report Number:	1580,GI - GEO/SG,JD/06.06.16/FINAL V2
Client:	ARC:MC Limited
Project:	Unit 1, The Point, Greenwich View Place, Isle of Dogs, London, E14 9NN
Project Number:	1580,GI
Report Type:	Ground Investigation
Date of Report:	16 June 2016

Prepared by:	Stephen Gilchrist *Senior Geotechnical Consultant*	Date:	16 June 2016
Reviewed by:	Jim Dawson *Principal Remediation Engineer*	Date:	16 June 2016
Reviewed and Authorised by:	Paul Davies *Director*	Date:	16 June 2016

Prepared by:	Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ. Telephone (01603) 298 076. www.geosphere-environmental.co.uk
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REVISION RECORD

Revision	Date	Document	Prepared By:	Admin
V2	17/03/17	1580,GI - GEO/SG,JD/06.06.16/FINAL V2	SG	CJ

AMENDMENT RECORD

Revision	Date	Amendments
V2	17/03/17	Update subject to LA comments

EXECUTIVE SUMMARY

Project Details	Geosphere Environmental Ltd was commissioned by the Client, ARC:MC Ltd, to undertake a Ground Investigation for a proposed commercial development at Units 1,2 and 4, The Point, Greenwich View Place, Isle of Dogs, London, E14 9NN. This investigation is based on proposed development drawings, provided by the architect; ARC:MC, and a Phase 1 Site Environmental Report, (Desk Study), undertaken by RPS Ltd reference JER5464 dated May 2012. A previous report, 1580,GI - GEO/SG,JD/06.06.16/FINAL dated 6 June 2016, was produced by Geosphere Environmental Ltd, which comprises of a geotechnical and geo-environmental assessment for use in facilitating planning conditions associated with Unit 2 and 4. This report is provided to specifically target Unit 1.
Site Location / Description	The subject site was situated at Greenwich View Place, Isle of Dogs, London, approximately 230m to the west of the Crossharbour train station, and which may be located by National Grid Reference, (NGR), TQ 37659 79300. The site is an irregular shaped roughly level parcel of land approximately 0.6ha in size, and comprises of a number of two story commercial units, (1, 2 and 4), together with areas of block pave vehicular access and parking. At the time of the walkover the units were derelict, whilst the car parking areas were still being used by neighbouring office units.
Previous investigation	The findings of a previous Desk Study indicated a number of sources of contamination to be present that required further investigation, however a re- assessment of the desk study findings indicated the majority of sources to be beyond the boundaries of the site. Based upon the reassessment of the desk study, it is considered that there is a risk of contamination from Made Ground sources associated with historical developments and from off-site sources of organics and hydrocarbons. Further to the above, an electricity substation was noted to the north west of Unit 1, which may present a risk of Polychlorinated Biphenyls to site workers during the redevelopment of the site. It is therefore recommended this area is subject to a targeted geo-environmental investigation in order to quantify the risk to the receptor.
Site Works	Site works were carried out between 11 January 2016 and 22 February 2016 and comprised of the following: o Formation of two hand dug/machine dug trial pits in the location of borehole excavations together with soil sampling; o Excavation of two Cable Percussive boreholes, (U1-BH-02, U1-BH-03) extended to depths ranging from 23.20m to 36.50m together with soil sampling and in-situ testing; o Installation of gas and groundwater monitoring standpipes/piezometers within each borehole location.
Ground Conditions	The geotechnical ground conditions at the site comprised of the following: A nominal amount of block paving and/or concrete over significant thicknesses of Made Ground, extending to depths ranging from 3.9m to 5.6m bgl. A number of

	concrete slabs were noted at distinct depths across the excavations, largely noted between 1.15m to 1.30m and 1.65 to 2.1m bgl. The Made Ground was underlain in turn by both cohesive and granular alluvial soils of the Upper Thames Valley Formation, extending to depths ranging from 13.5m to 16.0m bgl. The alluvial Upper Thames Valley soils were underlain in turn by granular Lambeth Group soils. The latter was proven within a single borehole to a depth of 34.90m bgl, and was underlain by soils of the White Chalk Subgroup.
Gas Monitoring	A minimum requirement for gas protection measures for commercial developments in the area of U1-BH-02 are required, and may comprise of a proprietary gas resistant membrane installed to reasonable levels of workmanship, in line with current good practice under CQA with integrity testing and independent validation.
Laboratory Results	The chemical analyses were carried out on three soil samples, and indicated that concentrations of contaminants were below the thresholds for human health. A further two samples were analysed under current Waste Acceptance Criteria are provided within Appendix 7. Whilst chemical analysis of the soils indicates the level of contaminants within the soils on the site, the distribution of analysed soils within the Unit 1 area is limited and therefore further investigation may be required to fully assess the contamination status beneath that area.
Advanced Conceptual Model	Results of chemical analysis on soils indicate detectable concentrations of analytes, such as lead and benzo(a)pyrene to be present within the Made Ground, but not in significantly elevated concentrations compared to thresholds for commercial developments. However, short term mitigation measures should be implemented to protect ground workers during the development of the site. It is considered such analytes are not present in significantly elevated or highly leachable quantities and therefore the risk to controlled waters is considered to be very low. Any hydrocarbons encountered within the soils during the demolition and construction of the proposed development should be excavated and replaced with certified clean soils or engineered fill. A Remediation Method Statement may be required by the local authority. At this stage of the development, no investigation of PCBs has been undertaken in the location of the electricity sub-station due to the presence of live services. A small scale supplementary investigation is recommended, post-demolition of the site and when live services have been cleared from the aforementioned area, so that a schedule of soil sampling and testing can be undertaken and risk quantified. Taking into consideration the various components of waste classification process, the *combined* laboratory results indicate soils across the site may be considered as inert waste soil classification. This should be assessed by the potential waste receivers and their site-specific receipt thresholds. Further assessment may be warranted.
Geotechnical Appraisal	Soil Shrinkability: Results of Atterberg Limit testing within the cohesive Upper Thames Valley Formation soils indicated the soils to be of low to very high plasticity and low to high volume change potential, whilst the Reading Formation is of high plasticity and high volume change potential, as defined in the NHBC Standards Chapter 4.2 Building near Trees, (ref. R.15).

	Foundations: Information provided by the Client indicates that the proposed foundation shall be piled using 900mm diameter piles and shall incorporate a 750mm thick raft beneath the structure. Given the soils encountered during the intrusive investigation, it is considered that this foundation option is the more viable solution. Further recommendations are provided within the relevant section of this report. Excavations: All excavations within the Made Ground must be assumed to be subject to short term instability. Particular attention must be paid to ensuring the stability of adjacent structures, neighbouring sites and the adjacent dockside. Shallow groundwater was not encountered during the investigation, and as such is not considered likely to be encountered during service run excavations in the short term. All structures founded below the water table must be designed to accommodate the forces of buoyancy, either by self-weight or by tension piles, if necessary. Floor Slabs: It is considered that the proposed raft foundation will form the ground floor and is likely to be constructed onto Made Ground soils. It is recommended that ground bearing floors are fully debonded from structural load bearing walls and suitably reinforced top and bottom to enable spanning of soft spots. Pavement Design: It is likely that the subbase for roadways shall comprise of an engineered fill from the construction of proposed structures, and therefore would be adequate for roadways. Concrete Class: In accordance with the BRE guidance a DS-1 sulphate class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground at the site.
Further Works	Based upon the findings of the investigation thus far, the following recommendations for further works are given below: o A Discovery Strategy should be in place for the site clearance, demolition and slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment. In addition to which a document such as a Remediation Method Statement may also be required by the Regulatory Authorities. o A post-demolition sampling and chemical analysis exercise around the location of Unit 1.
This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive engineering analysis and is for guidance only. It is recommended that the reader reviews the reporting its entirety and any material referenced therein.	

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TABLES

1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by the Client, ARC:MC Ltd, to undertake a Ground Investigation for a proposed commercial development at Units 1,2 and 4, The Point, Greenwich View Place, Isle of Dogs, London, E14 9NN.

It was understood that the development site is to be developed to comprise of a three level data centre facility. The ground level will provide ancillary support to levels 2 and 3 above, and which will include data halls and support functions. Additional plant rooms, electrical and mechanical equipment will be provided at roof level. All levels will be accessed via a stair core of reinforced concrete construction, and a link bridge shall be incorporated to link Unit 3 to the proposed structures. External parking shall also be included as part of the scheme.

The primary objectives of this ground investigation are to:

- Assess the ground conditions at the site;
- Assess the potential risk to human health and the environment.

These are to be achieved by:

- Undertaking an intrusive investigation of the site, based upon the findings of a previous desk study;
- Logging and sampling the soils on the site and noting any visual or olfactory evidence of contamination;
- Installing monitoring wells for groundwater sampling and monitoring and ground gas measurements;
- Undertaking chemical laboratory analysis of selected representative soil samples;
- Undertaking assessment of the laboratory results in accordance with guidance to develop a refined Conceptual Site Model and determine the potential risk to receptors;
- Provide recommendations to assist the development.

This investigation is based on proposed development drawings, provided by the architect, ARC:MC, and a Phase 1 Site Environmental Report, (Desk Study), undertaken by RPS Ltd, reference JER5464 dated May 2012. Whilst the information within the Desk Study covered a wider area, the findings have been reassessed based upon the boundary of the proposed development and are provided within section 3.

Further to the above, this report has been provided to specifically target the area of Unit 1. A previous report, 1580,GI - GEO/SG,JD/06.06.16/FINAL dated 6 June 2016, was produced by Geosphere Environmental Ltd, which comprises of a geotechnical and geo-environmental assessment for use in facilitating planning conditions associated with Units 2 and 4.

2. SITE DESCRIPTION

The subject site is situated at Greenwich View Place, Isle of Dogs, London, approximately 230m to the west of Crossharbour train station, and may be located by National Grid Reference, (NGR), TQ 37659 79300.

Site Location and Extent Plans are presented in Figures 1 and 2 below:

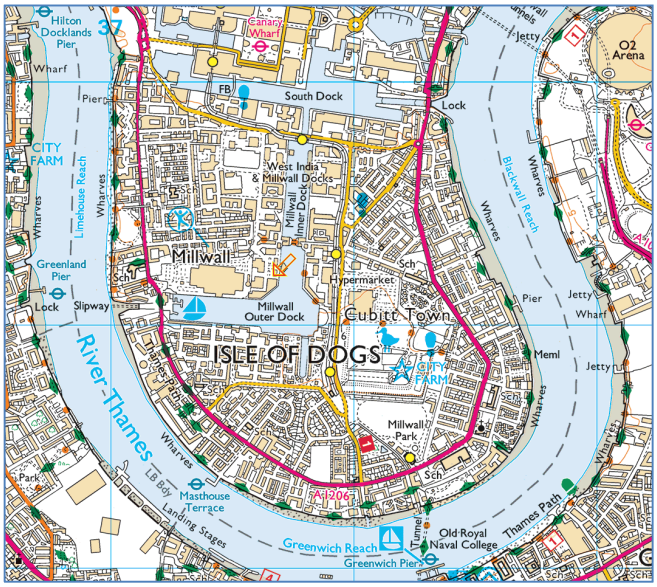

Figure 1 – Site Location Plan

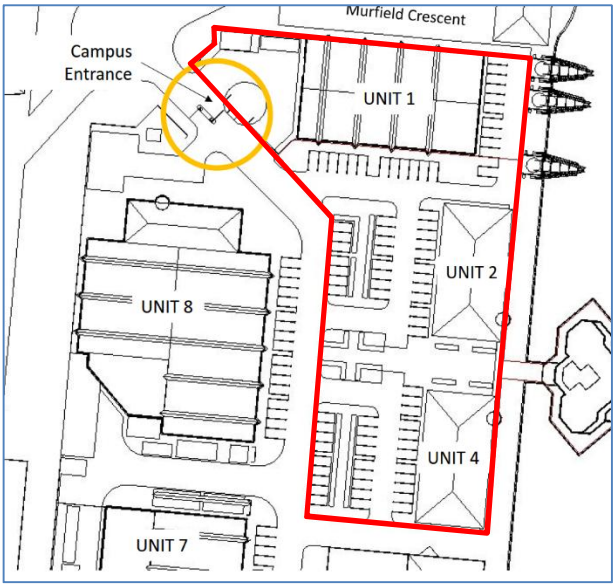

Figure 2 – Site Plan

The development site is an irregular shaped roughly level parcel of land approximately 0.6ha in size and comprises of a number of two story commercial units, (1, 2 and 4), together with areas of block pave vehicular access and parking. At the time of the walkover the units were derelict, whilst the car parking areas were still being used by neighbouring office units.

The northern boundary of the site is formed by an existing brick built boundary wall, approximately 2.0m in height, beyond which was Murfield Crescent with associated parking and residential accommodation located further north. The eastern boundary is largely open, beyond which existed a pedestrian walkway with a number of ornamental dockside cranes to the north, Commercial Unit 3 and Millwall Outer Dock. The southern and western boundaries are both open, with a number of generators and an area of car parking beyond the boundaries, respectively. Further beyond the boundaries, are units associated with Greenwich View Place.

A full site description was provided within the Desk Study Report, undertaken by RPS Ltd, and should be read in conjunction with this report. However, the development site was indicated as comprising of the additional Units 3 and 5 to 8, and associated paved areas, generators and a waste facility. For the purposes of this report, all information relating to the aforementioned may be considered as being located off-site.

Given the reduced site area, on-site sources of contamination were noted to include the following. An electricity sub-station was located to the north west of Unit 1, which was noted to be in good condition. Anecdotally, a fuel storage area was located to the east of the electricity sub-station, the remains of which comprised of a raised concrete pad with a number of stockpiled paving blocks and Intermediate Bulk Containers (IBC's) in a reasonably clean condition. No visual or olfactory evidence of leaks or spills of hydrocarbons were noted at the surface.

The structures of Units 1, 2 and 4 were in a reasonable state of repair, although within Unit 1 was a large workshop/warehouse area, with concrete floor slab and signs of recent fixed plant removal, i.e. electrical components, motors, heaters, etc. A number of bolts were noted to protrude from the floor slab where machinery was located. No visual or olfactory evidence of leaks or spills of chemicals or hydrocarbons were noted at the surface.

A Site Plan, Drawing ref. 1580,GI 001 / Rev 0, is included in Appendix 8 at the end of this report, and in Figure 2 above.

3. PREVIOUS REPORTS

3.1 Overview

As mentioned previously, a Phase 1 Site Environmental Report, undertaken by RPS Ltd reference JER5464 dated May 2012, was undertaken on The Point, Greenwich View Place on behalf of Sarandan Design and Management, which incorporated the investigation site and surrounding area to the south and west, including Units 3 and 5 to 8. Given that the site has not changed in its layout since the submission of the above report, an update to the report was not considered necessary. It is recommended that the above report is read in conjunction with this report.

The report comprised of desk study information for the site, including the geology, hydrology, site history and surrounding industrial land use, for use in providing a preliminary conceptual site model to determine the risk from contamination. Based upon the available information it was considered that there was a low to medium risk of contamination of soils being present on the site, but as part of the geotechnical assessment of the proposed redevelopment some geo-chemical/soil quality assessment is a necessary or prudent measure.

3.2 Re-assessment of Desk Study Findings

Given the findings of the desk study and preliminary conceptual model, a number of pollutant linkages were categorised as low risk. Whilst it is considered necessary to undertake an intrusive survey and subsequent schedule of chemical analysis to confirm any risk identified at the conceptual stage, a targeted soil investigation for pollutant linkages considered to be low risk is not considered necessary.

Those pollutant linkages considered to be above a low risk category have therefore been considered necessary for targeted investigation and have been summarised from the desk study within Table 1, below:

Table 1 – Summary of Conceptual Model

Contamination Source	Contaminant Type	Exposure Pathway	Receptor	Likely Risk Level
Historical site use including Made Ground from previous redevelopment of Site.	Various organic and inorganic contaminants.	Leaching of contaminants to groundwater and migration of contaminated groundwater, possible enhanced vertical migration where piles are advanced as part of redevelopment.	Secondary Aquifer	Medium
		Leaching of contaminants to groundwater and migration of contaminated groundwater into adjacent surface waters.	Surface Waters	
Waste Compactor	Organic and inorganic contaminants from plant and	Leaching of contaminants to groundwater and migration of contaminated groundwater, possible enhanced vertical migration where piles are	Secondary Aquifer	Low to Medium

Table 1 – Summary of Conceptual Model				
Contamination Source	Contaminant Type	Exposure Pathway	Receptor	Likely Risk Level
	compacted materials	advanced as part of redevelopment.		
		Leaching of contaminants to groundwater and migration of contaminated groundwater into adjacent surface waters	Surface waters	
Diesel fuelled generator and three smaller generators located in the south-west corner of the Site	Hydrocarbons	Leaching of contaminants to groundwater and migration of contaminated groundwater, possible enhanced vertical migration where piles are advanced as part of redevelopment.	Secondary Aquifer	Low to Medium
		Leaching of contaminants to groundwater and migration of contaminated groundwater into adjacent surface waters	Surface waters	

Considering the extent of the desk study area, it was noted that the current proposed development area is smaller than that covered by the desk study, and therefore the above has been reassessed based upon the current site area.

The waste compactor, diesel fuelled generator and three smaller generators located in the south west corner of the desk study site were located beyond the boundaries of the proposed development site, and therefore the on-site risk to the secondary aquifer and controlled waters is considered to be negligible. However, a risk of contamination from the off-site sources, through leaching and groundwater migration to the site, is considered to remain.

Based upon the reassessment of the desk study, it is considered that there is a risk of contamination from Made Ground sources associated with historical developments and from off-site sources of organics and hydrocarbons. It is therefore considered that a schedule of environmental testing is required so that the risk of the above sources may be quantified.

Further to the above, an electricity substation was noted to the north west of Unit 1, which may present a risk of Polychlorinated Biphenyls to site workers during the redevelopment of the site. It is therefore recommended this area is subject to a targeted geo-environmental investigation, in order to quantify the risk to the receptor.

4. SITE WORKS

4.1 Methodology

This ground investigation was carried out on the basis of the practices set out in BS 10175: 2011+A1:2013, (ref. R.3), and BS 5930: 2015, (ref. R.4). The location of exploratory holes has been planned, where possible, in general accordance with CLR 4, (ref. R.8).

Proposed borehole location plans are provided within Appendix 8.

For the purposes of this report, information relating to Unit 1 only has been provided below.

4.2 Scope

Site works were carried out between 11 January 2016 and 22 February 2016 and comprised of the following:

- Formation of two hand dug/machine dug trial pits in the location of borehole excavations together with soil sampling;
- Excavation of two Cable Percussive boreholes, (U1-BH-02, U1-BH-03) extended to depths ranging from 23.20m to 36.50m together with soil sampling and in-situ testing;
- Installation of gas and groundwater monitoring standpipes/piezometers within each borehole location.

4.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms the anticipated geology as interpreted from the British Geological Survey, (BGS) map, Sheet Number 270, "South London", Solid and Drift Edition 1:50,000 scale, published, 1998.

The sequence and indicative thickness of strata are provided in Table 2, below.

Table 2 - Ground Conditions

Strata	Depth Encountered (mgl)		Strata Thickness (m)	Composition
	From	To		
Surfacing	GL	0.25 – 0.30	0.25 – 0.30	Concrete with 20mm rebar: U1-BH-02 and U1-BH-03
Made Ground	0.25 – 0.30	3.90 – 5.60	3.60 – 4.75	Largely brown granular soil with varying amounts of brick, metal, clinker, plastic, wood and concrete. Distinct layers of concrete noted between 1.15m - 1.30m and 1.65 – 2.1m.
Alluvium	3.90 – 5.60	13.50 – 16.50	8.00 - 15.40	Stiff grey cohesive soil with varying amounts of sand (ranging from 3.4m to 6.1m in thickness) over,

Table 2 - Ground Conditions				
Strata	Depth Encountered (mgl)		Strata Thickness (m)	Composition
	From	To		
(Upper Thames Valley Formation)				Medium dense brown sand and/or gravel (Thames Gravel) A grey clay with shell fragments is noted at the base of the Upper Thames Valley Formation within U2-BH-01
Lambeth Group	16.00 – 20.50	34.90 (U2-BH-02)	18.90 (U2-BH-02)	Very dense brown fine to medium sand.
White Chalk Subgroup	34.90 (U2-BH-02)	Unproven	Unproven	(Proven only within U1-BH-02) Grey/off-white chalk recovered as a gravelly putty.

4.4 Groundwater

Groundwater was encountered within all of the boreholes excavated during the ground investigation, ranging in depth from approximately 7.7m and 12.0m bgl.

4.5 Visual and Olfactory Evidence of Contamination

With the exception of those construction materials recovered from the Made Ground, (brick, concrete, metal, etc.), encountered within all of the exploratory holes, no visual or olfactory evidence of gross contamination was encountered in any of the exploratory holes.

5. LABORATORY TESTING

5.1 Methodology

Representative disturbed samples were taken at the depths shown within the laboratory testing results and despatched to the laboratory. The laboratory results are included in Appendix 6.

Samples collected for environmental purposes were stored in plastic tubs and amber glass jars and kept in a cool box with cooling aid. Samples collected for geotechnical testing were collected in plastic tubs or bulk bags.

No field analysis techniques were undertaken for the soil samples, all analyses of the soil samples took place in the laboratory.

5.2 Environmental Testing Suite

5.2.1 Quality Control

The environmental laboratory used, (QTS Environmental Ltd), was an accredited laboratory by the United Kingdom Accreditation Service, (UKAS), and at least 50% of individual parameters are from methods pending accreditation to the Environment Agency Monitoring Certification Scheme, (MCERTS), for the range of analyses undertaken as part of this investigation. The MCERTS performance standard for the chemical testing of soil is an application of ISO 17025: 2000 specifically for the chemical testing of soil.

5.2.2 Environmental Testing Suite – Soils

The chemical analyses were carried out on three samples of Made Ground soils for a general suite of contaminants. The nature of the analyses is detailed below:

- Metals screen - arsenic, cadmium, chromium, lead, mercury, selenium, boron (water soluble), beryllium, copper, nickel, vanadium and zinc;
- Organic screen - total petroleum hydrocarbons, (TPH) – with specific carbon banding; benzene, toluene, ethylbenzene and xylenes, (BTEX); polyaromatic hydrocarbons, (PAH) – USEPA 16 suite;
- Inorganics screen - cyanide (total), sulphate (water soluble);
- Others - pH, organic matter, asbestos.

In addition to which, a total of two samples of soil were analysed for current Waste Acceptance Criteria suite of analyses, including simulated leaching testing.

A copy of the laboratory test results is included in Appendix 6.

5.3 Geotechnical Testing Suite

The geotechnical testing has been chosen based upon the soils encountered during the ground investigation, and was undertaken in accordance with BS 1377 at a UKAS accredited laboratory. The following tests were undertaken:

- Moisture content determination;
- Plasticity testing;
- Particle size distribution testing;
- One dimensional consolidation testing;
- BRE SD1 guidance based testing of soils, including pH, total sulphate, soluble sulphate and magnesium.

A copy of the laboratory test results is included in Appendix 7 at the back of this report.

6. MONITORING

6.1 Gas Monitoring

A number of ground gas monitoring standpipes were installed to depths ranging from 5.0m and 6.0m within all the boreholes formed on the site, with subsequent monitoring being undertaken by a suitably qualified environmental consultant, using a GA2000 landfill gas analyser. The main determinants to be recorded are methane (CH_4), carbon dioxide (CO_2), oxygen (O_2) as well as flow and groundwater levels.

Ground gas monitoring was carried out in accordance with current guidance, (ref. R.25). Four initial consecutive monitoring visits were undertaken under a range of atmospheric pressures.

The results and dates of the monitoring are presented in Table 3 below:

Table 3 - Ground Gas Monitoring Results

Monitoring Well	Monitoring Date	Atmospheric Pressure (mb)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	VOC (ppm)	Flow Rate (l/hr)
U1-BH-02	24/02/16	1014	1.2	1.4	17.7	4	0.0
	02/03/16	992	<0.1	0.3	19.9	-	0.3
	07/03/16	1007	7.0	5.7	8.5	0	-0.1
	10/03/16	1016	7.7	5.6	8.0	0	-0.2
	03/05/16	1027	0.2	0.2	20.6	0	0.0
	24/05/16	1020	0.2	0.2	20.4	4	0.3
U1-BH-03	24/02/16	-	-	-	-	-	-
	02/03/16	991	1.1	2.2	17.6	0	0.2
	07/03/16	1007	<0.1	0.2	20.9	1	-0.2
	10/03/16	1016	<0.1	0.1	20.8	0	-0.3
	03/05/16	1025	0.5	0.8	18.7	0	0
	24/05/16	1020	0.2	1.2	17.7	0	0.0

6.2 Groundwater

Groundwater piezometers were installed within all of the boreholes and extended to depths ranging from 6.0m and 36.5m bgl. The monitoring dates were consistent with those for gas monitoring. The water levels and dates of monitoring are presented in Table 4 below:

Table 4 - Groundwater Monitoring Results

Monitoring Well	Depth of Monitoring Well (mbgl)	Groundwater Encountered at (mbgl)					
		Visit 1 24/02/16	Visit 2 02/03/16	Visit 3 07/03/16	Visit 4 10/03/16	Visit 5 03/05/16	Visit 6 24/05/16
U1-BH-02	25.0	3.36	1.60	6.70	3.57	2.60	3.66
U1-BH-03	6.00	n/m	3.36	Dry	Dry	3.20	4.93

Notes:
Dry - no groundwater encountered
n/m – not measured
0 - well filled with water

7. RISK ASSESSMENT

7.1 Risk to Human Health

7.1.1 Methodology

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- Risk Estimation;
- Risk Evaluation.

7.1.2 Soil Quality Screening Values

The results of the soil analyses have been compared to soil quality screening values where deemed applicable, such as:

- The LQM/CIEH S4ULs for Human Health Risk Assessment, (ref. R.31);
- Defra/CL:AIRE Final C4SLs, (ref. R.30);
- The LQM/CIEH, EIC/AGS/CL:AIRE Generic Assessment Criteria, (GAC), (ref. R.20).

Where the concentrations determined on site are at or below the respective screening concentrations, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated.

The land use scenario that this Human Health risk assessment is based upon is for Commercial land use. It is assumed that there will be no soft landscaping, grass or planting/ educational garden areas. If these types of "heightened exposure" areas are undertaken on site, a re-assessment of the risk from the ground conditions must be undertaken.

Whilst chemical analysis of the soils indicates the level of contaminants within the soils on the site, the distribution of analysed soils within the Unit 1 area is limited and therefore further investigation may be required to fully assess the contamination status beneath that area.

7.1.3 Asbestos

Whilst not indicated within the previous desk study report, there were indications that asbestos may reside within the building fabric of Unit 1.

The results of the analyses recorded no quantifiable amounts of asbestos detected within the analysed soil samples.

Based upon the above, the risk to receptors from asbestos exposed from the soils on site is low. However, it is recommended that a Refurbishment and Demolition type asbestos survey of the Unit 1 structure, in accordance with MDHS guidance, (ref. R.12), is undertaken prior to any alteration, clearance or demolition of structure(s), to ensure any asbestos is suitably removed and prevented from entering the waste stream or released to air.

Any suspected asbestos encountered within the soils during the demolition and construction phase of the proposed development should be left in situ and temporarily fenced off, until its identification and removal/treatment has been established. Works in the immediate area of the suspected asbestos should cease during this period until a suitably qualified and authorised person has given permission for works to continue.

7.1.4 Metals and PAHs

Although the proposed development is to be for commercial use, the guideline threshold values for residential developments is presented to highlight the potential risk to construction workers, or others, exposed to or in direct contact with the Made Ground soils. A comparison of chemical analysis results with the soil screening values has been undertaken and is presented within Table 5, below:

Table 5 – Summary of Soil Screening Values Exceedances (metals and PAHs)

Contaminant	Guideline Concentration Threshold Value (mg/kg)	Sampling Location	Concentration (mg/kg)	Depth (mbgl)
Lead	82 - 210 *(pC4SL - residential)* 1100 – 6000 *(pC4SL – commercial)*	U1-BH-02	208	1.10 – 1.80
		U1-BH-03	91	1.50 – 2.00
Benzo(a)pyrene	3.2 *(S4ULs – residential)* 35 *(S4ULs – commercial)*	U1-BH-03	3.29	1.50 – 2.00

The above results indicate that no samples of Made Ground soil exhibit lead concentrations in excess of a lower C4SL screening value for lead and mercury in a commercial land use setting. Similarly the concentrations of a single PAH congener, (Benzo(a)pyrene) are below the thresholds compared to commercial S4UL screening concentrations. However all of the above exceed the thresholds for a residential land use, (with plant uptake). Corresponding recommendations are provided below.

7.1.5 Poly Chlorinated Biphenyls

At this stage of the development, no investigation of PCBs has been undertaken in the location of the electricity sub-station due to the presence of live services.

It is therefore recommended that a small scale supplementary investigation is undertaken, post-demolition of the site and when live services have been cleared from the aforementioned area, so that a schedule of soil sampling and testing can be undertaken and risk quantified.

7.1.6 Waste Soil Classification Assessment

As mentioned previously, a total of seven samples of soils were analysed for a Waste Acceptance Criteria, (WAC), suite to assist waste classification. The results of the WAC analyses are provided within Appendix 7. This can be utilised in conjunction with the other soil quality data within this report, to determine a waste classification for the soils due to be removed as part of the proposed development. A full waste classification of the soils at site, is outside of the scope of this report. However, some initial assessment is provided below.

It is assumed that within the scope of the redevelopment there shall be a quantity of excavated soils that will not be re-used on site, therefore they will be classed as waste. On the basis of which, soils excavated as part of the development should be removed from site and disposed of off-site, at a waste facility licenced to receive or treat the material. Some facilities may enable re-use of the soil, including the Made Ground, but this is dependent upon their licence and the exact nature of the Made Ground. Whilst the results of chemical analysis indicates the quantity of any contaminant present, materials disposed of off-site, should be further assessed or classified in accordance with the current Landfill Regulations, 2010, (England and Wales), (amendment), and the, (European), Waste Framework Directive.

The results of WAC analysis on a number of soils is provided within the chemical analysis results presented in Appendix 7: “the results indicate waste soil to be classified as either Inert or “Stable Non-Reactive Hazardous”.

Some of the soil samples classified as Hazardous, (stable-non-reactive), are only marginally this classification, due to the marginal exceedances of the inert concentration thresholds of a singular determinant, (antimony, common in London Basin soils).

Taking into consideration this and the various components of waste classification process, the *combined* laboratory results indicate soils across the site may be considered as inert waste soil classification. This should be assessed by the potential waste receivers and their site-specific receipt thresholds. Further assessment may be warranted.

7.1.7 Ground Gas

The results of the soil gas monitoring have been compared with current guidance, (refs. R.25, R.24 and R.32). A graphical representation of the gas monitoring results is included in Appendix 5.

Upon analysis of the results, it is evident that concentrations of methane and carbon dioxide are elevated within borehole U1-BH-02. However no significant flow was recorded.

On the basis of the recorded methane concentration, a Gas Screening Value (GSV) of <0.02 l_{CH4}/hr has been calculated. Similarly, on the basis of the recorded carbon dioxide concentrations, a GSV of <0.01 l_{CO2}/hr has been calculated.

Comparison of the above results to the NHBC traffic light system indicates that the site falls within the green category, which requires no special gas protection measures. However, British Standard BS8485:2015 recommends that where methane and carbon dioxide exceed concentrations of 1% and 5% respectively, the characterisation of the site falls within Amber 1. Therefore a minimum requirement for gas protection measures for commercial developments in the area of U1-BH-02 are required, and shall comprise the following:

- Proprietary gas resistant membrane installed to reasonable levels of workmanship, in line with current good practice under CQA with integrity testing and independent validation.

7.1.8 Other Sources

The assessment of potential contamination risks highlighted within the previous desk study indicate a number of localised off-site sources of contamination which have the potential to mobilise to the site through leaching or groundwater mobilisation, including Poly-Chlorinated Biphenyls, (PCB's), and hydrocarbons associated with electrical substations and generators.

Whilst the above sources of hydrocarbons were not investigated in detail, the results of the recent chemical analysis report the absence of any elevated or detectable concentrations of hydrocarbons or PCBs, (see WAC analysis data as discussed above), and therefore is not considered to be a site-wide issue. It is therefore considered that any hydrocarbons which may have been introduced to the soils from the aforementioned sources represent contamination hotspots, and should be investigated and remediated appropriately. This is discussed in more detail within the following sections.

The risk of PCBs, (and associated hydrocarbons), being present in soils across the site is considered to be very low to low and, if present at all, are likely to be localised around the potential source, (electrical substations). It has been recommended that this is investigated further around the area to the north west of Unit 1 subsequent to demolition and decommissioning of live services to enable recovery of soil samples.

This is discussed in more detail within the following sections.

7.2 Risk to Controlled Waters

The risks to Controlled Waters have been assessed qualitatively with respect to soil contamination; groundwater analysis may only be undertaken subsequent to standpipe monitoring.

The exposure pathway for contaminants to reach the groundwater or adjacent West India and Millwall docks, (Millwall Outer Docks), was considered and detailed within the previous desk study report. Since the site is likely to be developed to comprise of buildings and large areas of hardstanding, the precipitation infiltration volume is low thus the potential for any unidentified elevated concentrations of analytes to leach into the underlying aquifer is further limited, however vertical migration may occur should a piled solution be adopted. Should contaminants reach or be present already in the underlying alluvial deposits, it is likely that a migration pathway to the underlying groundwater and those within the docks exists.

Results of chemical analysis on soils indicate a marginally elevated concentration of lead to be present within the Made Ground, (when compared to a conservative human health risk assessment screening value of 210mg/kg). Based upon the simulated leaching analysis of the WAC analyses it is considered that this is not likely to present a significant risk via leachable quantities. The marginally elevated concentrations of antimony reported within the WAC data is considered to not pose a significant risk to the nearest controlled water receptor(s).

As mentioned previously, migration of contaminants from off-site hotspots may exist in localised areas from sources highlighted within the previous desk study. Any hydrocarbons encountered within the soils during the demolition and construction of the proposed development, should be excavated and replaced with certified clean soils or engineered fill. Given the potential for contamination hotspots on the site, it is recommended that a shallow limited investigation is undertaken around those sources, as identified within the previous desk study. Such assessment is likely to be undertaken most efficiently following site demolition, clearance and slab removal.

A Discovery Strategy should be in place, and a document such as a Remediation Method Statement may also be required by the Regulatory Authorities.

7.3 Risk to Plants

It is understood that no planting is proposed within the development. However, a review of the commonly occurring phytotoxic chemicals boron, copper, nickel and zinc, has been undertaken based upon the now superseded ICRCL guidance. Although the ICRCL trigger threshold levels have been withdrawn, there are no equivalent guidance values for phytotoxicity.

Concentrations of metals were recorded at concentrations below the thresholds considered to have phytotoxic effects.

7.4 Risk to Services

7.4.1 Pipes

A comparison has been undertaken of the recent contamination levels with the WRAS standard, (ref. R.22). The requirements of the Thames Water pipe laying documentation is understood to be based upon this WRAS document.

It is advised that the WRAS standard, (ref. R.22), is adopted and consultation with the local water company is sought prior to laying any services.

However, as an interim assessment, it is likely that any potable water pipes due to traverse through Made Ground on site, may require protection or be of a foil-lined specification. The routes of potable water pipes should be assessed in detail with the locations of elevated hydrocarbons and PAHs, following remediation.

7.5 Conceptual Model

Following the findings of the ground investigation the Conceptual Model provided within the previous Desk Study has been reviewed and the conclusions are presented in Table 6 below:

Table 6 – Revised Conceptual Model

Source	Pathway	Receptor
Identified On-site: o Lead o Benzo(a)pyrene o Hazardous ground gasses Off-site: None	o Ingestion of contaminated soil by direct contact o Ingestion of contaminants through vegetables o Entry of contaminants by skin or eye contact with contaminated soils or dust o Inhalation of contaminated dust o Inhalation or migration of toxic / explosives gases	Humans o Site occupants o Site users o Construction workers o Maintenance workers o Neighbouring site users
Possible	o Direct uptake and accumulation of contaminants o Accumulation or migration of toxic gases	Flora and Fauna o Landscaped areas o Sensitive areas

Table 6 – Revised Conceptual Model		
Source	Pathway	Receptor
On-site Hotpots: o Asbestos o PCB Off-site: o None significant	o Migration o Surface run-off	Water Environment o Groundwater o Surface Waters
	o Direct contact of contaminants with building materials	Building Materials and Services o Concrete o Plastic pipes and services
Note: Common sources, pathways and receptors greyed out above are no longer considered to be acting as a contaminant source/active/at risk respectively.		

7.6 Development Considerations

7.6.1 Soils Quality

Risks to humans include construction workers, site neighbours and end users of the site. Theoretically, exposure to contaminants can take the form of direct contact with the skin, consumption of contaminants through transfer of contaminants to the food chain, or the inhalation of contaminants through wind-blown soils or vapours.

To reduce the risks of exposure and transfer of contaminants during construction, short term mitigation measures specified in the Additional Information, (B – page 24), section of this report should be adhered to and, where applicable, be incorporated in to the development Construction Phase Health and Safety Plan or similar document.

The exposure of contaminants to the end user is only considered to be a risk where soil is exposed, for example in garden areas or areas of soft landscaping. Where soils are covered by proposed on-site structures or areas of paving, the pathway by which contaminants can reach the end user is removed and the risk to the end user is considered negligible.

The proposed development of the site is understood to be covered by either proposed structures or areas of hardstanding; therefore a pathway for contaminants to reach the end user is negligible. See also Section 8.1.1 if the development design scheme alters.

7.6.2 Recommended Further Works

A Discovery Strategy should be in place for the site clearance, demolition and slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment. In addition to which, a document such as a Remediation Method Statement may also be required by the Regulatory Authorities.

It should be noted that further investigation works in the area of Unit 1 are ongoing. Whilst no contaminants were found to exceed threshold values for the type of land use to date, it is likely that they may be present

in quantities similar to those encountered above. Furthermore, given the presence of an electricity substation in the north eastern corner of Unit 1, there is the potential for PCBs to exist. Therefore, subsequent to the ongoing investigation, details of further chemical analysis shall be submitted within a subsequent letter report.

8. GEOTECHNICAL CONSIDERATIONS

8.1 Proposed Development

As mentioned previously, it was understood that the site is to be developed to comprise of a three level data centre facility. The ground level will provide ancillary support to levels 2 and 3 above, which will include data halls and support functions. Additional plant rooms, electrical and mechanical equipment will be provided at roof level. All levels will be accessed via a stair core of reinforced concrete construction, and a link bridge shall be incorporated to link Unit 3 to the proposed structures. External parking shall also be included as part of the scheme.

Information provided by the Client indicates that the proposed foundation shall be piled using 900mm diameter piles, and which will incorporate a 750mm thick raft beneath the structure.

It is understood that the total Live, (axial), Load, (LL), on central column piles shall be in the order of 1740kN for the main structure, with marginal columns being designed to an LL of 605kN. Furthermore, corner columns shall be designed to an LL of 312kN. The link bridge shall be designed using an LL of 1160kN for marginal columns, and corner columns shall be designed to 600kN.

The raft is anticipated to bear a load of 40kN (LL) from heavy plant machinery, however a further 2.5kN should be allowed for permanent loading.

8.2 Foundations

8.2.1 Soil Shrinkability

The undisturbed granular soils of the Upper Thames Valley Formation and the Lambeth Group may be considered to be non-plastic and hence non shrinkable. No specific precautions are therefore considered to be required with respect to protecting foundations from the effects of soil heave/ shrinkage founded through or within these soils.

Results of Atterberg Limit testing within the cohesive Upper Thames Valley Formation soils indicated the soils to be of low to very high plasticity, and low to high volume change potential. Given the nature of cohesive alluvial soils, which often incorporate peaty layers within the stratum, (e.g. U1-BH-03), a worse-case scenario should be adopted into the design of foundations within the stratum. The Reading Formation is of high plasticity and high volume change potential, as defined in the NHBC Standards Chapter 4.2 Building near Trees, (ref. R.15).

Whilst this document does not provide detailed foundation design, the final design recommendation requirements for sleeving or reinforcing of piled foundations and requirements for placement of void formers beneath rafts, must take into account the volume change potential of the soil and the presence of trees (previous, present and proposed).

A number of trees were noted in the immediate vicinity of the proposed development, however given the significant thickness of granular Made Ground encountered on the site, it is unlikely that the presence of trees on the site shall contribute to any significant desiccation of the underlying cohesive soils.

8.2.2 Foundation Options

Information provided by the Client indicates that the proposed foundation shall be piled using 900mm diameter piles, and which will incorporate a 750mm thick raft beneath the structure. Given the soils encountered during the intrusive investigation, it is considered that this foundation option is the more viable solution.

8.2.2.1 Raft Foundations

The investigation encountered significant thicknesses of Made Ground beneath the surface and ranged in thickness from 3.60m to 4.75m. Furthermore, a number of concrete layers, considered to represent floor slabs from historic site uses, were encountered.

In-situ testing undertaken within the Made Ground, where possible, indicated the Made Ground to have a Nett Allowable Bearing Pressure, (NABP), of between 90kN/m2 and 220kN/m^2, which would theoretically be appropriate for the proposed raft. However, consideration should be given to the inherent variability of Made Ground in general and the effect of historical floor slabs on the stability of the proposed raft.

It is likely that a proportion of historical concrete rafts shall require excavation due to their obstruction for piles to extend to depth. This may offer the opportunity to assess the Made Ground further as to its competence and the potential requirement for ground improvement techniques, (i.e vibro-compaction or stone columns). However, should historical floor slabs be completely removed beneath the proposed development, it may be appropriate for an engineered fill be placed and designed to accept proposed loads from the raft.

8.2.2.2 Piled Foundations

The proven ground conditions would indicate that bored or CFA piles could be employed to provide a suitable foundation solution with piles terminating within the Lambeth Group soils. However due care and consideration should be given to the effect of a driven pile on the stability of neighbouring structures.

In addition to the information provided above, the method of pile installation will have to accommodate the presence of groundwater beyond a depth of approximately 7.0m, and potential relict structural obstructions and/or natural occurring hard strata. As mentioned in the above section, it is likely that a proportion of historical concrete rafts shall require excavation due to their obstruction for piles to extend to depth.

The modelled ground profile on which this assessment is based does not include the contribution of bearing capacity from the Made Ground, as this shall be subject to change dependent upon the final design. In this instance, the top 5.6m of soil has been disregarded from the preliminary calculations. Further contribution has been disregarded from the cohesive alluvial soils, as these incorporate highly compressible soils within the stratum and consideration should be given to sleeving. Therefore a total of 10m of soil profile, from ground level, has been disregarded from the preliminary calculations.

Soil parameters have been provided for each stratum based on the results of in-situ and laboratory testing and are summarised, together with their soil properties, in Table 7, shown below:

Table 7 – Summary of Soil Properties					
Strata		Angle of Internal Friction (ϕ) (degrees)	Cohesion (kPa)	Bearing Capacity (kN/m²)	Bulk Density (kN/m³)
Made Ground		35	0	90 - 220	21
Alluvium	Cohesive	17	10	0 - 100	12 - 20
	Granular	40 - 50	0	100 ‡	12*
Reading Formation		17 - 19	13	350‡	19 - 20
Lambeth Group		34	50	190‡	13*
* Bulk Density taking into consideration of groundwater and effect of Buoyancy. ‡ Minimum conservative value based on in-situ testing					

It is considered that pile caps may be appropriate within the Made Ground, based on the soil parameters provided in Table 7.

Preliminary pile loadings have been calculated based upon the results of in-situ and laboratory are presented in Table 8, below. Whilst it is understood that a 900mm pile diameter shall be used, a range of diameters have been provided for comparison:

Table 8 – Preliminary Pile Loads (kN)			
Pile Diameter (mm)	Pile Depth (m bgl)		
	22	25	30
300	535	705	1045
600	1250	1625	2335
900	2170	2760	3880
Notes: * The above values have been calculated based on laboratory testing of the soils as these represent a conservative approach. ** In this case, the upper 10m of the soil profile has been ignored to account for loss of friction from the pile cap and sleeving through compressible soils. *** A conservative global factor of safety of 2.5 has been used in all cases.			

It is noted that the above values should only be used as a guide for use in the final design of piles. The design of piles should, and will remain, the responsibility of the piling contractor who will reflect their own methods and experience on the final design of the piles.

8.2.3 Excavations, Temporary Works and Groundwater Ingress

All excavations within the Made Ground must be assumed to be subject to short term instability.

Where personnel access is required to any excavation, its stability should be assessed by a suitably qualified and experienced responsible person. For general guidance it is recommended that where access is required

to excavations greater than 1.2m depth, excavations should be fully supported or side slopes battered back to a safe angle of repose.

Particular attention must be paid to ensuring the stability of adjacent structures, neighbouring sites and the adjacent dockside. A detailed inspection of the side slopes should be made during excavation, and a risk assessment carried out to fully assess the support measures required. It is recommended that further guidance is obtained from CIRIA document Report 97 (Second Edition) 'Trenching Practice', (ref. R.29).

Shallow groundwater was not encountered during the investigation and as such is not considered likely to be encountered during service run excavations in the short term. It is not envisaged that any deep excavations will be required to remain open at depths where groundwater inflow would occur.

All structures founded below the water table must be designed to accommodate the forces of buoyancy, either by self-weight or by tension piles, if necessary.

8.3 Floor Slabs

It is considered that the proposed raft foundation will form the ground floor and is likely to be constructed onto Made Ground soils. Further guidance for the construction of the raft is provided within 8.2.2.1.

Differential movement between the floor slab and structural walls and across the floor slab itself should be anticipated, however adequate compaction, proof rolling should ensure this is kept to a minimum. It is recommended that ground bearing floors are fully debonded from structural load bearing walls, and suitably reinforced top and bottom to enable spanning of soft spots.

Formations should be adequately proof rolled and any excessively soft materials excavated and replaced with a suitable engineered fill.

The detailing of services through or underground-bearing floors should incorporate flexible connections and where appropriate enhanced falls.

8.4 Pavement Design

Access ways and car parking pavements are proposed at the site. California Bearing Ratio, (CBR), values have been estimated based on Table 5.1 of the Highways Agency's, 'Design Manual for Roads and Bridges, Volume 7. Interim advice note Design Guidance for Road Pavement Foundations Draft HD 25' (ref. R.27).

Pavements at the site are likely to be constructed on a subgrade comprising of granular Made Ground and for preliminary design purposes, are considered to have a California Bearing Ratio, (CBR), value of 2%. However it is likely that the Made Ground shall comprise of an engineered fill from the construction of proposed structures and therefore would be adequate for roadways.

Nevertheless, It is recommended that once the site has been graded to the appropriate pavement formation level, it is inspected and, if necessary, *in-situ* CBR testing be conducted on the subgrade to confirm the appropriate pavement design, (i.e. to determine the subbase and capping thickness). In addition to which, the formation should be proof-rolled and any soft/loose pockets encountered should be excavated and replaced with well compacted granular fill prior to pavement construction. Requirements for the design of road pavements are given in the Highways Agency, 'Design Manual for Roads and Bridges, Volume 7. Interim advice note Design Guidance for Road Pavement Foundations Draft HD 25, (ref. R.27).

8.5 Retaining Structures

The construction of any basement will require careful consideration to be given to the stability of adjacent structures, services and property. It is considered unlikely given the confines of the site that a basement could be constructed in an 'open' unsupported excavation. Retaining structures are likely to be required.

It is also likely that the proximity of boundaries and presence of a harbour wall to the east of the site will preclude the use of anchored support systems, unless the consent of relevant land owners and third party stakeholders can be secured. It is therefore considered that either propped opposing walls or cantilevered piled walls will be required. It is suggested that a propped wall would limit potential for ground movement.

It is noted that the use of top driven piling techniques is likely to induce significant vibration of surrounding structures and, dependant on the technique adopted, may also generate significant noise. It is therefore considered probable that rotary bored or continuous flight auger piling systems will be used to form the required retaining wall.

It is considered that a contiguous or secant pile wall constructed into the Made Ground soils would provide a suitable retaining structure, either acting in cantilever or propped. Either a secant pile wall or wing-jetted contiguous pile wall would effectively ensure control against water ingress associated with adjacent water bodies, or with potential perched water bodies not revealed by the investigation. It is, however, likely that the adjacent water body is being retained by the existing harbour wall.

It is recommended that retaining structures should be designed using effective shear strength parameters as provided within Table 5.

8.6 Buried Concrete

In consideration of the previous usage of the site, it is recommended that 'brown field conditions' be assumed for the purposes of assessing the aggressive chemical environment for concrete classification, (ACEC class). Given the expected permeability of the Made Ground and natural soils and the noted occurrence of groundwater at depth, 'mobile groundwater' conditions can also be reasonably assumed.

Chemical analysis of the soil indicates a sulphate content falling into Design Sulphate Class DS-1 of Table C2 of the Building Research Establishment Special Digest No 1 "Concrete in aggressive ground", 2005, (ref. R.27). The results of the pH tests indicate that the underlying soils are alkaline.

In accordance with the BRE digest an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground at the site.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

Geosphere Environmental Ltd was commissioned by the Client, ARC:MC Ltd, to undertake a Phase 2 geoenvironmental ground investigation for a proposed commercial development at Units 1,2 and 4, The Point, Greenwich View Place, Isle of Dogs, London, E14 9NN.

Site works were carried out between 11 January 2016 and 22 February 2016, and comprised of the formation of two hand dug/machine dug trial pits and excavation of two Cable Percussive boreholes extended to depths ranging from 18.00m to 36.50m, together with soil sampling and in-situ testing.

A geotechnical and environmental laboratory testing regime was subsequently undertaken on selected samples, for use in the design and construction of the proposed scheme.

Results of chemical analysis on soils indicate detectable concentrations of analytes, such as lead and benzo(a)pyrene to be present within the Made Ground, but not in significantly elevated concentrations compared to thresholds for commercial developments. However, short term mitigation measures should be implemented to protect ground workers during the development of the site. It is considered such analytes are not present in significantly elevated or highly leachable quantities and therefore the risk to controlled waters is considered to be very low. Any hydrocarbons encountered within the soils during the demolition and construction of the proposed development should be excavated and replaced with certified clean soils or engineered fill. A Remediation Method Statement may be required by the local authority.

At this stage of the development, no investigation of PCBs has been undertaken in the location of the electricity sub-station due to the presence of live services. A small scale supplementary investigation is recommended, post-demolition of the site and when live services have been cleared from the aforementioned area, so that a schedule of soil sampling and testing can be undertaken and risk quantified.

Taking into consideration the various components of waste classification process, the *combined* laboratory results indicate soils across the site may be considered as inert waste soil classification. This should be assessed by the potential waste receivers and their site-specific receipt thresholds. Further assessment may be warranted.

Information provided by the Client indicates that the proposed foundation shall be piled using 900mm diameter piles, and which will incorporate a 750mm thick raft beneath the structure. Given the soils encountered during the intrusive investigation, it is considered that this foundation option is the more viable solution.

Results of Atterberg Limit testing within the cohesive Upper Thames Valley Formation soils indicated the soils to be of low to very high plasticity and low to high volume change potential, whilst the Reading Formation is of high plasticity and high volume change potential. All excavations within the Made Ground must be assumed to be subject to short term instability. Particular attention must be paid to ensuring the stability of adjacent structures, neighbouring sites and the adjacent dockside.

Shallow groundwater was not encountered during the investigation and as such is not considered likely to be encountered during service run excavations in the short term. All structures founded below the water table must be designed to accommodate the forces of buoyancy, either by self-weight or by tension piles, if necessary.

It is considered that the proposed raft foundation will form the ground floor and is likely to be constructed onto Made Ground soils. It is recommended that ground bearing floors are fully debonded from structural load bearing walls, and suitably reinforced top and bottom to enable spanning of soft spots.

It is likely that the subbase for roadways shall comprise of an engineered fill from the construction of proposed structures and therefore would be adequate for roadways.

In accordance with the BRE guidance a DS-1 sulphate class and an AC-1 ACEC classification should be assumed as a minimum, for the design of concrete in contact with the ground at the site.

9.2 Recommendations for Further Works

Based upon the findings of this investigation, the following further works are recommended:

- A Discovery Strategy should be in place for the site clearance, demolition and slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment. In addition to which, a document such as a Remediation Method Statement may also be required by the Regulatory Authorities;
- A post-demolition sampling and chemical analysis exercise around the location of Unit 1.

ADDITIONAL INFORMATION

A. CONSULTATION

During the development of a contaminated site, consultation may be required for a number of reasons with a number of Regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required. The remediation strategy would have to be agreed with the following:

- Local Authority. Consultation is likely to be required with a designated Contaminated Land Officer within the Environmental Health Department, as part of the planning process. The Local Authority is generally concerned with human health risks. Some Authorities now require 'Completion Certificates' to be signed off following remediation works;

- Environment Agency. Where a site is within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.

In addition to which, the following may also be involved in the consultation process:

National House Building Council, NHBC. Section 4.1 of the NHBC Standards requires land management to be addressed.

- Water Authorities. They are likely to impose constraints on the nature of water supply pipes that are to be laid in contaminated land. Guidance on the selection of materials for water pipes is provided by the Water Regulations Advisory Scheme, (ref. R.22).

Based upon the results of any consultation, there may be specific remediation requirements imposed by one or more of the aforementioned Authorities.

B. SHORT-TERM MITIGATION MEASURES

During site preparatory works of any potential development/construction works, some short-term mitigation measures will be required to protect the site workers, neighbouring sites users and the environment from the potential effects of exposure to potentially contaminated materials and soils. The majority of the proposed measures represent good practice for the construction industry and include:

- Briefing all of the site workers of the identified contamination on site, and ensuring they are aware of the potential health effects from exposure;

- Where appropriate, workers who are at potentially risk due to their working in areas of identified contamination will be provided with suitable PPE;

- Ensuring good hygiene is enforced on site and washing facilities are maintained on the site. Workers are discouraged from smoking, eating or drinking without washing their hands first;

- Ensuring site personnel report any unusual complaints, such as skin rashes, nausea, light-headedness etc. which may be attributable to the contamination on the site;

- Ensuring that dust suppression measures are put into practice where contamination is becoming airborne;

- Site drainage should be prevented from entering the adjacent watercourse;

- Where necessary contamination will be prevented from dirtying adjacent highways, a wheel-wash or other method for cleaning vehicles may be required.

Where contaminated materials are being removed from the site they should be disposed of at a suitably licensed landfill, with a 'duty of care' system in place and maintained throughout the disposal operations. The classification of contaminated soils for disposal is dependent upon the individual landfill operator, which is in term dependent upon the operator's license.

C. DISCOVERY STRATEGY

There is the possibility that other sources of contamination may be present on the site which were not detected during the investigation. Should such contamination be identified or suspected during the site clearance or ground works, these should be dealt with accordingly. A number of options are available for handling this material, which include:

- The removal from site and disposal to a suitably licensed tip of all material suspected of being contaminated;

- Short-term storage of the suspected material while undertaking verification testing for suspected contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area;

- Treatment of the identified contamination in accordance with the site-specific Remediation Method Statement;

- Having a suitably experienced Environmental Engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

Should any anomalous materials be identified within the soils, the Regulatory Authorities should be informed and where necessary the remedial strategy agreed.

APPENDICES

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APPENDIX 1 - ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ACM	Asbestos containing material
ADE	Average daily exposure
ASPT	Average score per Taxon
BOD	Biochemical oxygen demand
BH	Borehole
BRE	Building Research Establishment
BS	British Standard
BTEX	Benzene, Toluene, Ethyl benzene and Xylenes
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CLR	Contaminated Land Research reports
DEFRA	Department of the Environment, Food and Rural Affairs (formerly the DoE and DETR)
DETR	Department of the Environment, Transport and the Regions (formerly the DoE and now Defra)
DO	Dissolved oxygen
DoE	Department of the Environment (then DETR and later Defra)
DQRA	Detailed quantitative risk assessment (Tier 2)
EA	Environment Agency
EPH	Extractable petroleum hydrocarbons
EQI	Environmental Quality Index
EQS	Environmental Quality Standards
GQRA	Generic quantitative risk assessment (Tier 1)
mAOD	Metres above ordnance datum
mbgl	Metres below ground level
NGR	National grid reference
NHBC	National House Building Council
NRA	National Rivers Authority (now the Environment Agency)
PACM	Potentially asbestos containing material

APPENDIX 2 – REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports, and most importantly CLR Report 3, (ref. R.7).

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use should another end-use been intended a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The report is limited to those aspects of land contamination specifically reported on and is necessarily qualified accordingly, no liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present unrecorded land uses both on~ and off~ site and the potential for associated contaminant migration. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

APPENDIX 3 – REFERENCES

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R.8. CLR 4, 'Sampling strategies for contaminated land'. Report by The Centre for Research into the Built Environment, the Nottingham Trent University, DoE, 1994.

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R.23. Anglian Water "Standards for Mainlaying in Contaminated Land", Standard No. WSV-STD-001, September 2001.

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R.27. BRE Special Digest 1, 'Concrete in Aggressive Ground, 2005.

R.28. Highways Agency, 'Design Manual for Roads and Bridges, Volume 7. Pavement Design and Maintenance: Foundations HD 25/94.

R.29. CIRIA document Report 97 (Second Edition) 'Trenching Practice', 1992.

R.30. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2), Contaminated Land: Applications in Real Environments (CL:AIRE) September 2014.

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APPENDIX 4 – BOREHOLE LOGS

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U1 BH02

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 35.9 m

GRID REFERENCE

DATES 11/01/2016 - 19/11/2016

SHEET 1 OF 4

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
11/01 08:00	0.00	Dry		CONCRETE (Concrete with 20mm diameter rebar)			0.00													
				MADE GROUND (Brown gravelly sand. Gravel of angular to subrounded fine to coarse flint)			0.30		0.30	D	1									
12/01 08:00	0.00	Dry																		
				CONCRETE			1.15		1.10	D	2									
				MADE GROUND (Brown gravelly sand. Gravel of angular to subrounded fine to coarse flint)			1.30													
				MADE GROUND (Dark brown slightly gravelly slightly sandy silt. Gravel of angular to subrounded fine to medium flint and red brick fragments)			1.60		1.80	D	3									
									2.00-2.45	S	4	1 1 2 2 2 3	9							
									3.00-3.45	S	5	2 3 3 4 5 5	17							
									4.00-4.45	S	6	2 3 3 3 5 6	17							
13/11 07:45	4.90	Dry							5.00-5.45	S	7	2 3 3 3 4 5	15							
				Firm dark grey sandy CLAY (ALLUVIUM) 5.80 - 10.00 Limited recovery from 5.8 to 10.0m			5.60													
									6.00-6.45	S	8	1 1 1 2 2 4	9							
				7.00 Becoming dark grey with depth					7.00-7.45	S	9	1 1 2 2 2 3	9							
									8.00-8.45	S	10	1 2 2 3 3 4	12							
				9.00 Becoming dark brown with depth					9.00-9.45	S	11	1 2 2 3 3 3	11							
	9.80						9.80													Inflow of water at 9.8m

Starter pit excavated from ground level to 3.0m using mechanical excavator

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH02 | SHEET 1 OF 4 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U1 BH02

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 35.9 m

GRID REFERENCE

DATES 11/01/2016 - 19/11/2016

SHEET 2 OF 4

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Medium dense becoming very dense brown/grey slightly sandy GRAVEL of subangular to subrounded fine to coarse flint with occasional cobbles of flint (THAMES GRAVEL - ALLUVIUM) *(continued)*					10.00-10.45	B	12	2 3 4 5 5 6	20							
									11.50-11.95	B	13	3 4 6 6 7 8	27							
				13.00 Cobbles becoming frequent with depth					13.00-13.45	B	14	2 5 8 12 15 15	50*							
18/11 08:00	14.00	8.10						75				25 50	75*							Borehole chiselled from 13.9m to 14.3m
									14.50-14.95	B	15	3 6 8 8 9 12	37							
				Dense green brown very sandy GRAVEL of subangular to subrounded fine to coarse flint (LAMBETH GROUP)			16.00		16.00-16.45	B	16	2 5 8 9 9 10	36							
				17.50 Becoming green with depth				58	17.50-17.95	B	17	2 6 9 15 15 11	58*							
									19.00-19.45	B	18	3 6 6 8 9 10	33							
19/11 08:00	19.00	8.20																		

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH02 | SHEET 2 OF 4 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U1 BH02
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 35.9 m	GRID REFERENCE DATES 11/01/2016 - 19/11/2016	SHEET 3 OF 4 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense green brown very sandy GRAVEL of subangular to subrounded fine to coarse flint (LAMBETH GROUP) *(continued)*					20.50-20.95	B	19	3 5 7 8 8 12	35							
				Very dense grey brown fine to medium SAND (LAMBETH GROUP)			21.00	68	22.00-22.45	B	20	6 9 15 38	68*							
								62	23.50-23.95	B	21	6 6 9 20 21	62*							
								73	25.00-25.45	B	22	8 15 24 26	73*							
								65	26.50-26.95	B	23	6 9 15 20 15	65*							
								75	28.00-28.45	B	24	25 50	75*							
				Very dense dark grey fine SAND (LAMBETH GROUP)			28.30													
								75	29.50-29.95	B	25	25 50	75*							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH02 | SHEET 3 OF 4 | PROJECT No. 1580,GI

CLIENT: ARC:MC Limited	**PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place**	**GROUND LEVEL m**	**HOLE No. U1 BH02**
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 35.9 m	GRID REFERENCE DATES 11/01/2016 - 19/11/2016	SHEET 4 OF 4 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very dense dark grey fine SAND (LAMBETH GROUP) *(continued)*					31.00-31.45	B	26	25 40 10	75*							
									32.50-32.95	B	27	25 50	75*							
									34.00-34.45	B	28	25 40 10	75*							
				Grey and off-white CHALK recovered as a gravelly putty. Putty is grey, gravel of off-white fine to coarse chalk fragments (WHITE CHALK SUBGROUP)			34.90		34.90-35.35	S D	29 30	6 6 7 8 9 9	33							
19/11 09:30	31.40	16.50					35.90													Borehole completed at 35.9m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH02 | SHEET 4 OF 4 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U1 BH03

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 23.2 m

GRID REFERENCE

DATES 20/01/2016 - 21/01/2016

SHEET 1 OF 3

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				CONCRETE (Concrete with 20mm diameter rebar)			0.00													Starter pit excavated from ground level to 3.0m using mechanical excavator
				MADE GROUND (Brown gravelly sand)			0.30													
				CONCRETE			1.15													
				MADE GROUND (Brown gravelly sand)			1.30		1.20-1.65	B	1	2 2 2 3 4 6	15							
				CONCRETE (Lean mix)			1.65													
				MADE GROUND (Brown gravelly sand)			2.10		2.00-2.45	B	2	3 4 5 5 5 6	21							
				MADE GROUND (Stiff brown/orange brown mottled sandy gravelly clay. Gravel of subangular to subrounded fine to coarse flint)			2.80		3.00-3.45	B	3	2 3 3 4 6 6	19							
				MADE GROUND (Medium dense green silty sand with occasional gravel)			3.80													
				Stiff dark grey/black mottled slightly silty CLAY with slightly organic odour (ALLUVIUM)			4.00		4.00-4.45	B	4	2 3 3 3 4 6	16							
									5.00-5.45	S B	5 6	2 2 3 4 4 5	16							
				6.70 Becoming less silty with depth					6.00 6.00-6.45	D S	7 8	2 3 3 3 4 6	16							
									7.00-7.45	B U	9 9									
				Brown slightly silty slightly clayey PEAT (ALLUVIUM)			7.90		7.90 8.00-8.45	D B	11 12	2 4 6 6 7 9	28							
	8.90	8.90		Medium dense brown/grey brown slightly silty fine to medium SAND (ALLUVIUM)			8.00													
+ 20 mins		7.90		Very dense brown sandy GRAVEL of subangular to subrounded fine to coarse flint (THAMES GRAVEL - ALLUVIUM)			8.90		9.00-9.45	B	13	4 6 9 12 15 15	51*							Slow inflow of water at 8.9m

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH03 | SHEET 1 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U1 BH03
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 23.2 m	GRID REFERENCE DATES 20/01/2016 - 21/01/2016	SHEET 2 OF 3 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very dense brown sandy GRAVEL of subangular to subrounded fine to coarse flint (THAMES GRAVEL - ALLUVIUM) *(continued)*					10.00-10.45	B	14	3 4 6 8 8 9	31							
								75	11.50-11.95	B	15	25 50	75*							
									13.00-13.45	B	16	5 6 8 12 15 15	50*							
				Very stiff blue/brown slightly gravelly slightly sandy CLAY. Gravel of angular to subrounded fine flint (READING FORMATION)			13.90	61	14.50-14.95	B	17	5 6 8 12 15 15	61*							
								65	16.00-16.45	B	19	6 9 12 18 20	65*							
				Very dense brown/blue sandy GRAVEL of subangular to subrounded fine to coarse flint (LAMBETH GROUP)			17.50	62	17.50-17.95	B	20	6 6 12 14 24	62*							
								64	19.00-19.45	B	21	5 9 15 20 15	64*							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH03 | SHEET 2 OF 3 | PROJECT No. 1580,GI

CLIENT: ARC:MC Limited	**PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place**	**GROUND LEVEL m**	**HOLE No. U1 BH03**
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 23.2 m	GRID REFERENCE DATES 20/01/2016 - 21/01/2016	SHEET 3 OF 3 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very dense brown fine to medium SAND (LAMBETH GROUP) *(continued)*			19.90													
								70	20.50-20.95	B	22	8 12 20 30	70*							
								68	22.00-22.45	B	23	8 12 25 23	68*							
							23.20													Borehole completed at 23.2m. Unable to progress due to dense soils

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U1 BH03 | SHEET 3 OF 3 | PROJECT No. 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL -1m

HOLE No. U2 BH01

LOGGED BY: SG
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 18.0 m

GRID REFERENCE

DATES 03/05/2016 - 13/05/2016

SHEET 1 OF 2

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Concrete crush with frequent brick and clay pipe with cables and rebar)			0.00		0											Hand dug starter pit from ground level to 1.2m
				MADE GROUND (Dark brown slightly clayey sand with frequent fine to coarse gravel and cobbles of brick, concrete and flint with timber and occasional 20mm diameter rebar)			0.30		0.35	J	1								No collapse of sidewalls during drilling
									0.50	D	1									
								69	0.80	J	2									
									1.00-	S	2	7 12	69*							
									1.45			50								
									1.30	J	3									
									1.50	D	3									
	2.00						1.90		2											
				MADE GROUND (Pale grey/dark orange brown gravelly coarse sand (possible fill))			2.10		2.00	J	4	1 2	8							Inflow of water at 2m
				MADE GROUND (Grey sand with occasional gravel of fine to coarse flint)					2.00-	S	4	2 2								
									2.45			2 2								
									2.50	D	5									
				Dark grey slightly gravelly CLAY. Gravel of fine to coarse flint (ALLUVIUM)			3.00		3											
									3.00-	S	6									
									3.45	D	7									
				Grey silty CLAY with occasional gravel of fine to coarse flint (ALLUVIUM)			3.50		3.00											
									3.50	D	8									Water added from 3.5m to m
								59												
									4											
									4.00-	U100	9	2 7	59*							
									4.45	S	10	9 17								
									4.00-	D	11	24								
									4.40											
									4.00-											
									5.00											
									5											
									5.00-	U100	12									
									5.45											
				Dark brown silty SAND with occasional gravel of fine to coarse flint (THAMES GRAVEL - ALLUVIUM)			5.70		5.65	S	13									
									5.70-	B	14									
									6.00	D	15									
									6.00											
									6											
									6.50-	S	16	1 1	8							
									6.95			2 2								
									7			2 2								
				Very gravelly SAND. Gravel of fine to coarse flint (THAMES GRAVEL - ALLUVIUM)			7.00													
									7.50-	B	17									
									8.00											
									8											
									8.00-	S	18	4 5	32							
									8.45			7 8								
												8 9								
									9											
									9.00	D	19									
									9											
									9.50-	S	20	2 3	33							
									9.95			7 8								
									10			9 9								

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH01 | SHEET 1 OF 2 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL -1m

HOLE No. U2 BH01

LOGGED BY: SG
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 18.0 m

GRID REFERENCE

DATES 03/05/2016 - 13/05/2016

SHEET 2 OF 2

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very gravelly SAND. Gravel of fine to coarse flint (THAMES GRAVEL - ALLUVIUM) *(continued)*					10.00-11.00	B	21									
									11.00-11.45	S	22	3 5 6 7 7 7	27							
				Pale brown gravelly SAND (THAMES GRAVEL - ALLUVIUM)			11.50		11.50	D	23									
		12.00																		Inflow of water at 12m
									12.50-12.95	S	24	4 7 7 9 9 11	36							
									13.00	D	25									
									13.30-13.75	U100	26									
				Grey CLAY with occasional shell fragments (ALLUVIUM)			13.50		13.80	S	27									
									14.00-15.00	B	28									
									15.00-15.35	S	29	7 10 15 15 20	67*							
				Green blue sandy slightly clayey slightly gravelly SILT (LAMBETH GROUP)			15.50		15.50	D	30									
									16.50-16.85	S	31	6 10 13 15 17 5	66*							Borehole chiselled from 17m to 18m
									17.50-18.00	B	32									
							18.00		18.00	S	33	6 10 15 18 14	63*							Borehole completed at 18.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH01 | SHEET 2 OF 2 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U2 BH02

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 36.5 m

GRID REFERENCE

DATES 22/01/2016 - 24/01/2016

SHEET 1 OF 4

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Block paving)			0.00													Starter pit excavated from ground level to 3.0m using mechanical excavator
				CONCRETE (Pale grey concrete with gravel of flint)			0.10													
				MADE GROUND (Pale brown gravelly sand. Gravel of angular to subrounded fine to coarse red/yellow brick, concrete, metal, clinker and flint)			0.30													
				MADE GROUND (Red brown sandy gravel of angular coarse red brick)			0.60													
				MADE GROUND (Pale brown gravelly sand. Gravel of angular to subrounded fine to coarse red/yellow brick, concrete, metal, clinker and flint)			0.70													
				MADE GROUND (Dark brown silty sandy gravel of subangular to subrounded fine to coarse flint)			1.20		1.20-1.65	B C	1	1 3 4 4 4 4	16							
				MADE GROUND (Brown slightly clayey gravelly sand. Gravel of subangular to subrounded fine to coarse flint, plastic and wood fragments)			2.00		2.00-2.45	B C	2	2 4 4 4 5 6	19							
									3.00-3.45	B C	3	3 4 5 5 5 7	22							
				Stiff brown/grey/dark grey slightly silty sandy CLAY with moderate organic odour (ALLUVIUM)			3.90		4.00-4.45	B C	4	2 3 3 4 5 5	17							
									5.00-5.45	B C	5	2 3 3 4 5 6	18							
									6.00-6.45	B C	6	3 4 6 6 8 8	28							
		7.70							7.00-7.45	B C	7	4 5 5 7 8 9	29							Inflow of water at 7.7m
									8.00-8.45	B C	8	4 4 6 7 8 8	29							
									9.00-9.45	B C	9	4 6 6 7 8 9	30							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH02 | SHEET 1 OF 4 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U2 BH02
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 36.5 m	GRID REFERENCE DATES 22/01/2016 - 24/01/2016	SHEET 2 OF 4 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense brown sandy GRAVEL of angular to subrounded fine to coarse flint (THAMES GRAVEL - ALLUVIUM)			10.00		10.00-10.45	B C	10	4 5 5 9 12 15	41							
				Dense yellow brown slightly gravelly SAND. Gravel of angular to subrounded fine to coarse flint (ALLUVIUM)			13.00		11.50-11.95	B C	11	4 6 8 9 9 10	36							
				Very stiff brown/blue grey mottled gravelly sandy CLAY. Gravel of subangular to rounded fine to coarse flint (READING FORMATION)			14.50	62	13.00-13.45	B C	12	6 7 7 9 12 12	40							
									14.50-14.95	B C	13	6 8 12 22 14	62*							
								60	16.00-16.45	B C	14	2 8 12 12 26	60*							
								57	17.50-17.95	B C	15	6 6 9 12 18 18	57*							
				19.00 Becoming green/blue green and less gravelly with depth					19.00-19.45	B C	16	4 5 8 8 9 10	35							

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH02 | SHEET 2 OF 4 | PROJECT No. 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U2 BH02
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 36.5 m	GRID REFERENCE DATES 22/01/2016 - 24/01/2016	SHEET 3 OF 4 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense becoming very dense brown fine to medium SAND (LAMBETH GROUP)			20.50		20.50-20.95	B C	17	6 7 7 8 9 15	39							
									22.00-22.45	B C	18	6 8 8 9 12 14	43							
								70	23.50-23.95	B C	19	8 12 20 27 3	70*							
								73	25.00-25.45	B C	20	8 15 25 25	73*							
								80	26.50-26.95	B C	21	8 12 12 30 18	80*							
								71	28.00-28.45	B C	22	9 12 14 35 1	71*							
								75	29.50-29.95	B C	23	25 50	75*							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH02 | SHEET 3 OF 4 | PROJECT No. 1580,GI

CLIENT: ARC:MC Limited	**PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place**	**GROUND LEVEL m**	**HOLE No. U2 BH02**
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 36.5 m	GRID REFERENCE DATES 22/01/2016 - 24/01/2016	SHEET 4 OF 4 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense becoming very dense brown fine to medium SAND (LAMBETH GROUP) *(continued)*					30											
									75											
									31.00-31.45	B C	24	25 50	75*							
									32											
									32.50-32.95	B C	25	25 50								
									33											
									75											
									34.00-34.45	B C	26	25 40 10	75*							
									35											
									35.50-35.95	B C	27	25 50								
							36.50		36											Borehole completed at 36.5m. Unable to progress due to dense soils
									37											
									38											
									39											
									40											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH02 | SHEET 4 OF 4 | PROJECT No. 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U2 BH03

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 27.0 m

GRID REFERENCE

DATES 12/02/2016 - 16/02/2016

SHEET 1 OF 3

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Block paving over fine sand)			0.00													Starter pit excavated from ground level to 3.0m using mechanical excavator
				CONCRETE			0.15													
				MADE GROUND (Pale grey/dark grey gravelly sand. Gravel of coarse flint and brick with cobbles of brick)			0.25													
				CONCRETE			1.15													
				MADE GROUND (Dark grey gravelly sand. Gravel of coarse flint)			1.30													
				CONCRETE (Orange brown sandy lean mixed concrete)			1.65													
				MADE GROUND (Orange brown sandy gravel of coarse flint)			2.10													
				MADE GROUND (Brown/grey slightly clayey gravelly sand. Gravel of subangular to subrounded fine to coarse flint)			2.80		3.00-3.45	B	1	1 3 3 3 4 5	15							
									4.00-4.45	B	2	2 3 4 4 4 4	16							
				Stiff brown/dark grey/black speckled slightly sandy CLAY with occasional gravel of flint (ALLUVIUM)			5.00		5.00-5.45	B	3	2 2 3 4 5 6	18							
									6.00-6.45	B	4	3 4 4 5 6 8	23							
									7.00-7.45	B	5	2 4 6 6 7 9	28							
									8.00-8.45	B	6	3 4 4 7 8 9	28							
				Dense brown gravelly SAND. Gravel of subangular to subrounded fine to medium flint (THAMES GRAVEL - ALLUVIUM)			8.40		9.00-9.45	B	7	4 5 7 7 8 10	32							
		9.80																		Inflow of water at 9.8m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. U2 BH03 | SHEET 1 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U2 BH03
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 27.0 m	GRID REFERENCE DATES 12/02/2016 - 16/02/2016	SHEET 2 OF 3 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense brown gravelly SAND. Gravel of subangular to subrounded fine to medium flint (THAMES GRAVEL - ALLUVIUM) *(continued)*					10.00-10.45	B	8	4 6 9 9 9 12	39							
				11.50 Gravel becoming fine to coarse with depth					11.50-11.95	B	9	3 5 7 8 8 9	32							
									13.00-13.45	B	10	4 5 5 7 9 12	33							
				Very stiff blue/green brown gravelly CLAY. Gravel of subangular to rounded fine to coarse flint with occasional cobbles of flint (READING FORMATION)			14.50		14.50-14.95	B	11	6 6 7 9 12 12	40							
									16.00-16.45	B	12	6 8 8 9 15 15	47							
								65	17.50-17.95	B	13	6 9 9 12 18 11	65*							
				Very dense dark brown fine to medium SAND with occasional gravel of flint (LAMBETH GROUP)			18.90	66	19.00-19.45	B	14	8 8 12 18 20	66*							

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH03 | SHEET 2 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place	GROUND LEVEL m	HOLE No. U2 BH03
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 27.0 m	GRID REFERENCE DATES 12/02/2016 - 16/02/2016	SHEET 3 OF 3 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very dense dark brown fine to medium SAND with occasional gravel of flint (LAMBETH GROUP) *(continued)*				75	20.50-20.95	B	15	6 9 20 20 20	75*							
								68	22.00-22.45	B	16	6 12 30 20	68*							
								70	23.50-23.95	B	17	8 12 35 15	70*							
								67	25.00-25.45	B	18	8 9 15 35	67*							
								70	26.50-26.95	B	19	8 12 20 30	70*							
							27.00													Borehole completed at 27.0m. Unable to progress due to dense soils

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U2 BH03 | SHEET 3 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	**PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place**	**GROUND LEVEL m**	**HOLE No. U4 BH01**
LOGGED BY: SG FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Trial Pit/trench Uncased to 2.2 m	GRID REFERENCE DATES 04/05/2016 - 04/05/2016	SHEET 1 OF 1 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Dark grey sandy gravelly clay. Gravel of fine to coarse brick, concrete and flint with occasional cobbles of concrete and brick with 10mm diameter steel rebar)			0.00		0											No collapse of sidewalls during excavation No groundwater encountered during excavation
									0.50	J	1									
									1.10	J	2									
									1.70	J	3									
				Dark orange brown SAND & GRAVEL of rounded fine to medium flint			1.90		2.10	J	4									Trial pit completed at 2.2m and backfilled prior to drilling
							2.20													

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U4 BH01 | SHEET 1 OF 1 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U4 BH02

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 25.4 m

GRID REFERENCE

DATES 08/02/2016 - 11/02/2016

SHEET 1 OF 3

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Block paving over fine sand)			0.00		0											Starter pit excavated from ground level to 3.0m using mechanical excavator
				CONCRETE			0.15													
				MADE GROUND (Pale grey/dark grey gravelly sand. Gravel of coarse flint and brick with cobbles of brick) 0.60 150mm diameter drainage pipe with pea gravel surround encountered			0.25		0.40	J	1									
									0.70	J	2									
				CONCRETE			1.15		1											
				MADE GROUND (Dark grey gravelly sand. Gravel of coarse flint)			1.30		1.20	B J	1 3	1 0 0 0 0 1	1							
				CONCRETE (Orange brown sandy lean mixed concrete)			1.65													
				MADE GROUND (Orange brown sandy gravel of coarse flint)			2.10		2.00	B	2	1 0 0 1 0 1	2							
				MADE GROUND (Brown/grey/black slightly sandy gravelly clay. Gravel of subangular to subrounded fine to coarse flint)			2.70		3.00	B	3	1 2 4 4 4 5	17							
									4.00	B	4	1 2 4 4 5 6	19							
				Stiff brown/grey CLAY (ALLUVIUM)			5.00		5.00	B	5	2 3 4 4 4 5	17							
									6.00	B	6	2 3 4 4 4 6	18							
									7.00	B	7	2 4 6 6 7 7	26							
									8.00	B	8	2 3 5 7 7 8	27							
				Dense brown gravelly slightly clayey SAND. Gravel of subangular to rounded fine to coarse flint (THAMES GRAVEL - ALLUVIUM)			8.40		9.00	B	9	2 6 6 7 9 10	32							
		9.80							10											Inflow of water at 9.8m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U4 BH02 | SHEET 1 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited

PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place

GROUND LEVEL m

HOLE No. U4 BH02

LOGGED BY: PC
FIELDWORK BY: DRILLT
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: SG
DATE:

EXCAVATION METHOD: Cable Percussion (shell and auger)
Uncased to 25.4 m

GRID REFERENCE

DATES 08/02/2016 - 11/02/2016

SHEET 2 OF 3

PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	r Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dense brown sandy GRAVEL of subangular to rounded fine to coarse flint with frequent cobbles of flint (ALLUVIUM)			10.00		10.00	B	10	4 7 8 12 12 12	44							
									11.50	B	11	3 5 8 9 12 15	44							
									13.00	B	12	4 5 5 6 7 8	26							
				Very dense yellow brown gravelly SAND with blue pockets (READING FORMATION)			13.90	65	14.50	B	13	6 9 12 18 20	65*							
				Very dense grey brown sandy GRAVEL of subangular to rounded fine to coarse flint (LAMBETH GROUP)			16.00	72	16.00	B	14	6 8 8 20 30	72*							
								63	17.50	B	15	6 7 9 15 15 11	63*							
								65	19.00	B	16	6 9 15 15 20	65*							
				Very dense dark brown fine to medium SAND (LAMBETH GROUP)			19.60													

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
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J Disturbed jar sample
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W Water Sample
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Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U4 BH02 | SHEET 2 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

CLIENT: ARC:MC Limited	**PROJECT: Units 1, 2 and 4 The Point, Greenwich View Place**	**GROUND LEVEL m**	**HOLE No. U4 BH02**
LOGGED BY: PC FIELDWORK BY: DRILLT TEMPLATE REF: GEL AGS BH BETA CHECKED BY: SG DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) Uncased to 25.4 m	GRID REFERENCE DATES 08/02/2016 - 11/02/2016	SHEET 3 OF 3 PROJECT NO. 1580,GI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Very dense dark brown fine to medium SAND (LAMBETH GROUP) *(continued)*					62											
									20.50	B	17	4 8 12 14 24	62*							
									68											
									22.00	B	18	6 12 30 20	68*							
									62											
									23.50	B	19	6 6 34 16	62*							
							25.40													Borehole completed at 25.4m. Unable to progress due to dense soils

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
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Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. U4 BH02 | SHEET 3 OF 3 | PROJECT No 1580,GI

GEL AGS BH BETA 1580,GI GREENWICH POINT, IOD, 27-01-16.GPJ GINT STD AGS 3 1.GDT 19/5/16

Geosphere Environmental Ltd
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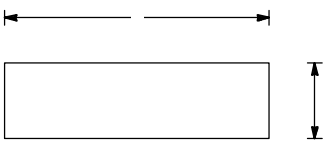
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Units 1, 2 and 4 The Point, Greenwich View Place	ARC:MC Limited	**U2 BH01**

Job No	Date	Ground Level (m)	Grid Reference ()
1580,GI	03-05-16 03-05-16		

Fieldwork By	Logged By	Sheet
DRILLT	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	MADE GROUND (Concrete crush with frequent brick and clay pipe with cables and rebar)				No collapse of sidewalls during excavation
0.30-1.90	MADE GROUND (Dark brown slightly clayey sand with frequent fine to coarse gravel and cobbles of brick, concrete and flint with timber and occasional 20mm diameter rebar)		0.35	1J	
			0.80	2J	
			1.30	3J	
▽1.90-2.10	Pale grey/dark orange brown gravelly coarse SAND (possible fill)		2.00	4J	Inflow of water at2 m Trial pit completed at 2.1m and backfilled prior to drilling



Shoring/Support:
Stability:

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By SG

Geosphere Environmental Ltd
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Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
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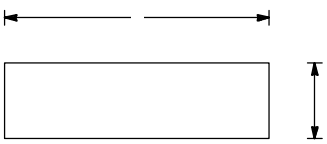
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Units 1, 2 and 4 The Point, Greenwich View Place	ARC:MC Limited	**U4 BH01**

Job No	Date	Ground Level (m)	Grid Reference ()
1580,GI	04-05-16 04-05-16		

Fieldwork By	Logged By	Sheet
DRILLT	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-1.90	MADE GROUND (Dark grey sandy gravelly clay. Gravel of fine to coarse brick, concrete and flint with occasional cobbles of concrete and brick with 10mm diameter steel rebar)		0.50	1J	No collapse of sidewalls during excavation No groundwater encountered during excavation
			1.10	2J	
			1.70	3J	
1.90-2.20	Dark orange brown SAND & GRAVEL of rounded fine to medium flint		2.10	4J	Trial pit completed at 2.2m and backfilled prior to drilling



Shoring/Support:
Stability:

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By SG

APPENDIX 5 – GAS AND GROUNDWATER MONITORING DATA

GROUND GAS AND GROUNDWATER MONITORING DATA

geosphere environmental ltd

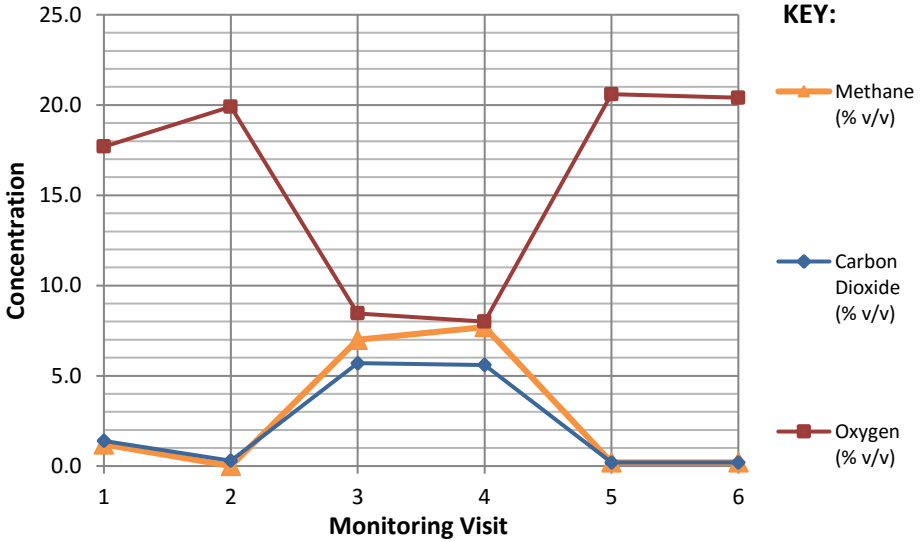
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

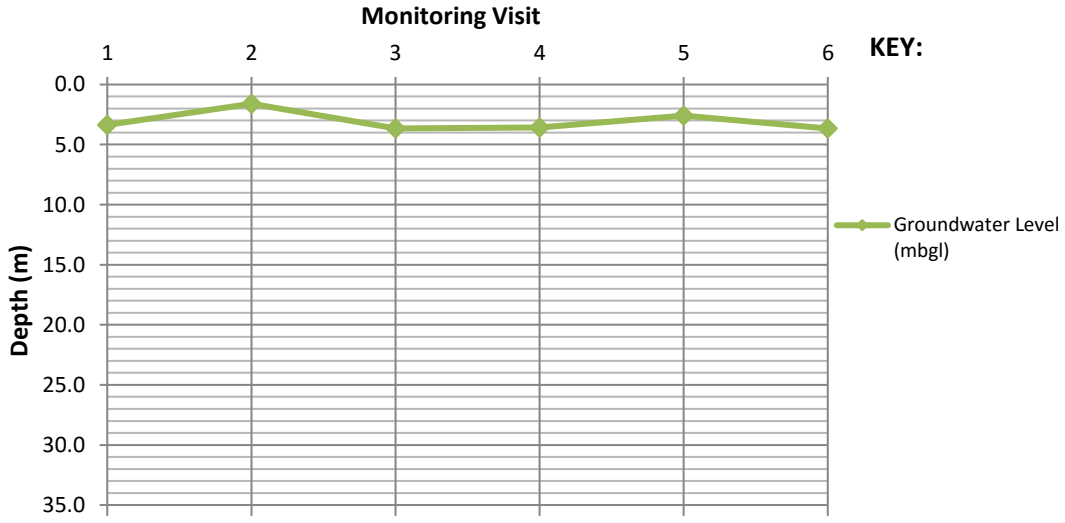
Exploratory Hole Location U1-BH-02 **Date of Installation** 19/01/2016

Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	VOC (ppm)	Water Level (mbgl)	Comments
1st visit	24/02/2016	1014	1.2	<2	1.4	17.7	0	4	3.36	Warm, sunny, dry and calm
2nd visit	02/03/2016	992	<0.1	<2	0.3	19.9	0.3	nm	1.60	Cold, overcast, wet and windy
3rd visit	07/03/2016	1007	7.0	nm	5.7	8.5	-0.1	0	3.65	Cool, sunny, dry and breezy
4th visit	10/03/2016	1016	7.7	<2	5.6	8.0	-0.2	0	3.57	Cool, sunny, damp and breezy
5th visit	24/05/2016	1020	0.2	<2	0.2	20.6	0.0	0	2.60	hot, sunny, dry and breezy
6th visit	24/05/2016	1020	0.2	<2	0.2	20.4	0.3	4	3.66	warm, sunny, dry and breezy

Instrument Used: GA2000 gas analyser **NOTE:** **n/a** Not applicable

REMARKS: **nm** Not measured





SITE
Unit 1, 2 and 4, The Point, Greenwich View Place, London, E14 9NN

REPORT
1580,GI

DATE
08 March 2016

GROUND GAS AND GROUNDWATER MONITORING DATA

geosphere environmental ltd

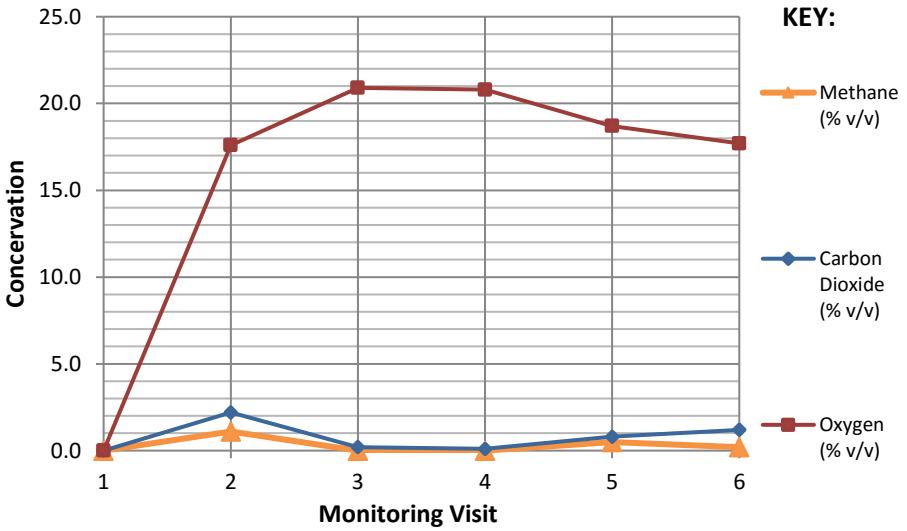
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

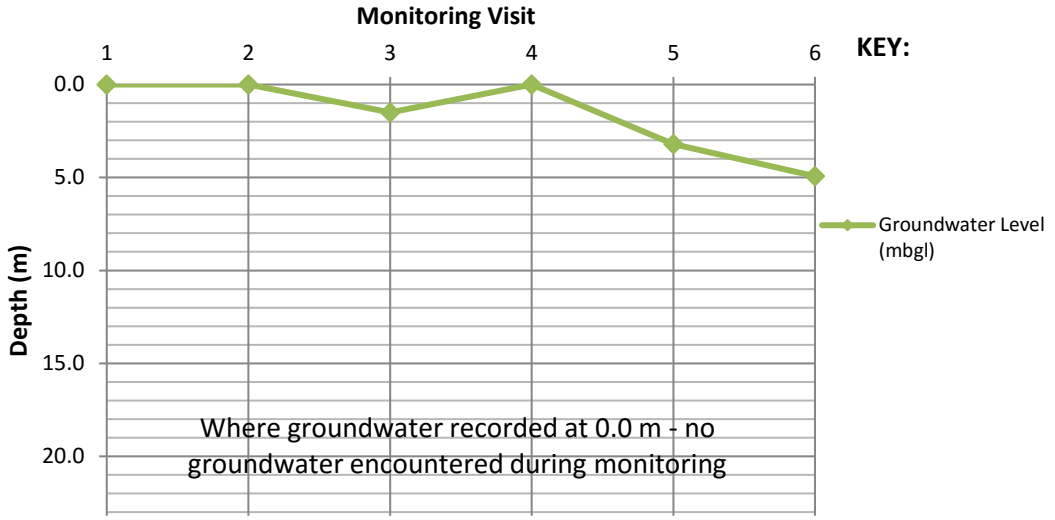
Exploratory Hole Location U1-BH-03 **Date of Installation** 21/01/2016

Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	VOC (ppm)	Water Level (mbgl)	Comments
1st visit	24/02/2016	nm	nm	nm	nm	nm	nm	nm	nm	Warm, sunny, dry and calm
2nd visit	02/03/2016	991	1.1	<2	2.2	17.6	0.2	0	Dry	Cold, overcast, wet and windy. No bung - piezo
3rd visit	07/03/2016	1007	<0.1	<2	0.2	20.9	-0.2	1	1.50	Cool, sunny, dry and breezy
4th visit	10/03/2016	1016	<0.1	<2	0.1	20.8	-0.3	0	dry	Cool, sunny, damp and breezy
5th visit	03/05/2016	1025	0.5	<2	0.8	18.7	-0.3	0	3.20	hot, sunny, dry and breezy
6th visit	24/05/2016	1020	0.2	<2	1.2	17.7	0.0	0	4.93	warm, sunny, dry and breezy

Instrument Used: GA2000 gas analyser **NOTE:** **n/a** Not applicable

REMARKS: **nm** Not measured





SITE
Unit 1, 2 and 4, The Point, Greenwich View Place, London, E14 9NN

REPORT
1580,GI

DATE
08 March 2016

GROUND GAS AND GROUNDWATER MONITORING DATA

geosphere environmental ltd

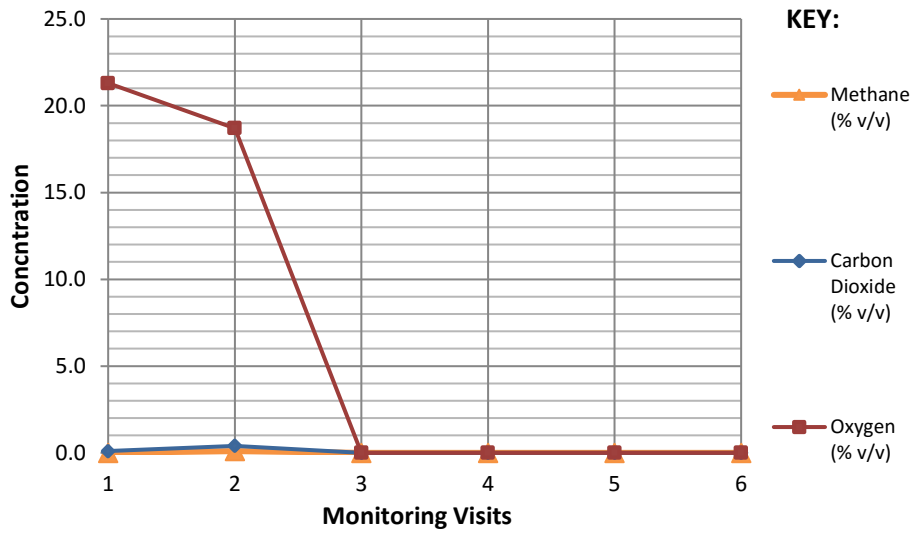
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

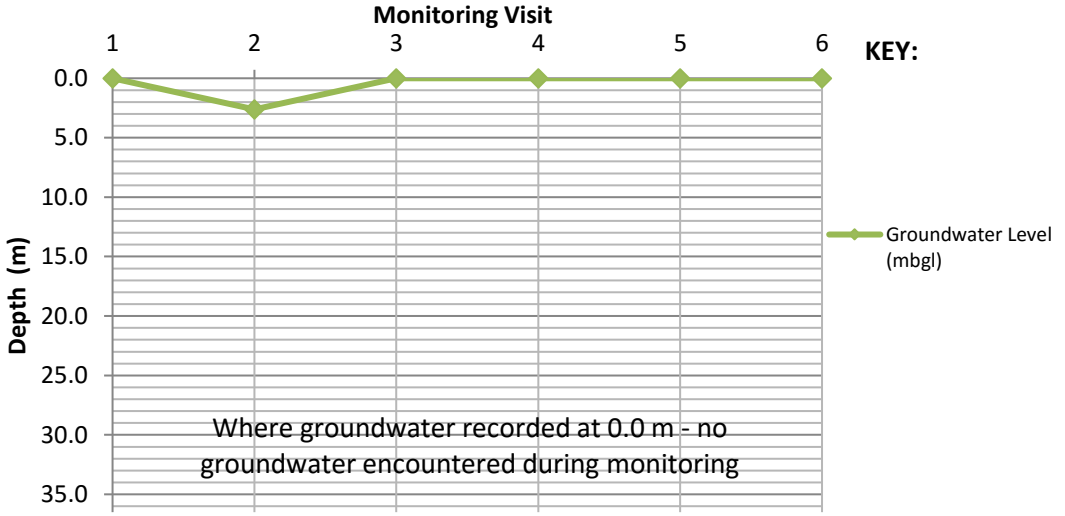
Exploratory Hole Location U2-BH-02 **Date of Installation** 22/01/2016

Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	VOC (ppm)	Water Level (mbgl)	Comments
1st visit	24/02/2016	1014	<0.1	<2	0.1	21.3	0.1	0	Dry	Warm, sunny, dry and calm
2nd visit	02/03/2016	991	0.1	<2	0.4	18.7	nm	nm	2.62	Cold, overcast, wet and windy. No bung - piezo
3rd visit	07/03/2016	1007	nm	nm	nm	nm	nm	nm	nm	Cool, sunny, dry and breezy
4th visit	10/03/2016	1016	nm	nm	nm	nm	nm	nm	nm	Cool, sunny, damp and breezy
5th visit	03/05/2016	1025	nm	nm	nm	nm	nm	nm	nm	hot, sunny, dry and breezy
6th visit	24/05/2016	1020	nm	nm	nm	nm	nm	nm	nm	warm, sunny, dry and breezy

Instrument Used: GA2000 gas analyser **NOTE:** **n/a** Not applicable

REMARKS: **nm** Not measured





SITE	REPORT	DATE
Unit 1, 2 and 4, The Point, Greenwich View Place, London, E14 9NN	1580,GI	08 March 2016

GROUND GAS AND GROUNDWATER MONITORING DATA

geosphere environmental ltd

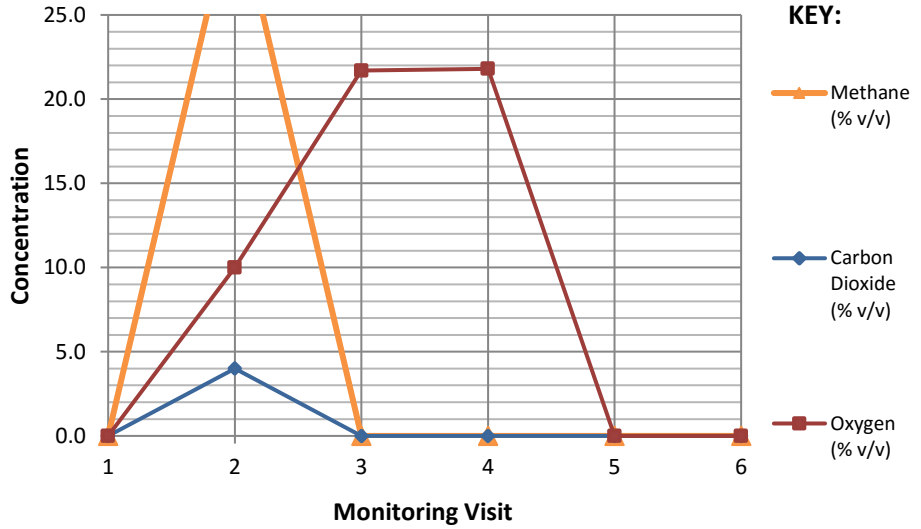
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

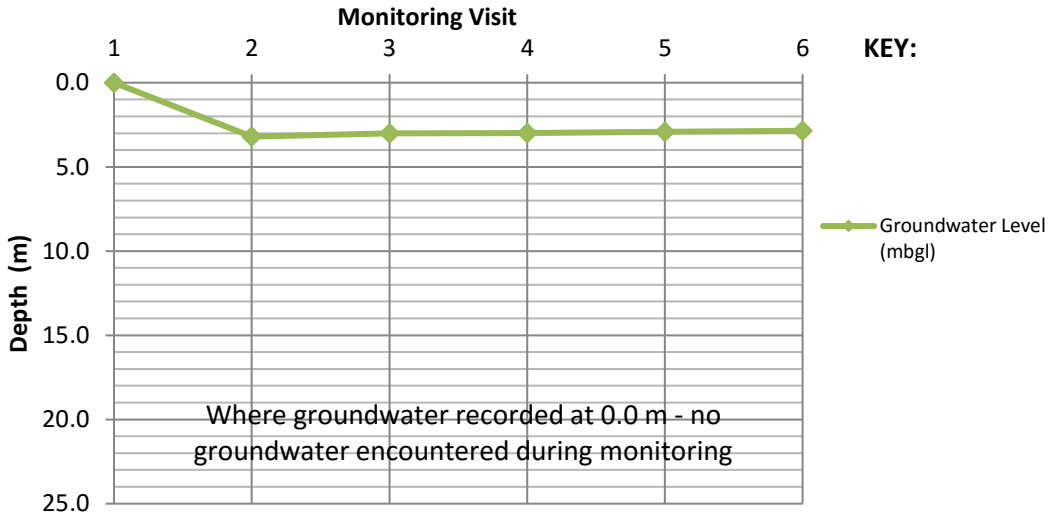
Exploratory Hole Location U4-BH-02 **Date of Installation** 11/01/2016

Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	VOC (ppm)	Water Level (mbgl)	Comments
1st visit	24/02/2016	nm	nm	nm	nm	nm	nm	nm	nm	Warm, sunny, dry and calm
2nd visit	02/03/2016	991	32.1	<2	4.0	10.0	0	0	3.20	Cold, overcast, wet and windy. No bung - piezo
3rd visit	07/03/2016	1007	<0.1	<2	0.0	21.7	-0.2	0	3.00	Cool, sunny, dry and breezy
4th visit	07/03/2016	1016	0.0	<2	0.0	21.8	-0.3	0	2.98	Cool, sunny, damp and breezy
5th visit	03/05/2016	1025	-	-	-	-	-	-	2.91	warm, sunny, dry and breezy
6th visit	24/05/2016	1020	-	-	-	-	-	-	2.86	warm, sunny, dry and breezy - no bung and top of well destroyed

Instrument Used: GA2000 gas analyser **NOTE:** **n/a** Not applicable

REMARKS: **nm** Not measured





SITE
Unit 1, 2 and 4, The Point, Greenwich View Place, London, E14 9NN

REPORT
1580,GI

DATE
08 March 2016

APPENDIX 6 – ENVIRONMENTAL LABORATORY TEST RESULTS

Andrew Bell
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Brightwell
Suffolk
IP10 0BJ

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 16-39535

Site Reference:	None Supplied
Project / Job Ref:	None Supplied
Order No:	1580
Sample Receipt Date:	15/01/2016
Sample Scheduled Date:	15/01/2016
Report Issue Number:	1
Reporting Date:	21/01/2016

Authorised by:

Russell Jarvis
Associate Director of Client Services
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Associate Director of Laboratory
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
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Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 16-39535	**Date Sampled**	11/01/16	11/01/16	14/01/16	14/01/16		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied		
Site Reference: None Supplied	**TP / BH No**	U1 BH02 D2 + D3	U1 BH03 D1	U2 BH02 J1, J2 & J3	U4 BH02 J1, J2 & J3		
Project / Job Ref: None Supplied	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied		
Order No: 1580	**Depth (m)**	1.10 + 1.80	1.50 + 2.00	0.30, 0.60 + 1.10	0.40, 0.70 + 1.20		
Reporting Date: 21/01/2016	**QTSE Sample No**	186691	186692	186693	186694		

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	MCERTS	10.8	10.7	10.6	11.6	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	178	227	689	57	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.18	0.23	0.69	0.06	
Organic Matter	%	< 0.1	MCERTS	1.3	2.1	2.1	1.2	
Arsenic (As)	mg/kg	< 2	MCERTS	13	14	21	14	
Barium (Ba)	mg/kg	< 5	NONE	154	146	282	111	
Beryllium (Be)	mg/kg	< 0.5	NONE	0.7	0.6	1	< 0.5	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	27	17	20	20	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	55	39	68	25	
Lead (Pb)	mg/kg	< 3	MCERTS	208	91	532	130	
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	1.2	< 1	
Molybdenum (Mo)	mg/kg	< 1	NONE	2	2.9	2.2	1	
Nickel (Ni)	mg/kg	< 3	MCERTS	18	21	22	13	
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	
Vanadium (V)	mg/kg	< 2	NONE	36	35	37	27	
Zinc (Zn)	mg/kg	< 3	MCERTS	152	95	190	99	
EPH (C10 - C40)	mg/kg	< 6	MCERTS	45	135	47	161	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Wioletta Goral

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis $^{(S)}$

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4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 16-39535	Date Sampled	11/01/16	11/01/16	14/01/16	14/01/16	
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: None Supplied	TP / BH No	U1 BH02 D2 + D3	U1 BH03 D1	U2 BH02 J1, J2 & J3	U4 BH02 J1, J2 & J3	
Project / Job Ref: None Supplied	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 1580	Depth (m)	1.10 + 1.80	1.50 + 2.00	0.30, 0.60 + 1.10	0.40, 0.70 + 1.20	
Reporting Date: 21/01/2016	QTSE Sample No	186691	186692	186693	186694	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.38	0.13	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	0.11	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	0.33	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	0.51	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	1	6.63	0.36	0.37	
Anthracene	mg/kg	< 0.1	MCERTS	0.17	1.68	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	1.20	7.44	0.67	0.77	
Pyrene	mg/kg	< 0.1	MCERTS	0.91	5.95	0.56	0.74	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.48	3.41	0.35	0.48	
Chrysene	mg/kg	< 0.1	MCERTS	0.49	3.07	0.37	0.50	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.53	3.64	0.53	0.71	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.23	1.42	0.19	0.27	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.37	3.29	0.38	0.47	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.24	2.22	0.28	0.37	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.30	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.23	1.94	0.24	0.33	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.9	42.3	4.1	5	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Maidstone
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Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 16-39535	**Date Sampled**	11/01/16	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: None Supplied	**TP / BH No**	U1 BH02 D2 + D3	
Project / Job Ref: None Supplied	**Additional Refs**	None Supplied	
Order No: 1580	**Depth (m)**	1.10 + 1.80	
Reporting Date: 21/01/2016	**QTSE Sample No**	186691	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.8	3%	5%	6%
Loss on Ignition	%	< 0.01	0.80	--	--	10%
BTEX[MU]	mg/kg	< 0.05	0.08	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	5.9	100	--	--
pH[MU]	pH Units	N/a	10.8	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2.1	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.05	< 0.02		0.2	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.030	0.006		< 0.20	0.5	10	70
Copper[U]	0.03	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.024	0.004		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.005	< 0.005		< 0.06	0.06	0.7	5
Selenium[U]	0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	47	7		120	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	52	13		179	1000	20000	50000
TDS	311	140		1617	4000	60000	100000
Phenol Index	0.01	< 0.01		< 0.5	1	-	-
DOC	12.9	5.2		62	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.21						
Dry Matter (%)	85						
Moisture (%)	17.8						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.22						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

QTS Environmental Ltd
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UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 16-39535	**Date Sampled**	11/01/16	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: None Supplied	**TP / BH No**	U1 BH03 D1	
Project / Job Ref: None Supplied	**Additional Refs**	None Supplied	
Order No: 1580	**Depth (m)**	1.50 + 2.00	
Reporting Date: 21/01/2016	**QTSE Sample No**	186692	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	1.2	3%	5%	6%
Loss on Ignition	%	< 0.01	4.60	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	42.8	100	--	--
pH[MU]	pH Units	N/a	10.7	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.03	< 0.02		< 0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.026	< 0.005		< 0.20	0.5	10	70
Copper[U]	0.02	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.020	0.003		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.020	0.014		0.15	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	23	3		61	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	79	15		240	1000	20000	50000
TDS	281	149		1673	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	8.2	5.4		57.9	500	800	1000

Leach Test Information						
Sample Mass (kg)	0.19					
Dry Matter (%)	91.6					
Moisture (%)	9.2					
Stage 1						
Volume Eluate L2 (litres)	0.33					
Filtered Eluate VE1 (litres)	0.24					

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 16-39535	**Date Sampled**	14/01/16	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: None Supplied	**TP / BH No**	U2 BH02 J1, J2 & J3	
Project / Job Ref: None Supplied	**Additional Refs**	None Supplied	
Order No: 1580	**Depth (m)**	0.30, 0.60 + 1.10	
Reporting Date: 21/01/2016	**QTSE Sample No**	186693	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	1.2	3%	5%	6%
Loss on Ignition	%	< 0.01	4.20	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	4.1	100	--	--
pH[MU]	pH Units	N/a	10.6	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.9	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	0.01		< 0.2	0.5	2	25
Barium[U]	0.02	< 0.02		0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.087	0.014		0.24	0.5	10	70
Copper[U]	0.05	0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.026	0.004		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.020	0.017		0.17	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	0.023	< 0.005		< 0.2	4	50	200
Chloride[U]	16	2		41	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	243	29		578	1000	20000	50000
TDS	393	158		1897	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	9.1	5.1		56.4	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.19						
Dry Matter (%)	91						
Moisture (%)	10						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.24						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 16-39535	**Date Sampled**	14/01/16	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: None Supplied	**TP / BH No**	U4 BH02 J1, J2 & J3	
Project / Job Ref: None Supplied	**Additional Refs**	None Supplied	
Order No: 1580	**Depth (m)**	0.40, 0.70 + 1.20	
Reporting Date: 21/01/2016	**QTSE Sample No**	186694	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.7	3%	5%	6%
Loss on Ignition	%	< 0.01	3.10	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	53	500	--	--
Total PAH[MU]	mg/kg	< 1.7	5	100	--	--
pH[MU]	pH Units	N/a	11.6	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.03	0.02		0.2	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.050	0.016		0.21	0.5	10	70
Copper[U]	0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.010	0.003		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.005	0.007		0.07	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	0.015	< 0.005		< 0.2	4	50	200
Chloride[U]	13	3		41	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	18	19		186	1000	20000	50000
TDS	242	189		1967	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	9.1	6.2		65.9	500	800	1000

Leach Test Information				
Sample Mass (kg)	0.19			
Dry Matter (%)	93.1			
Moisture (%)	7.4			
Stage 1				
Volume Eluate L2 (litres)	0.34			
Filtered Eluate VE1 (litres)	0.26			

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
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4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 16-39535	
Geosphere Environmental Ltd	
Site Reference: None Supplied	
Project / Job Ref: None Supplied	
Order No: 1580	
Reporting Date: 21/01/2016	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
186691	U1 BH02 D2 + D3	None Supplied	1.10 + 1.80	15	Brown clayey sand with brick and rubble
186692	U1 BH03 D1	None Supplied	1.50 + 2.00	8.4	Grey gravelly sand with ash and stones
186693	U2 BH02 J1, J2 & J3	None Supplied	.30, 0.60 + 1.10	9.1	Grey gravelly sand with ash and stones
186694	U4 BH02 J1, J2 & J3	None Supplied	.40, 0.70 + 1.20	6.9	Grey gravelly sand with ash and stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

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4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 16-39535
Geosphere Environmental Ltd
Site Reference: None Supplied
Project / Job Ref: None Supplied
Order No: 1580
Reporting Date: 21/01/2016

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10 C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/02698
Issue Number: 1 **Date:** 16 May, 2016

Client:
Geosphere Environmental Ltd
Unit 11
Brightwell Barns
Ipswich Road
Brightwell
Ipswich
Suffolk
IP10 0BJ

Project Manager: Stephen Gilchrist
Project Name: Greenwich View, Place
Project Ref: 1580, GI
Order No: TBC
Date Samples Received: 06/05/16
Date Instructions Received: 06/05/16
Date Analysis Completed: 16/05/16

Prepared by:

Danielle Brierley
Administrative Assistant

Approved by:

Gill Walker
Laboratory Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/02698

Client Project Name: Greenwich View, Place

Client Project Ref: 1580, GI

Lab Sample ID	16/02698/1	16/02698/3	16/02698/4	16/02698/6	16/02698/8				Units	Method ref
Client Sample No	J1	J3	J4	J2	J4					
Client Sample ID	U2-BH-01	U2-BH-01	U2-BH-01	U4-BH-01	U4-BH-01					
Depth to Top	0.35	1.30	2.00	1.10	2.10					
Depth To Bottom										
Date Sampled	03-May-16	03-May-16	03-May-16	03-May-16	03-May-16					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	6A	1A	4A	1A					
% Stones >10mm$_A^{\#}$	22.0	11.3	18.9	<0.1	56.2				% w/w	A-T-044
pH$_D^{M\#}$	10.91	8.35	9.74	9.75	8.58				pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.09	0.09	0.07	0.11	<0.01				g/l	A-T-026s
Cyanide (free)$_A^{M\#}$	<1	<1	<1	<1	<1				mg/kg	A-T-042sFCN
Cyanide (complex)$_A^{M\#}$	<1	<1	<1	2	<1				mg/kg	A-T-042sCCN
Cyanide (total)$_A^{M\#}$	<1	<1	<1	2	<1				mg/kg	A-T-042sTCN
Organic matter$_D^{M\#}$	2.6	4.3	0.8	6.1	<0.1				% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	12	11	6	10	4				mg/kg	A-T-024s
Barium$_D$	75	94	29	110	7				mg/kg	A-T-024s
Beryllium$_D^{\#}$	1	1	1	1	<1				mg/kg	A-T-024s
Boron (water soluble)$_D^{M\#}$	<1.0	1.4	<1.0	1.4	<1.0				mg/kg	A-T-027s
Cadmium$_D^{M\#}$	0.7	0.9	<0.5	<0.5	<0.5				mg/kg	A-T-024s
Copper$_D^{M\#}$	34	76	10	32	2				mg/kg	A-T-024s
Chromium$_D^{M\#}$	17	18	15	13	9				mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1				mg/kg	A-T-040s
Lead$_D^{M\#}$	195	145	30	118	3				mg/kg	A-T-024s
Mercury$_D$	1.22	1.02	0.80	0.36	<0.17				mg/kg	A-T-024s
Molybdenum$_D^{M\#}$	<1	<1	<1	<1	<1				mg/kg	A-T-024s
Nickel$_D^{M\#}$	17	19	15	11	8				mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1	<1	<1				mg/kg	A-T-024s
Vanadium$_D^{M\#}$	30	28	26	25	11				mg/kg	A-T-024s
Zinc$_D^{M\#}$	99	98	32	90	11				mg/kg	A-T-024s

Envirolab Job Number: 16/02698

Client Project Name: Greenwich View, Place

Client Project Ref: 1580, GI

Lab Sample ID	16/02698/1	16/02698/3	16/02698/4	16/02698/6	16/02698/8				Units	Method ref
Client Sample No	J1	J3	J4	J2	J4					
Client Sample ID	U2-BH-01	U2-BH-01	U2-BH-01	U4-BH-01	U4-BH-01					
Depth to Top	0.35	1.30	2.00	1.10	2.10					
Depth To Bottom										
Date Sampled	03-May-16	03-May-16	03-May-16	03-May-16	03-May-16					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	6A	1A	4A	1A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	Chrysotile	NAD					A-T-045
Asbestos Matrix (microscope)$_A$	-	-	-	Loose Fibres	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A	N/A	N/A					Gravimetry
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_D$	-	-	-	<0.001	-				% w/w	A-T-054

Envirolab Job Number: 16/02698

Client Project Name: Greenwich View, Place

Client Project Ref: 1580, GI

Lab Sample ID	16/02698/1	16/02698/3	16/02698/4	16/02698/6	16/02698/8				Units	Method ref
Client Sample No	J1	J3	J4	J2	J4					
Client Sample ID	U2-BH-01	U2-BH-01	U2-BH-01	U4-BH-01	U4-BH-01					
Depth to Top	0.35	1.30	2.00	1.10	2.10					
Depth To Bottom										
Date Sampled	03-May-16	03-May-16	03-May-16	03-May-16	03-May-16					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	6A	1A	4A	1A					
PAH 16										
Acenaphthene$_A^{M\#}$	0.03	0.09	<0.01	0.04	<0.01				mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.03	0.06	<0.01	0.07	<0.01				mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.11	0.47	<0.02	0.14	<0.02				mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.43	1.01	<0.04	0.84	<0.04				mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.43	0.68	<0.04	1.19	<0.04				mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.77	0.98	<0.05	1.35	<0.05				mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.28	0.37	<0.05	1.04	<0.05				mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.88	0.40	<0.07	0.53	<0.07				mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.52	0.98	<0.06	0.97	<0.06				mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.05	0.11	<0.04	0.25	<0.04				mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.82	2.05	<0.08	1.39	<0.08				mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.03	0.13	<0.01	0.04	<0.01				mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.30	0.45	<0.03	1.16	<0.03				mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03				mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.41	1.35	<0.03	0.61	<0.03				mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.73	1.61	<0.07	1.24	<0.07				mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	5.81	10.7	<0.08	10.9	<0.08				mg/kg	A-T-019s

Envirolab Job Number: 16/02698

Client Project Name: Greenwich View, Place

Client Project Ref: 1580, GI

Lab Sample ID	16/02698/1	16/02698/3	16/02698/4	16/02698/6	16/02698/8				Units	Method ref
Client Sample No	J1	J3	J4	J2	J4					
Client Sample ID	U2-BH-01	U2-BH-01	U2-BH-01	U4-BH-01	U4-BH-01					
Depth to Top	0.35	1.30	2.00	1.10	2.10					
Depth To Bottom										
Date Sampled	03-May-16	03-May-16	03-May-16	03-May-16	03-May-16					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	6A	1A	4A	1A					
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-022+23s
Aro >C5-C7$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	1.5	0.6	<0.1	1.5	<0.1				mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	1.0	<0.1	1.1	2.8	0.5				mg/kg	A-T-023s
Total Aromatics$_A$	2.5	0.6	1.1	4.3	0.5				mg/kg	A-T-022+23s
TPH (Ali & Aro)$_A$	2.5	0.6	1.1	4.3	0.5				mg/kg	A-T-022+23s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
This report shall not be reproduced, except in full, without written approval from Envirolab.
Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8, Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

Final Test Report

Envirolab Job Number:	16/02698	
Issue Number:	1	Date: 12-May-16
Client:	Geosphere Environmental Ltd Unit 11 Brightwell Barns Ipswich Road Brightwell Ipswich, Suffolk, IP10 0BJ	
Project Manager:	Stephen Gilchrist	
Project Name:	Greenwich View, Place	
Project Ref:	1580, GI	
Order No:	TBC	
Date Samples Received:	6-May-16	
Date Instructions Received:	6-May-16	
Date Analysis Completed:	12-May-16	

Notes - Soil analysis

All results are reported as dry weight (<40℃).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.

Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

Lianne Bromiley
Senior Client Manager

UKAS TESTING
No. 1247

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

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Sample Details								Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	16/02698/1						
Client Sample Number				J1				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				U2-BH-01						
Depth to Top				0.35						
Depth to Bottom										
Date Sampled				03/05/2016						
Sample Type				Soil - ES						
Sample Matrix Code				4A						
Solid Waste Analysis										
pH (pH Units)$_D$	A-T-031	Y	Y	**10.91**				-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**0.81**				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**0.3**				-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**4.5**				-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**1.91**				3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**6.77**				100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**134**				500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**				1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**				6	-	-
Eluate Analysis				**2:1**	**8:1**	**2:1**	**Cumulative 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
				mg/l		**mg/kg**				
Arsenic	A-T-025	Y	N	0.025	0.017	0.052	**0.170**	0.5	2	25
Barium	A-T-025	Y	N	0.005	0.004	0.012	**0.040**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	0.025	0.005	0.053	**0.070**	0.5	10	70
Copper	A-T-025	Y	N	0.028	0.007	0.058	**0.090**	2	50	100
Mercury	A-T-025	Y	N	0.0001	<0.0001	0.0003	**<0.001**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.023	0.004	0.047	**0.060**	0.5	10	30
Nickel	A-T-025	Y	N	0.002	<0.001	0.004	**<0.01**	0.4	10	40
Lead	A-T-025	Y	N	0.002	0.002	0.004	**0.020**	0.5	10	50
Antimony	A-T-025	Y	N	0.009	0.004	0.018	**0.050**	0.06	0.7	5
Selenium	A-T-025	Y	N	0.005	0.001	0.010	**0.020**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.005	0.002	0.010	**0.020**	4	50	200
Chloride	A-T-026	Y	N	22	2	46	**40**	800	15000	25000
Fluoride	A-T-026	Y	N	0.3	0.2	0.6	**2.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	120	23	249	**315**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	281	126	581	**1398**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	**<200**	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	10.2	10.5					
Conductivity (µS/cm)	A-T-037	N	N	562	252					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	89.7						
Stage 1										
Volume Leachant, L_2 (l)	A-T-046			0.350						
Filtered Eluate Volume, VE_1 (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L_8 (l)	A-T-046			1.430						

Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation

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Sample Details								Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	16/02698/4						
Client Sample Number				J4				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				U2-BH-01						
Depth to Top				2						
Depth to Bottom										
Date Sampled				03/05/2016						
Sample Type				Soil - ES						
Sample Matrix Code				1A						
Solid Waste Analysis										
pH (pH Units)$_D$	A-T-031	Y	Y	**9.74**				-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**0.44**				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**0.1**				-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**2.3**				-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**0.59**				3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**<0.08**				100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**<10**				500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**				1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**				6	-	-
Eluate Analysis				**2:1**	**8:1**	**2:1**	**Cumulative 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
				mg/l		**mg/kg**				
Arsenic	A-T-025	Y	N	0.032	0.013	0.068	**0.150**	0.5	2	25
Barium	A-T-025	Y	N	0.012	0.002	0.026	**0.030**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	0.012	0.002	0.024	**0.030**	0.5	10	70
Copper	A-T-025	Y	N	0.005	0.002	0.011	**0.020**	2	50	100
Mercury	A-T-025	Y	N	0.0001	<0.0001	0.0003	**<0.001**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.007	0.001	0.016	**0.020**	0.5	10	30
Nickel	A-T-025	Y	N	0.003	<0.001	0.006	**<0.01**	0.4	10	40
Lead	A-T-025	Y	N	0.002	<0.001	0.005	**0.010**	0.5	10	50
Antimony	A-T-025	Y	N	0.003	<0.001	0.006	**0.010**	0.06	0.7	5
Selenium	A-T-025	Y	N	0.003	<0.001	0.007	**<0.01**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.008	0.003	0.018	**0.030**	4	50	200
Chloride	A-T-026	Y	N	56	5	118	**97**	800	15000	25000
Fluoride	A-T-026	Y	N	0.4	0.1	0.9	**2.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	81	13	172	**191**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	248	61	524	**775**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	**<200**	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	9.1	9.7					
Conductivity (µS/cm)	A-T-037	N	N	495	122					
Mass Sample (kg)				0.201						
Dry Matter (%)	A-T-044	N	N	88.1						
Stage 1										
Volume Leachant, L_2 (l)	A-T-046			0.350						
Filtered Eluate Volume, VE_1 (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L_8 (l)	A-T-046			1.420						

Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation

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Sample Details								Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	16/02698/6						
Client Sample Number				J2				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				U4-BH-01						
Depth to Top				1.1						
Depth to Bottom										
Date Sampled				03/05/2016						
Sample Type				Soil - ES						
Sample Matrix Code				4A						
Solid Waste Analysis										
pH (pH Units)$_D$	A-T-031	Y	Y	**9.75**				-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**0.35**				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**0.06**				-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**3.8**				-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**3.56**				3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**10.1**				100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**<10**				500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**				1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**				6	-	-
Eluate Analysis				**2:1**	**8:1**	**2:1**	**Cumulative 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
				mg/l		**mg/kg**				
Arsenic	A-T-025	Y	N	0.018	0.009	0.037	**0.100**	0.5	2	25
Barium	A-T-025	Y	N	0.012	0.005	0.025	**0.050**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	0.037	0.006	0.075	**0.090**	0.5	10	70
Copper	A-T-025	Y	N	0.038	0.007	0.077	**0.100**	2	50	100
Mercury	A-T-025	Y	N	<0.0001	<0.0001	<0.0002	**<0.001**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.022	0.003	0.044	**0.050**	0.5	10	30
Nickel	A-T-025	Y	N	0.002	<0.001	0.003	**<0.01**	0.4	10	40
Lead	A-T-025	Y	N	<0.001	<0.001	<0.002	**<0.01**	0.5	10	50
Antimony	A-T-025	Y	N	0.011	0.006	0.022	**0.060**	0.06	0.7	5
Selenium	A-T-025	Y	N	0.003	<0.001	0.006	**<0.01**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.003	0.001	0.005	**0.010**	4	50	200
Chloride	A-T-026	Y	N	22	2	44	**39**	800	15000	25000
Fluoride	A-T-026	Y	N	0.4	0.3	0.8	**3.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	159	28	323	**388**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	352	164	714	**1800**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	**<200**	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	10.3	10.8					
Conductivity (µS/cm)	A-T-037	N	N	704	327					
Mass Sample (kg)				0.201						
Dry Matter (%)	A-T-044	N	N	90.6						
Stage 1										
Volume Leachant, L_2 (l)	A-T-046			0.350						
Filtered Eluate Volume, VE_1 (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L_8 (l)	A-T-046			1.450						

Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Geosphere Environmental Ltd, Unit 11, Brightwell Barns, Ipswich Road, Brightwell, Ipswich, Suffolk, IP10 0BJ

Project No: 16/02698

Date Instructions Received: 06/05/2016 (am)

Project: Greenwich View, Place

Clients Project No: 1580, GI

NO DEVIATIONS IDENTIFIED

APPENDIX 7 – GEOTECHNICAL LABORATORY TEST RESULTS

TEST REPORT.

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

DATE OF ISSUE : 07/03/16 **PAGE 1 of 30 Pages**

Contract Greenwich View Place, London

Serial No. S29734

UKAS TESTING 0998

CLIENT:

Geosphere Environmental Ltd.
Brightwell Barns
Brightwell
Ipswich
IP10 0BJ

Soil Property Testing Ltd.

15,16 & 18 Halcyon Court, St Margarets Way,
Stukeley Meadows, Huntingdon,
Cambs. PE29 6DG.

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

SAMPLES SUBMITTED BY:

Geosphere Environmental Ltd.

APPROVED SIGNATORIES:

☑ **J.C.GARNER B.Eng (Hons.) FGS**
Technical Director

☐ **S.P.TOWNEND FGS**
Quality Manager

☐ **W.JOHNSTONE**
Materials Lab Manager

SAMPLES LABELLED:

Greenwich View Place, London

DATE RECEIVED: 11/02/16

SAMPLES TESTED BETWEEN 11/02/16 **and** 07/03/16

REMARKS: For the attention of Mr S Gilchrist
Your reference 1580,GI

NOTES:

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 2 of 30

Contract Greenwich View Place, London

Serial No. S29734

SCHEDULE OF LABORATORY TESTS

Bh./ Tp No.	Sample Ref	Depth (from)	7:PSD by Wet Sieve BS1377	1:Moisture Content Determination	4:Liquid/Plastic limit 1 point	5:Wet Sieve Preparation for Limit	31:One Dimensional Consolidation	32:Consol extra 24 hr increment	13:Triaxial Test single stage	Remarks
U1-BH02	B12	10.00	*	*						
	B14	13.00		*						
	B16	16.00	*	*						
	B18	19.00		*						
	B20	22.00	*	*						
	B23	26.50		*						
	B25	29.50	*	*						
	B28	34.00		*						
U1-BH03	B2	2.00	*							
	B3	3.00	*							
	B4	4.00	*		*	*	*	*	*	
	U10	7.00			*	*				*
	B13	9.00	*	*						
	B19	16.00	*		*	*				
	B21	19.00	*	*						
	B23	22.00	*	*						
U2-BH02	B3	3.00	*							
	B5	5.00	*		*	*		*	*	
	B9	9.00	*		*	*	*	*	*	
	B11	11.50	*	*						
	B14	16.00	*	*						
	B16	19.00	*		*	*	*			
	B18	22.00	*	*						
	B22	28.00	*	*						
	B25	32.50	*	*						
-	-	-	20	16	6	6	3	3	3	1

<— Total Number of Tests —

Scheduled by: Geosphere Environmental Ltd.

Target Date: 03/03/16

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 3 of 30

Contract Greenwich View Place, London

Serial No. S29734

UKAS TESTING 0998

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

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	SAMPLE PREPARATION Method S/N	Ret'd 0.425mm (%)	Corr'd M/C <0.425mm	Curing Time (hrs.)	Description	CLASS
U1-BH03	4.00 -4.45	B4	34	36	18	18	1.06*	S	7(M)	37	29	Very soft dark grey locally oxidised to brown organic slightly sandy silty CLAY with rare fine and medium flint	CI
U1-BH03	7.00 -7.45	U10	43	84	32	52	0.21	N	0(A)		28	Firm (Medium strength) dark grey CLAY with frequent black organic speckling and grey mottling	CV
U1-BH03	16.00 -16.45	B19	20	67	21	46	-0.02	N	0(A)		25	Very stiff mottled orange, bluish grey and dark bluish grey slightly sandy CLAY with rare shell fragments	CH
U2-BH02	5.00 -5.45	B5	62	90	30	60	0.53	N	0(A)			Soft dark grey organic CLAY with occasional black mottling and rare peat pockets	CV/ CE
U2-BH02	9.00 -9.45	B9	18	25	16	9.0	1.89*	S	45(M)	33	27	Very soft dark grey slightly gravelly sandy silty CLAY. Gravel is black and white fine and medium angular to subrounded	CL
U2-BH02	19.00 -19.45	B16	28	40	18	22	0.91*	S	26(M)	38	28	Very soft mottled dark bluish grey, olive and bluish grey slightly sandy slightly gravelly silty CLAY. Gravel is brown and black fine and medium rounded and subrounded	CI

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

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

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

COMMENTS :

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

TEST REPORT.

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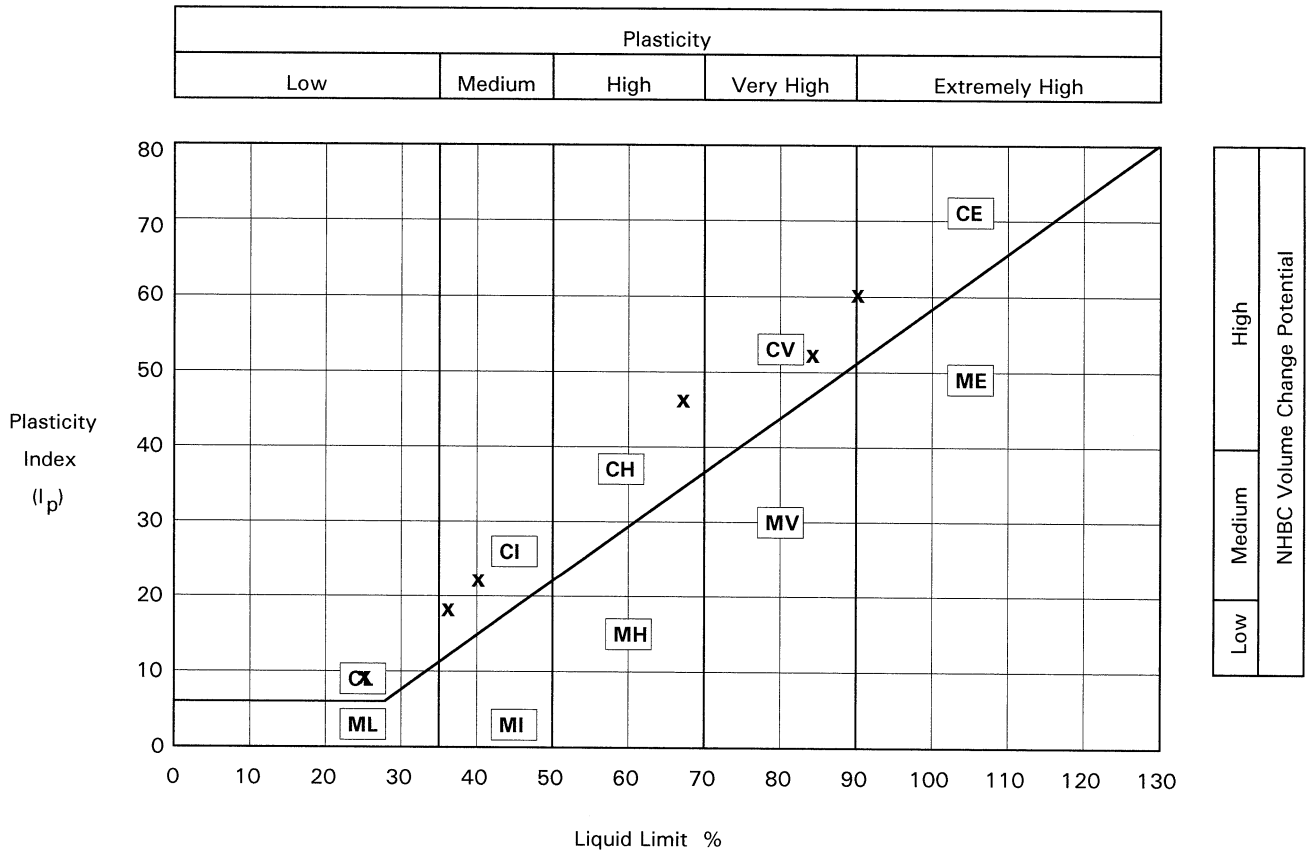
PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



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

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

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

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

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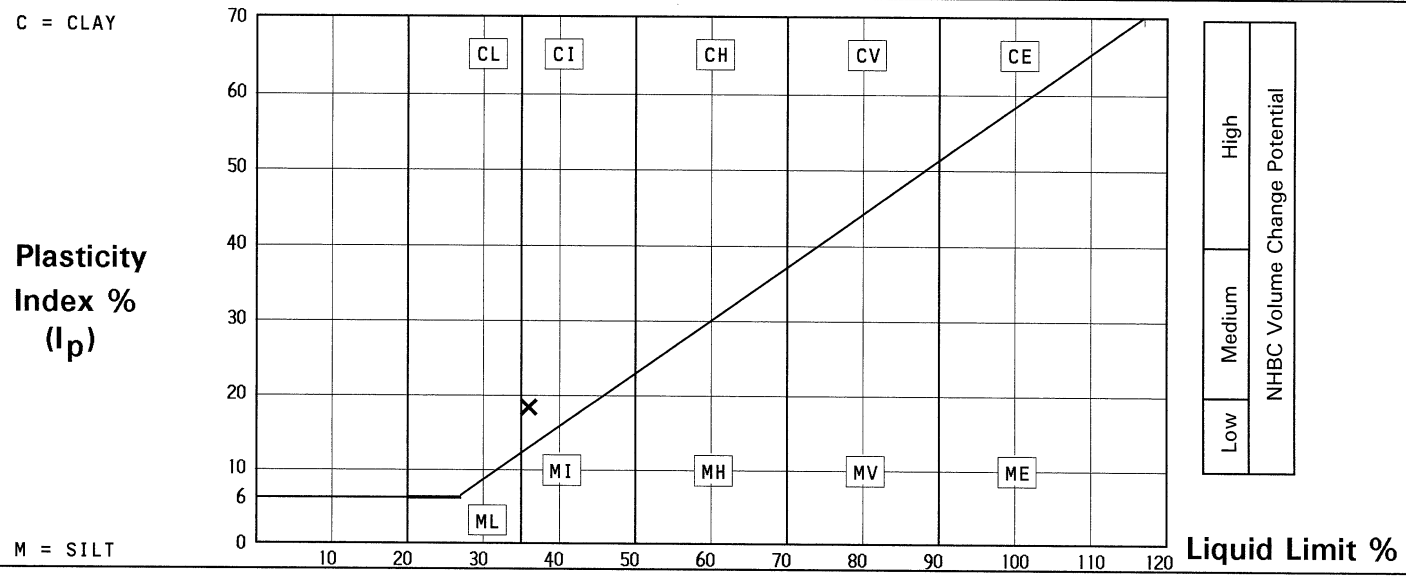
UKAS TESTING 0998

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

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U1-BH03	4.00 -4.45	B4	34	Very soft dark grey locally oxidised to brown organic slightly sandy silty CLAY with rare fine and medium flint	

PREPARATION

Method of Preparation	Sieved Specimen	Liquid Limit	36 %
Sample retained 0.425 sieve	(Measured) 7 %	Plastic Limit	18 %
Corrected moisture content for material passing 0.425mm	37 %	Plasticity Index	18 %
Curing Time	29 Hours	Liquidity Index	1.06
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



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

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

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

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)
2% retained on 2mm sieve.
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

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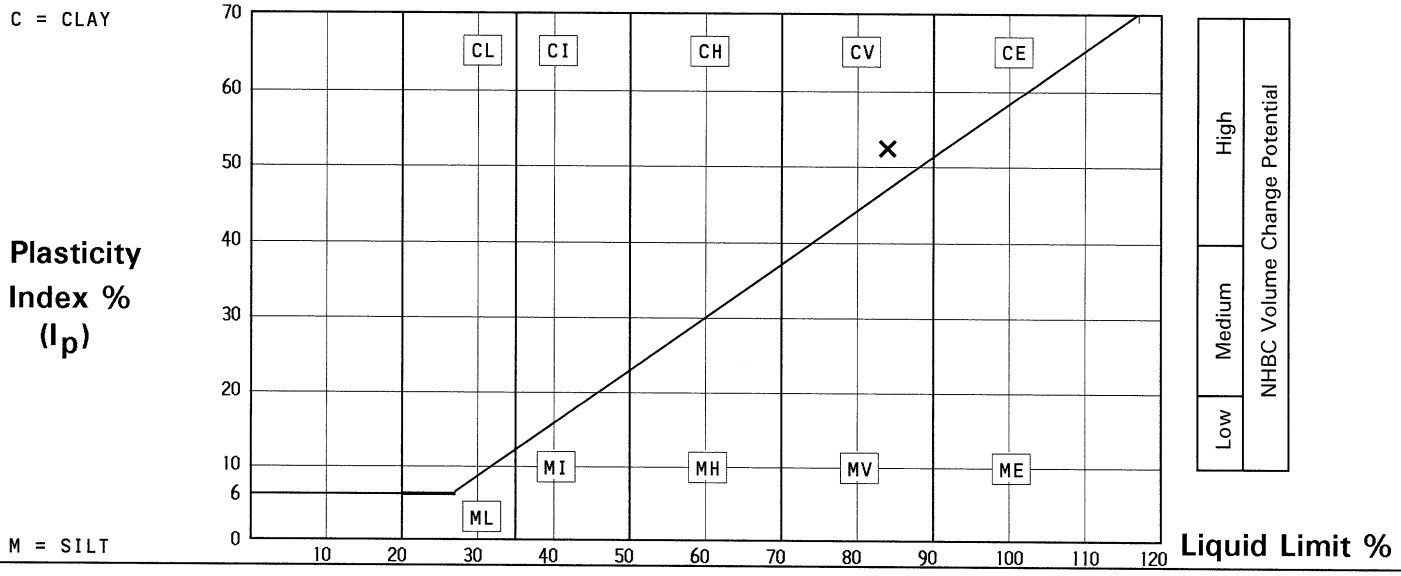
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U1-BH03	7.00 -7.45	U10	43	Firm (Medium strength) dark grey CLAY with frequent black organic speckling and grey mottling	

PREPARATION

Method of Preparation	Specimen from Natural Soil		
Sample retained 0.425 sieve	(Assumed)	0	%
Corrected moisture content for material passing 0.425mm			%
Curing Time		28 Hours	

Liquid Limit	84	%
Plastic Limit	32	%
Plasticity Index	52	%
Liquidity Index	0.21	
Clay Content	Not analysed.	%
Derived Activity (PI/CC)	Not analysed.	



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

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

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

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

TEST REPORT.

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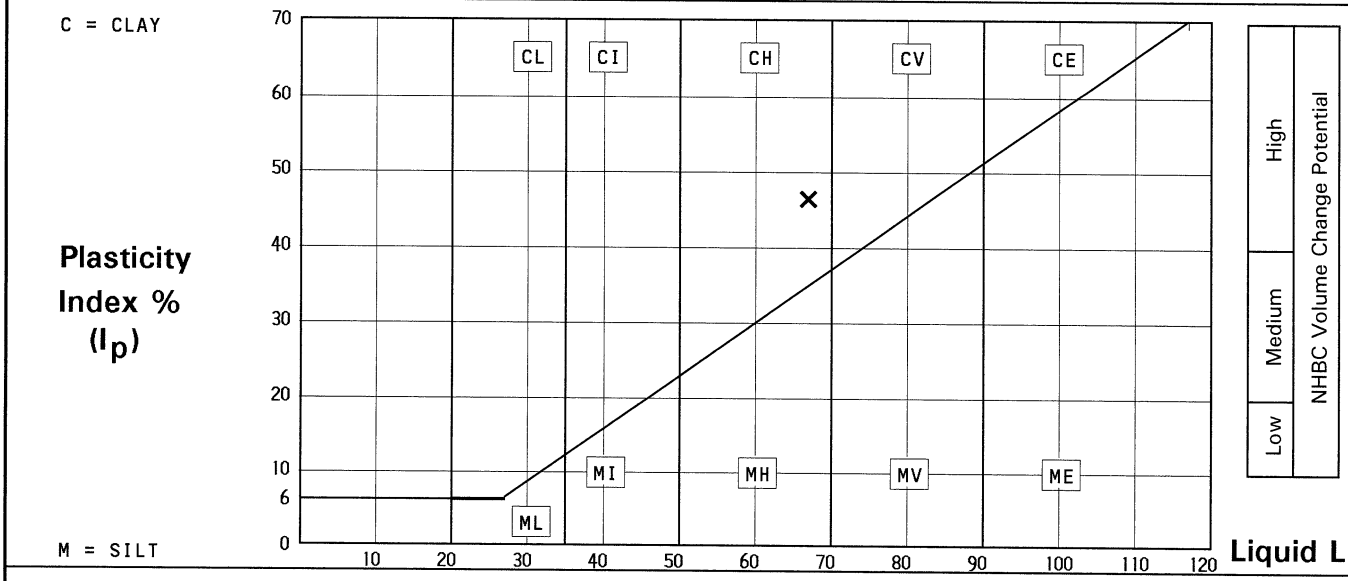
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U1-BH03	16.00 -16.45	B19	20	Very stiff mottled orange, bluish grey and dark bluish grey slightly sandy CLAY with rare shell fragments	

PREPARATION

Method of Preparation	Specimen from Natural Soil
Sample retained 0.425 sieve	(Assumed) 0 %
Corrected moisture content for material passing 0.425mm	%
Curing Time	25 Hours

Liquid Limit	67 %
Plastic Limit	21 %
Plasticity Index	46 %
Liquidity Index	-0.02
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



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

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

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

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

TEST REPORT.

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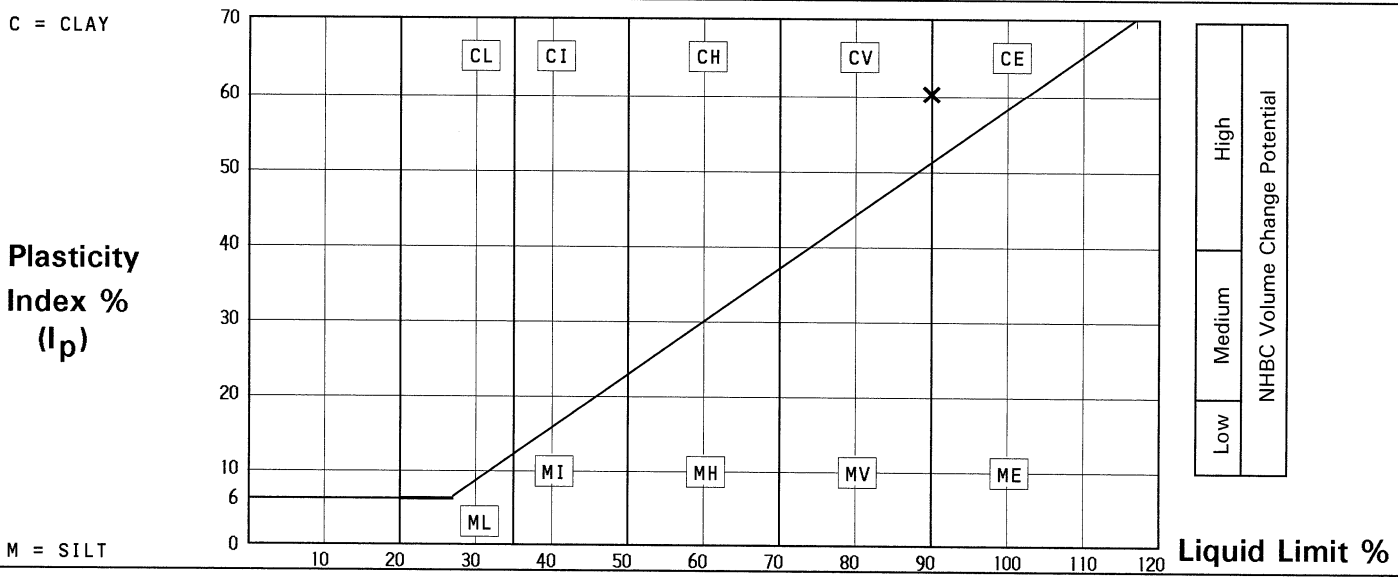
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U2-BH02	5.00 -5.45	B5	62	Soft dark grey organic CLAY with occasional black mottling and rare peat pockets	

PREPARATION

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

Liquid Limit	90 %
Plastic Limit	30 %
Plasticity Index	60 %
Liquidity Index	0.53
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



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

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

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

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

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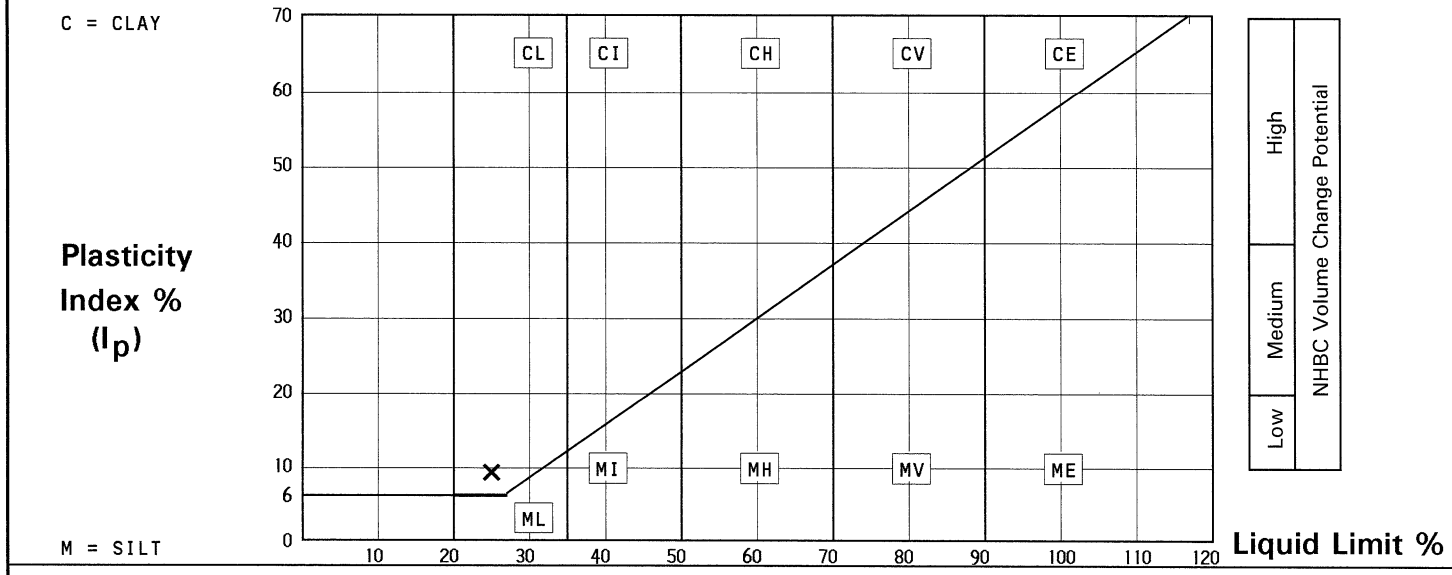
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U2-BH02	9.00 -9.45	B9	18	Very soft dark grey slightly gravelly sandy silty CLAY. Gravel is black and white fine and medium angular to subrounded	

PREPARATION

Method of Preparation	Sieved Specimen	Liquid Limit	25 %
Sample retained 0.425 sieve	(Measured) 45 %	Plastic Limit	16 %
Corrected moisture content for material passing 0.425mm	33 %	Plasticity Index	9.0 %
Curing Time	27 Hours	Liquidity Index	1.89
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



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

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

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

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)
17% retained on 2mm sieve.
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

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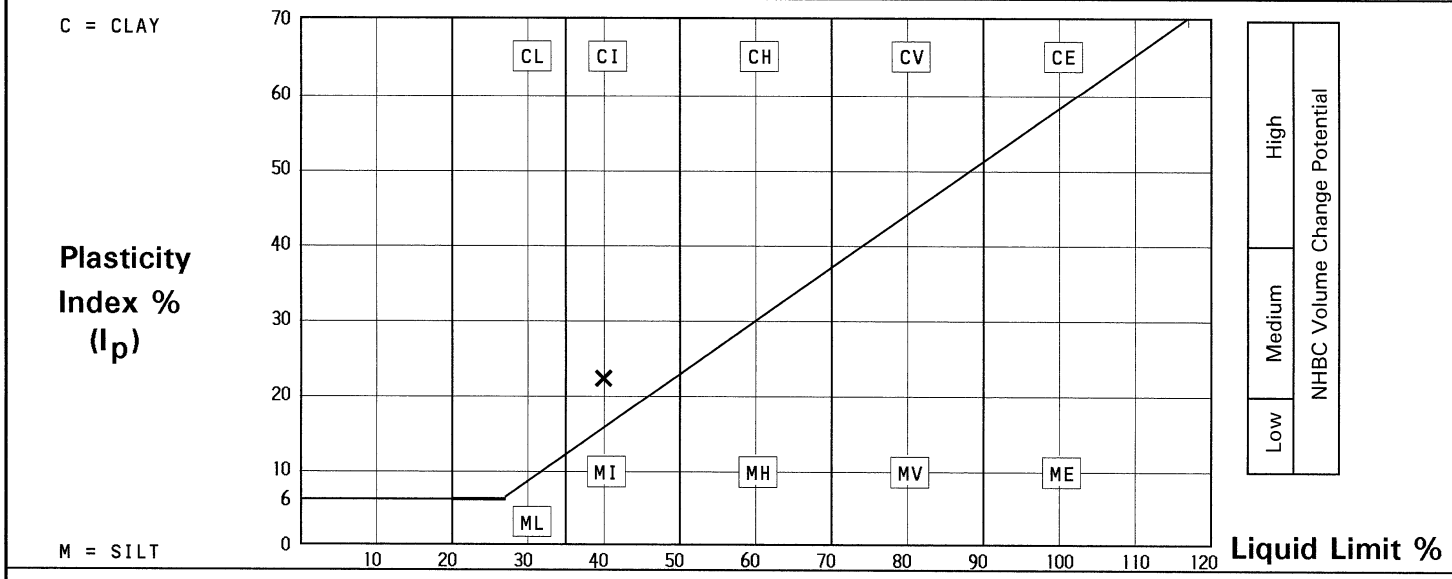
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U2-BH02	19.00 -19.45	B16	28	Very soft mottled dark bluish grey, olive and bluish grey slightly sandy slightly gravelly silty CLAY. Gravel is brown and black fine and medium rounded and subrounded	

PREPARATION

Method of Preparation	Sieved Specimen
Sample retained 0.425 sieve (Measured)	26 %
Corrected moisture content for material passing 0.425mm	38 %
Curing Time	28 Hours

Liquid Limit	40 %
Plastic Limit	18 %
Plasticity Index	22 %
Liquidity Index	0.91
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



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

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

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

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)
23% retained on 2mm sieve.
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

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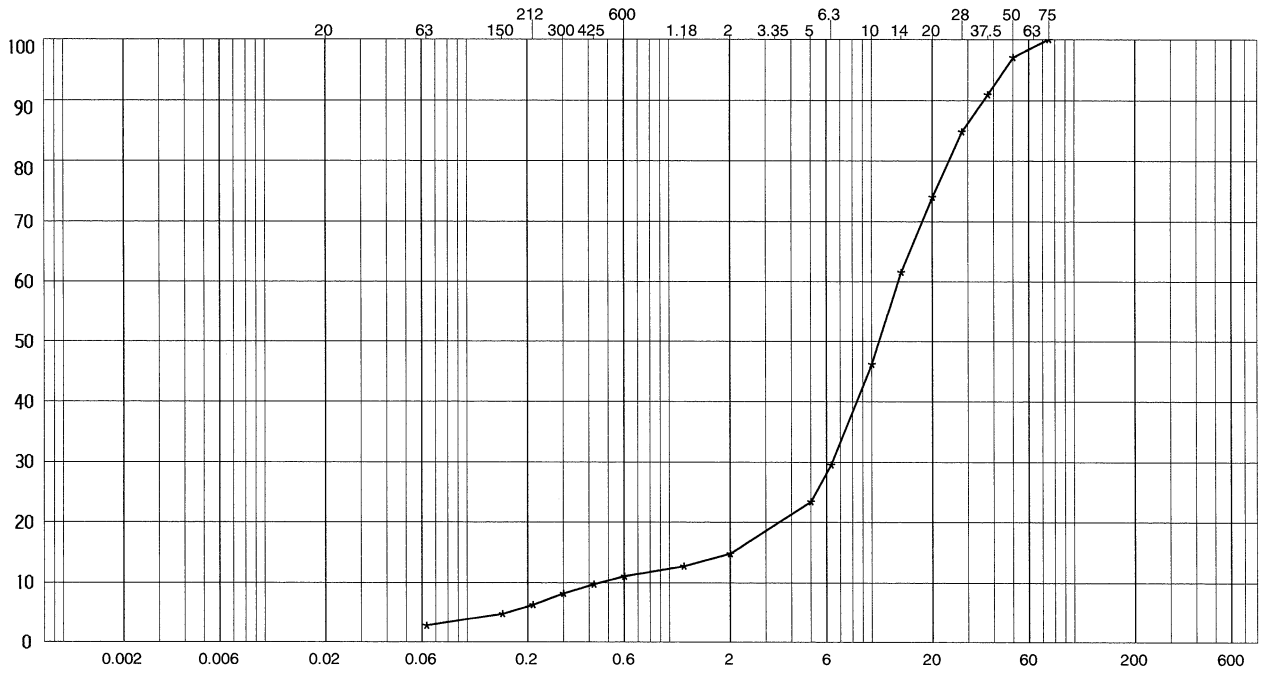
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	10.00 -10.45	B12	Black, brown and white slightly silty sandy angular to subrounded GRAVEL with rare soft olive clay lumps. Sand is olive	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)															Size (mm)														
Sieve Size															63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve															3	5	6	8	10	11	13	15	23	29	46	61	74	85	91	97	100



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

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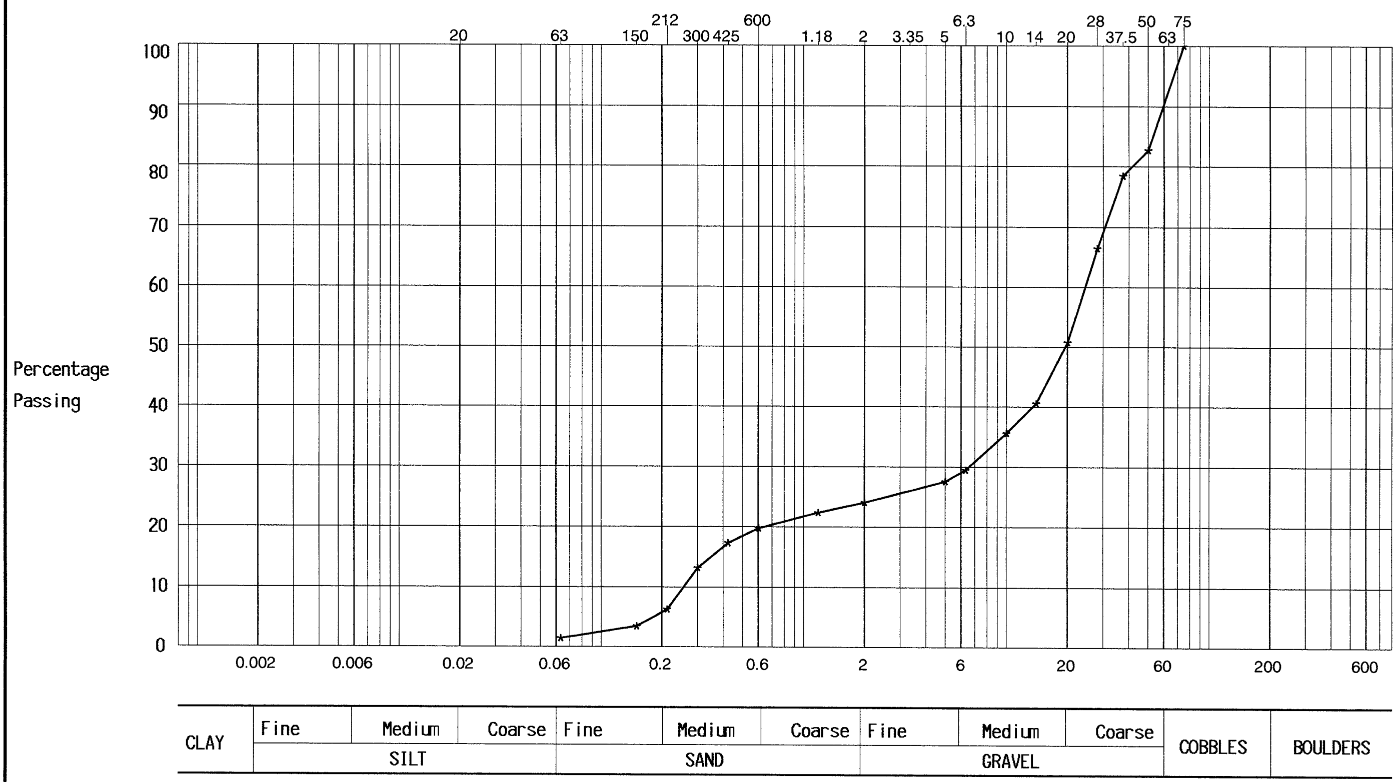
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	13.00 -13.45	B14	Black, brown and white slightly silty very sandy angular to subrounded GRAVEL. Sand is olive	

Method of Test:	Wet Sieve	Method of pre-treatment:	

	Size (microns)						Size (mm)											
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	1	3	6	13	17	20	22	24	27	29	35	41	51	66	78	83	100



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

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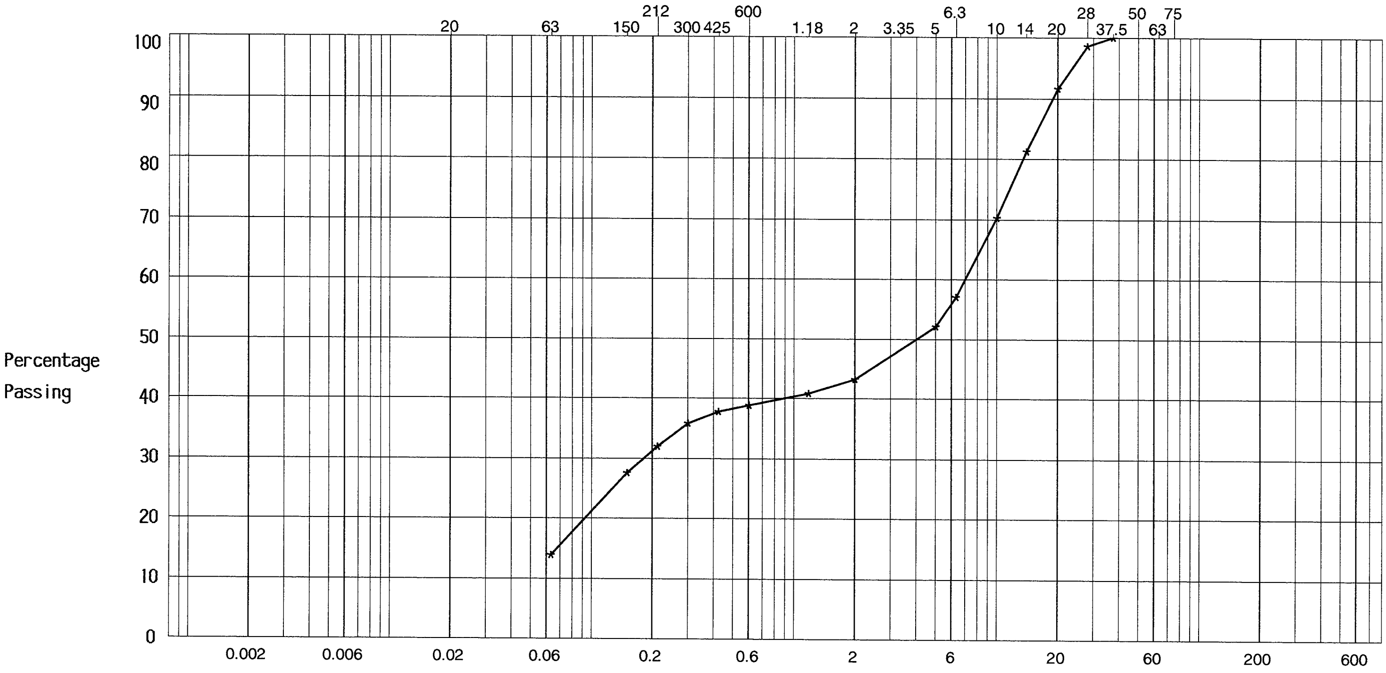
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	16.00 -16.45	B16	Black and brown clayey silty very sandy angular to rounded GRAVEL. Sand is olive	

Method of Test: Wet Sieve	Method of pre-treatment:

	Size (microns)						Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	14	28	32	36	38	39	41	43	52	57	70	81	92	99	100	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

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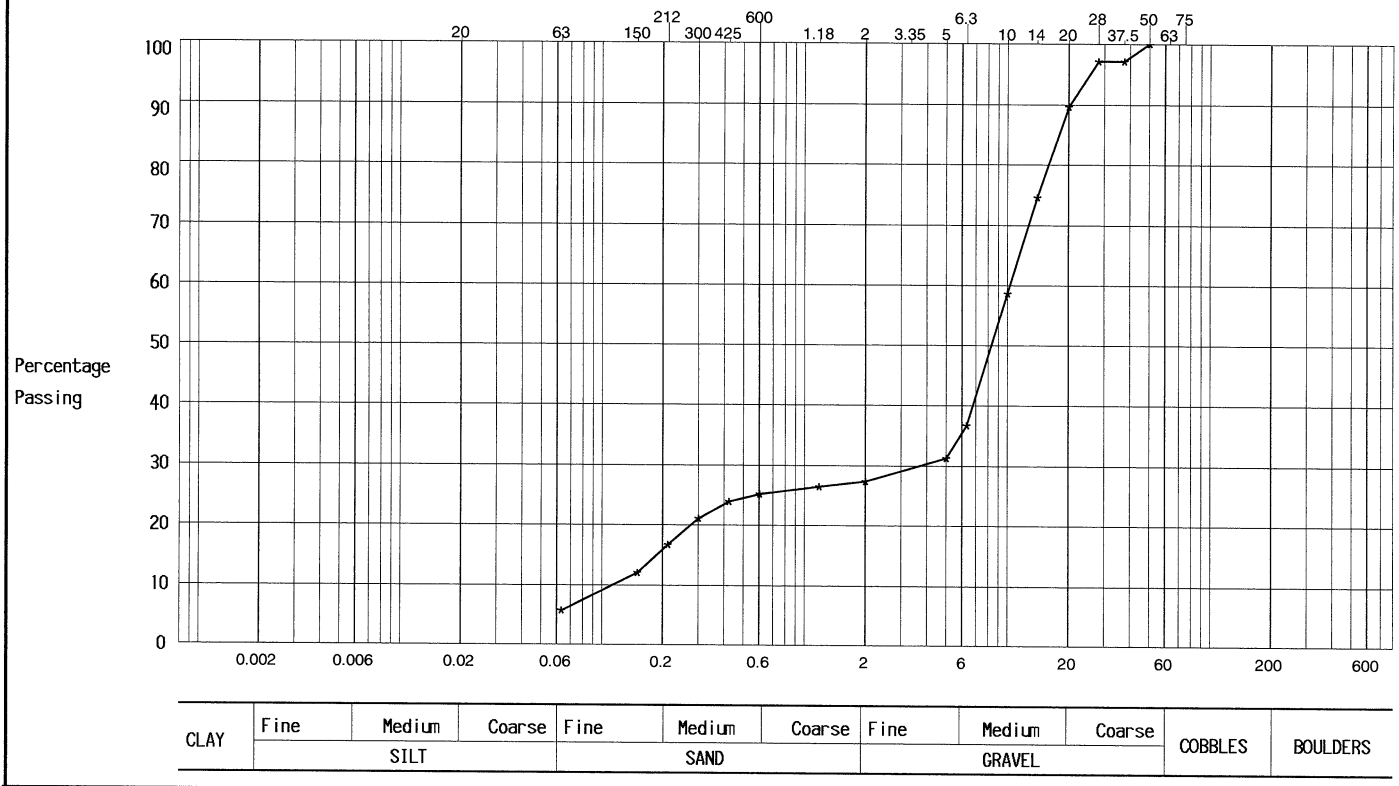
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	19.00 -19.45	B18	Black, brown and white slightly clayey silty very sandy angular to subrounded GRAVEL. Sand is olive	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)							Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75	
Percentage by Mass passing Sieve	6	12	17	21	24	25	26	27	31	37	59	74	90	97	97	100	-	



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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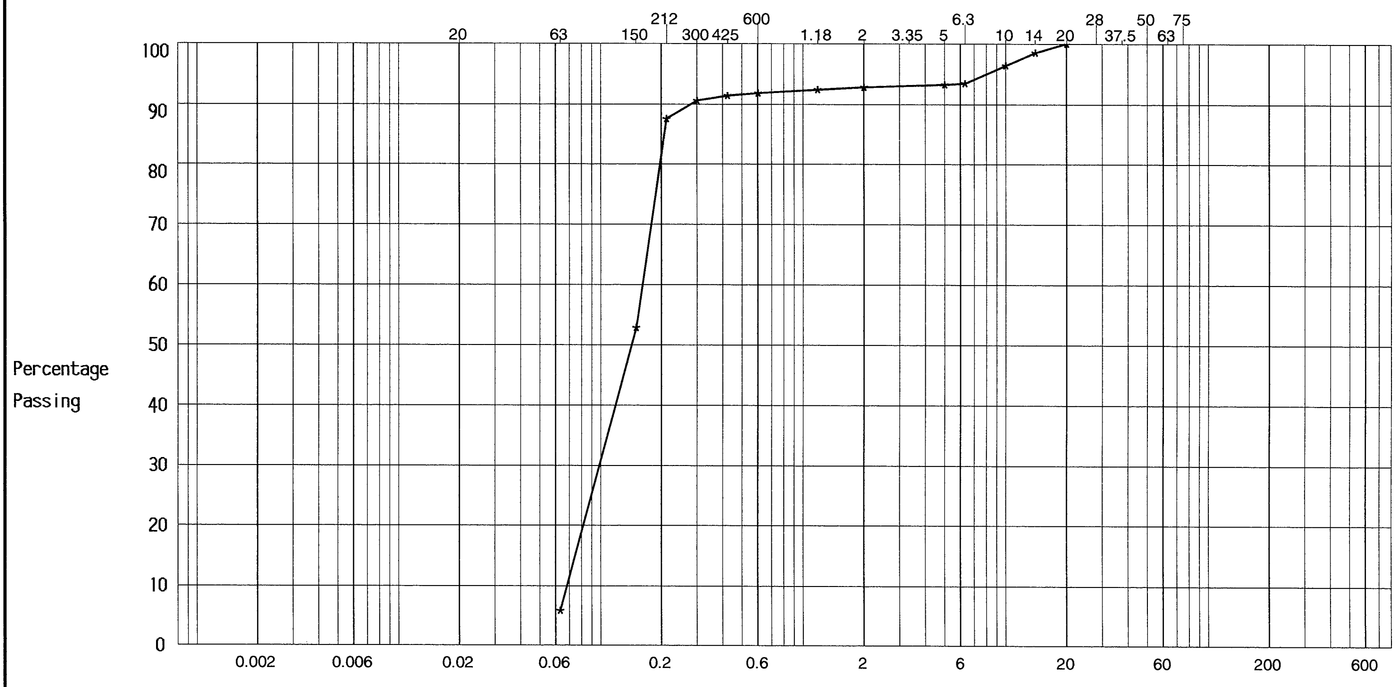
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	22.00 -22.45	B20	Olive silty gravelly SAND. Gravel is black and brown angular to subrounded	

Method of Test:	Wet Sieve	Method of pre-treatment:	

	Size (microns)																	Size (mm)										
Sieve Size													63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve													6	53	88	91	91	92	92	93	93	93	96	98	100	-	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

SPTR2M

TEST REPORT.

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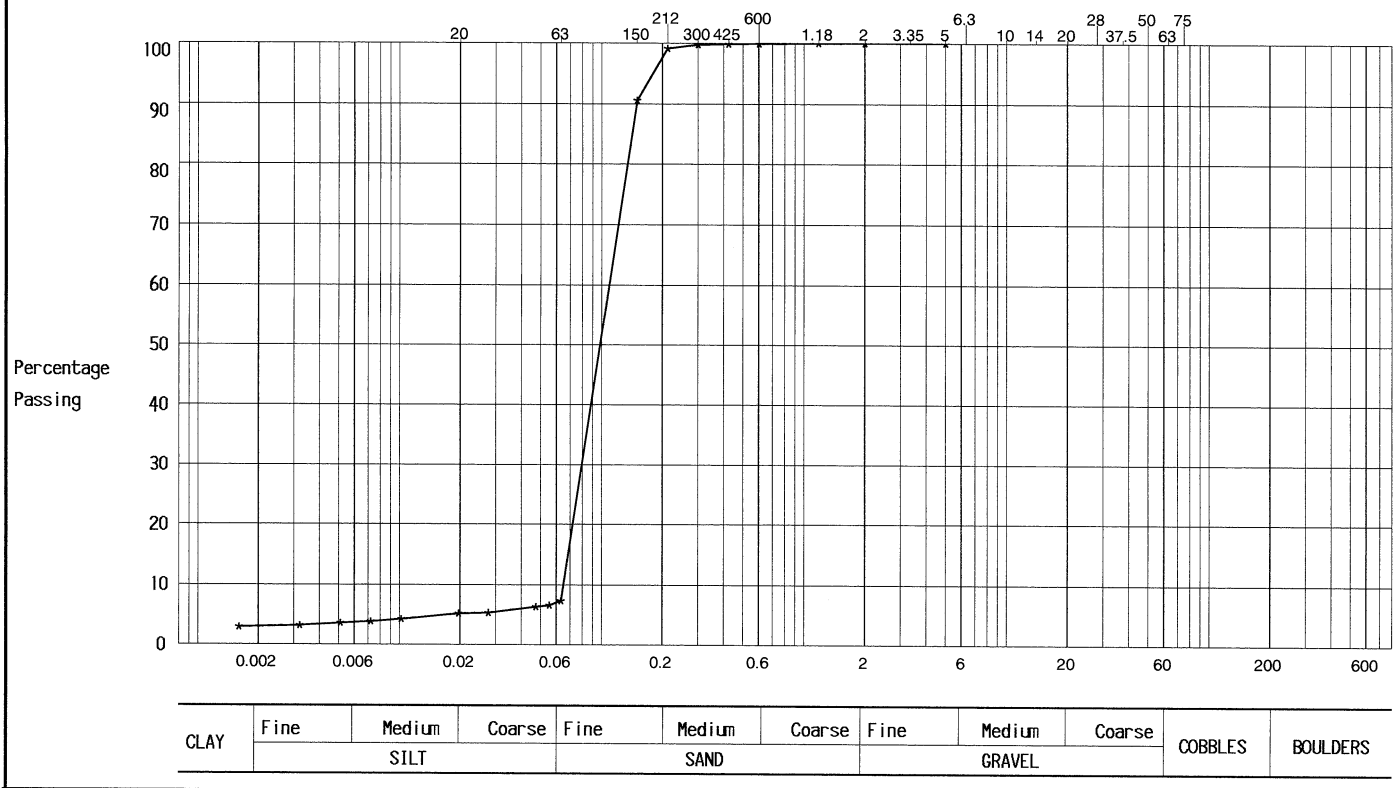
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	26.50 -26.95	B23	Olive grey slightly clayey slightly silty SAND	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

	Size (microns)																Size (mm)										
Sieve Size	1.6	3.2	5.1	7.2	10.2	19.6	27.6	47.4	55.2	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	3	3	4	4	4	5	5	6	7	7	90	99	100	100	100	100	100	100	-	-	-	-	-	-	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

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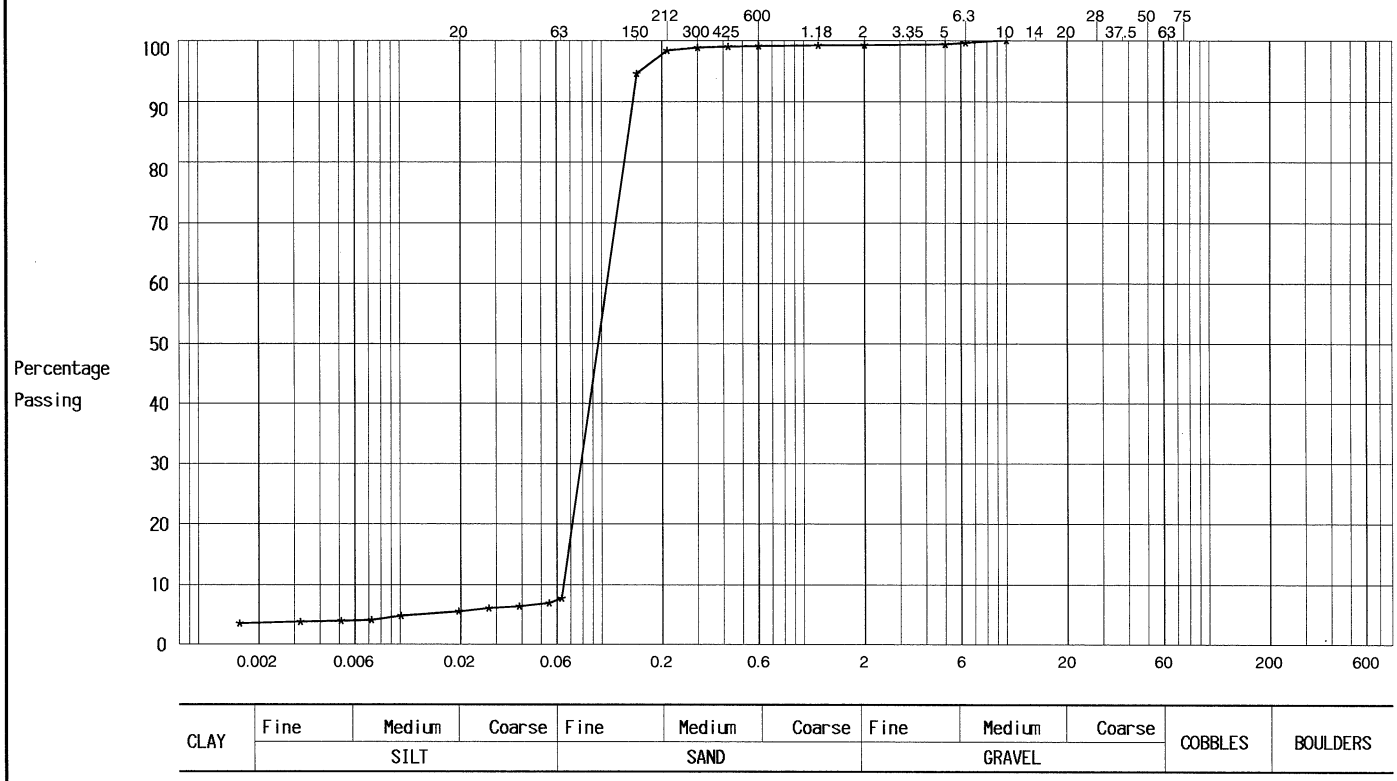
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	29.50 -29.95	B25	Olive grey slightly clayey silty SAND with rare fine angular gravel	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

	Size (microns)																Size (mm)										
Sieve Size	1.6	3.2	5.1	7.2	10.1	19.5	27.5	38.8	54.6	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	3	4	4	4	5	5	6	6	7	8	95	98	99	99	99	99	99	99	100	100	-	-	-	-	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

TEST REPORT.

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Serial No. S29734

UKAS TESTING 0998

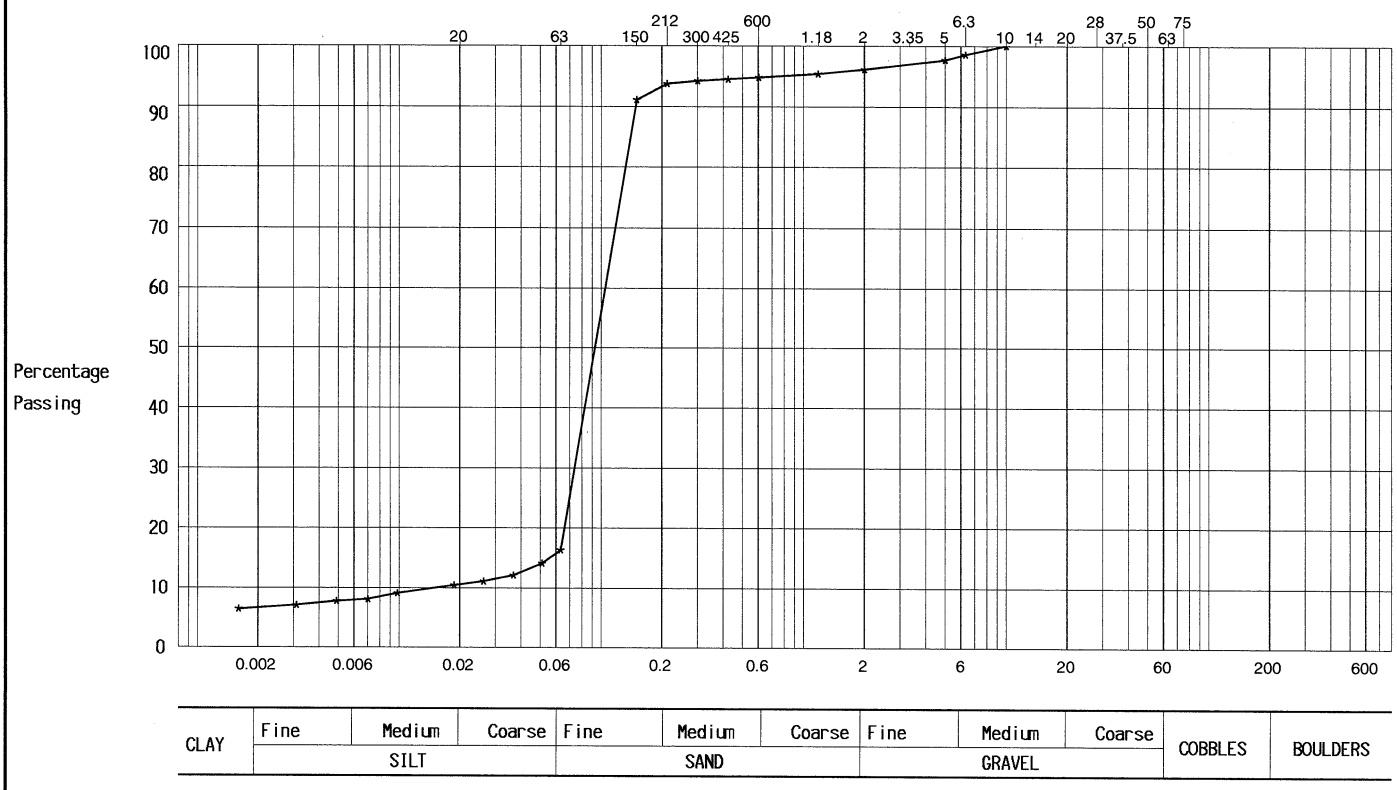
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH02	34.00 -34.45	B28	Dark olive grey slightly gravelly clayey silty SAND. Gravel is fine and medium	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

Size (microns)																		Size (mm)											
Sieve Size				1.6	3.1	4.9	7	9.8	18.7	26.2	36.8	51	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve				6	7	8	8	9	10	11	12	14	16	91	94	94	94	95	95	96	98	99	100	-	-	-	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

TEST REPORT.

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

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UKAS TESTING 0998

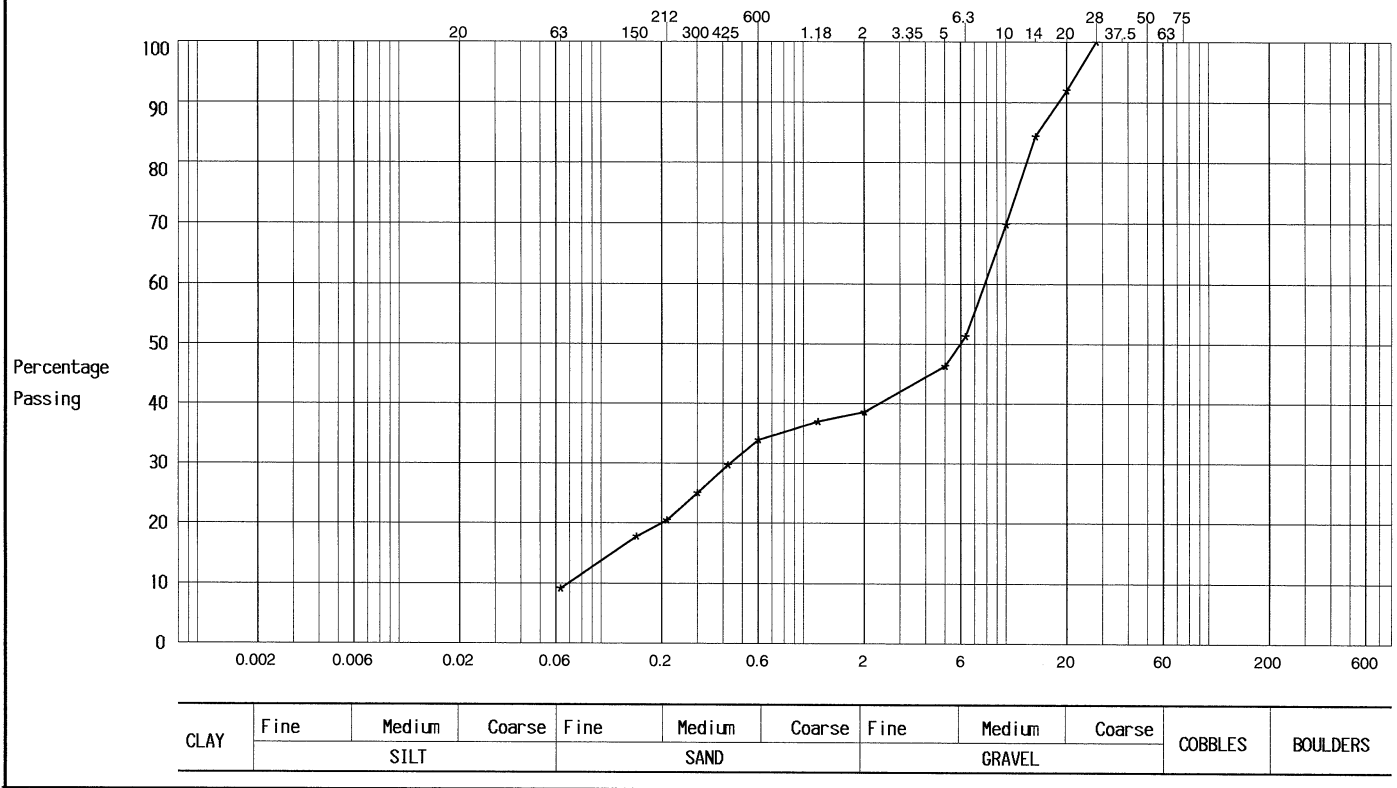
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH03	9.00 -9.45	B13	Black, brown and white slightly clayey silty very sandy angular to subrounded GRAVEL. Sand is greyish brown	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)							Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	9	18	20	25	30	34	37	39	46	51	70	84	92	100	-	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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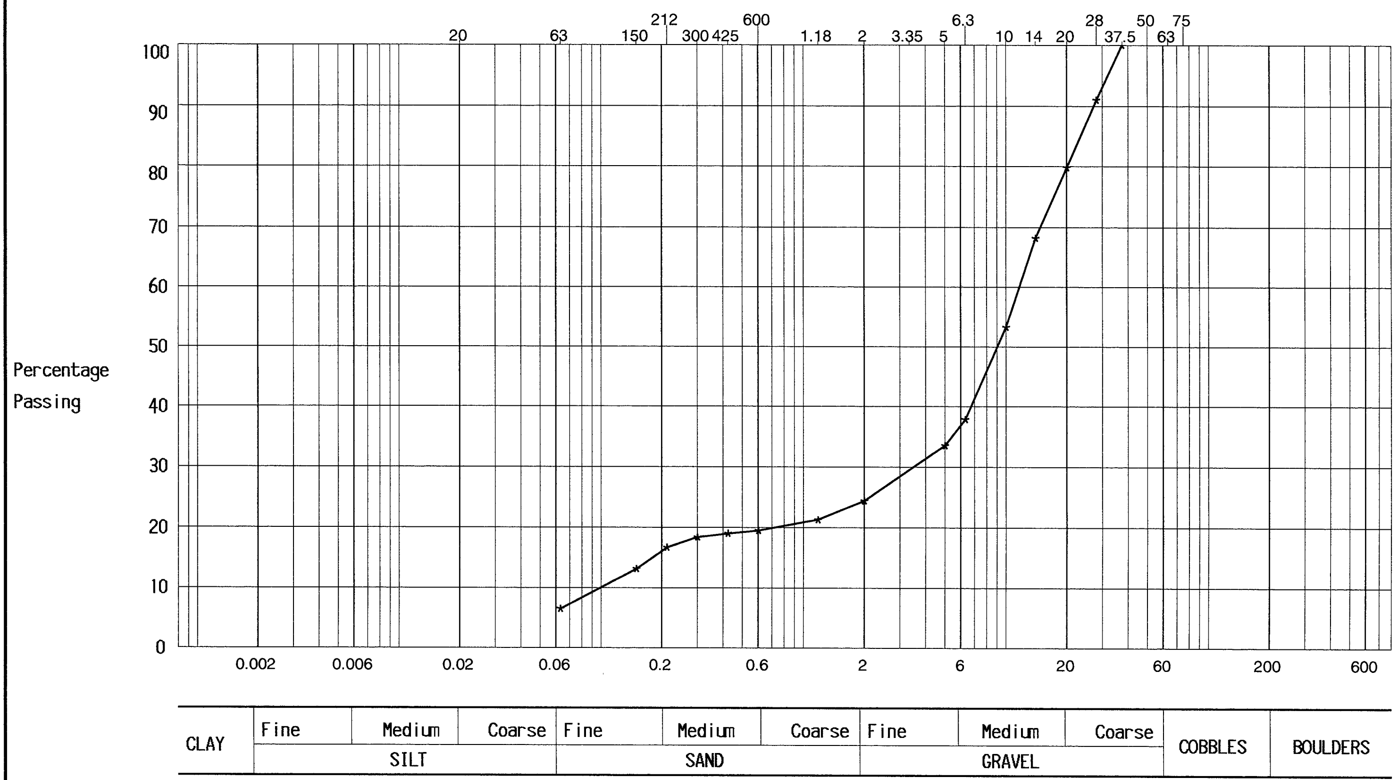
UKAS TESTING 0998

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH03	19.00 -19.45	B21	Black and brown slightly clayey silty sandy rounded to subangular GRAVEL. Sand is olive	

Method of Test: Wet Sieve	Method of pre-treatment:

	Size (microns)						Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	6	13	17	18	19	19	21	24	33	38	53	68	80	91	100	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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

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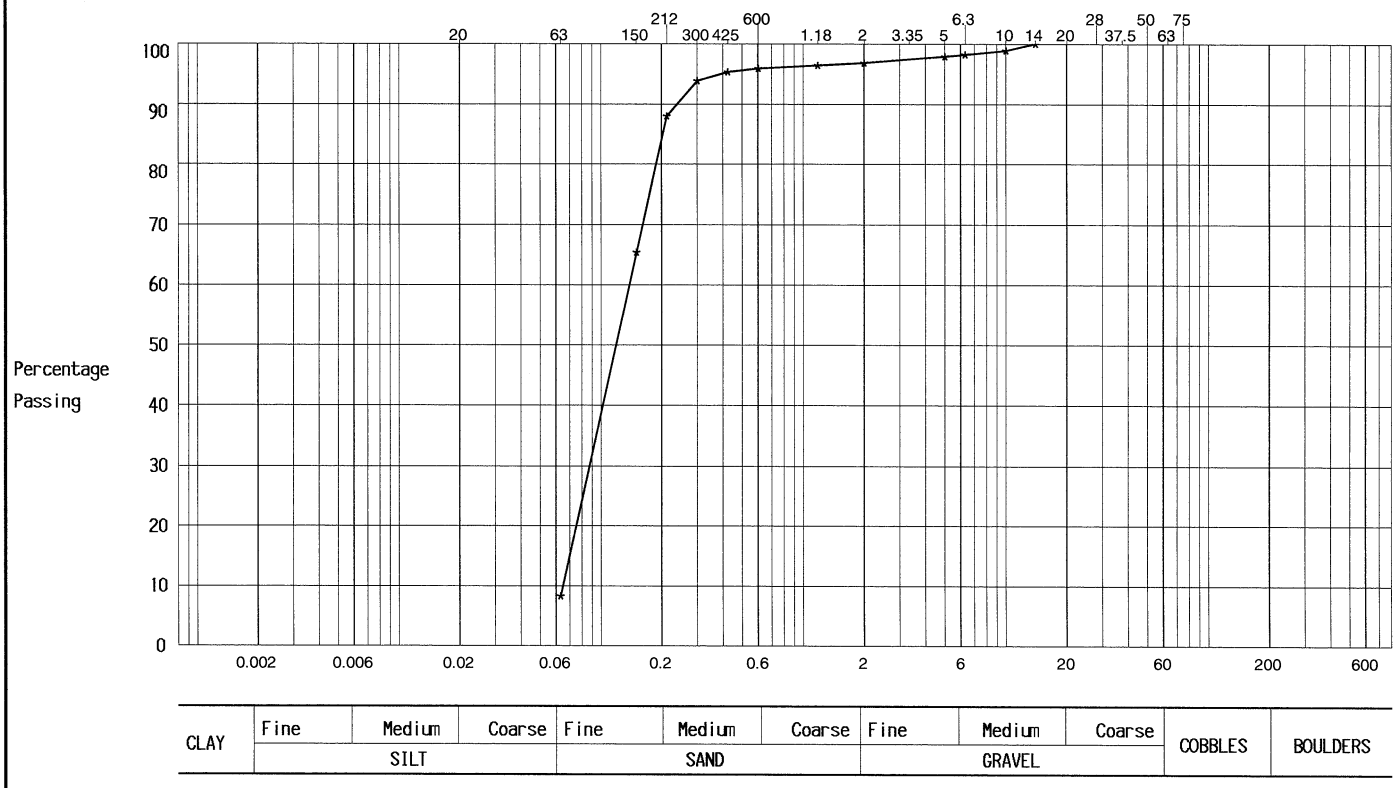
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH03	22.00 -22.45	B23	Olive slightly gravelly silty SAND. Gravel is black and brown subangular and subrounded	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)												Size (mm)											
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75						
Percentage by Mass passing Sieve	8	65	88	94	95	96	96	97	98	98	99	100	-	-	-	-	-						



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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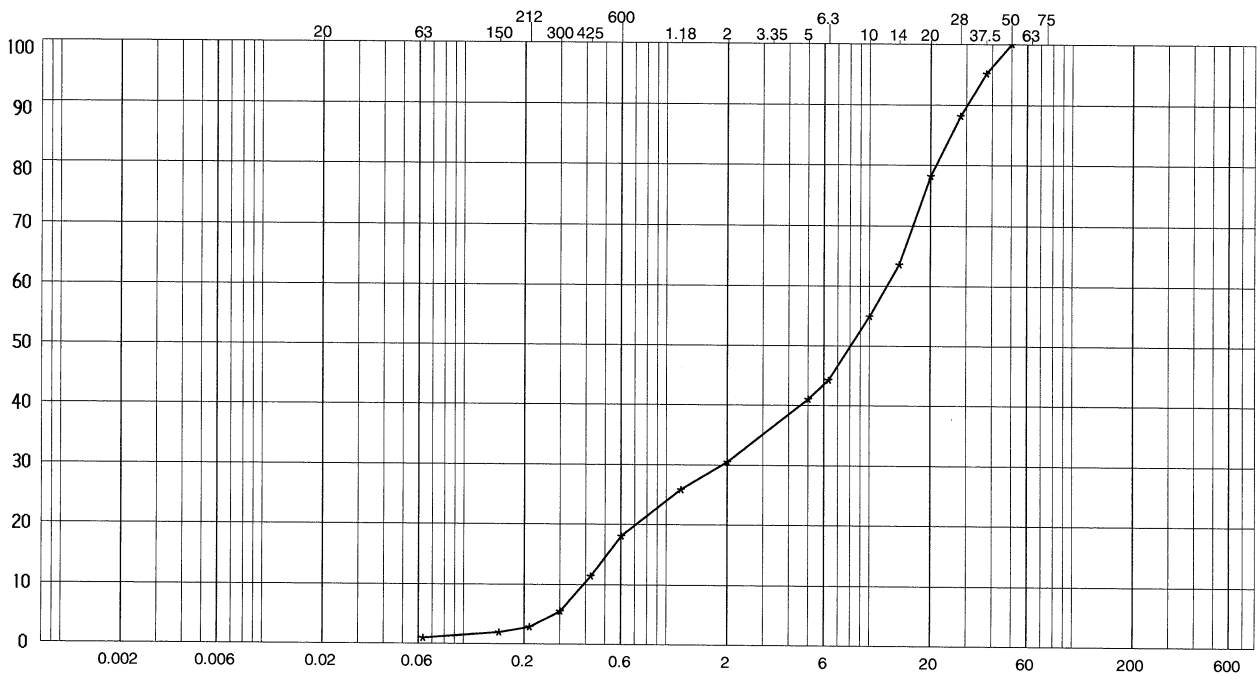
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH02	11.50 -11.95	B11	Black, brown and white angular to rounded slightly silty very sandy angular to rounded GRAVEL. Sand is olive	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)							Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75	
Percentage by Mass passing Sieve	1	2	3	5	11	18	26	30	41	44	55	64	78	88	95	100	-	



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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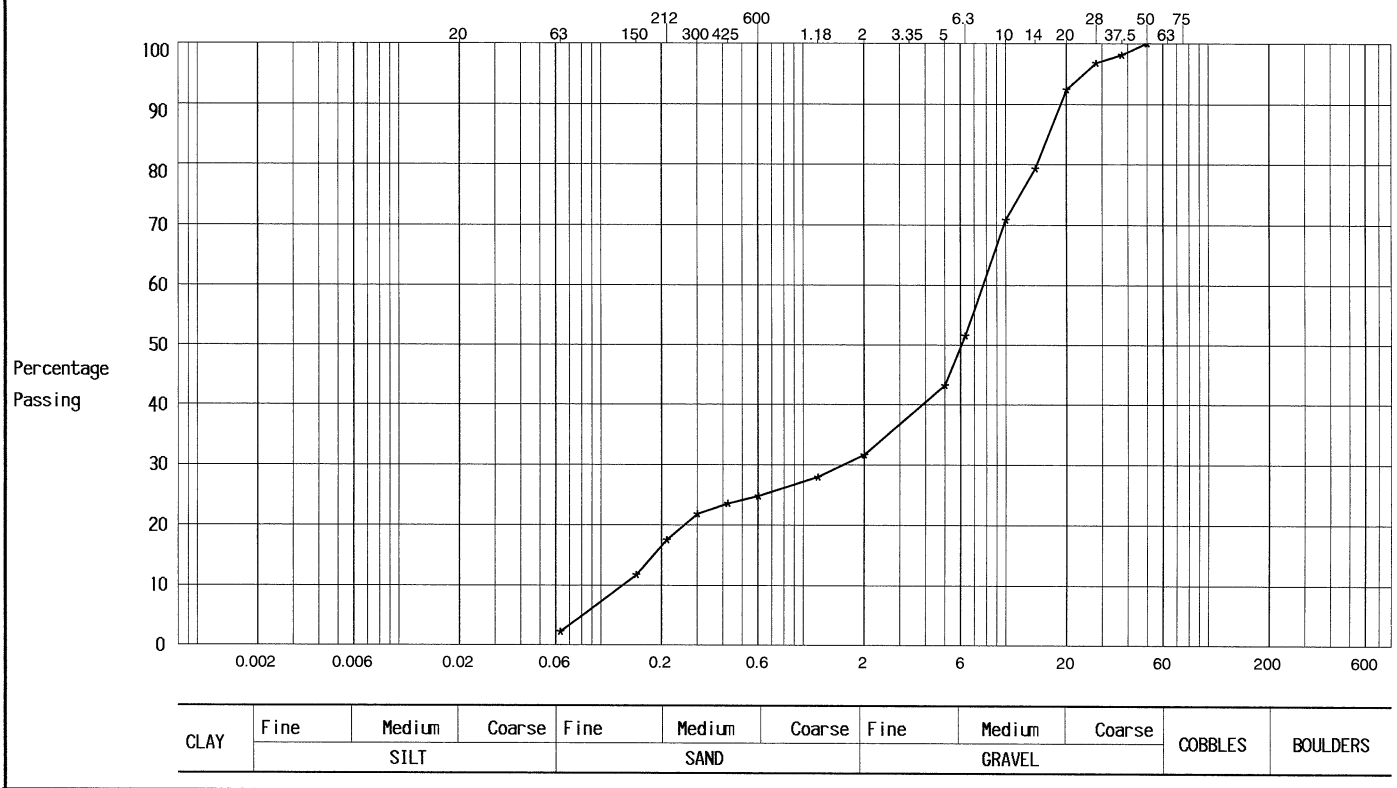
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH02	16.00 -16.45	B14	Black and brown angular to rounded slightly silty very sandy angular to rounded GRAVEL with occasional soft clay lumps. Sand is olive	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)												Size (mm)										
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75					
Percentage by Mass passing Sieve	2	12	17	22	23	25	28	32	43	51	71	79	92	97	98	100	-					



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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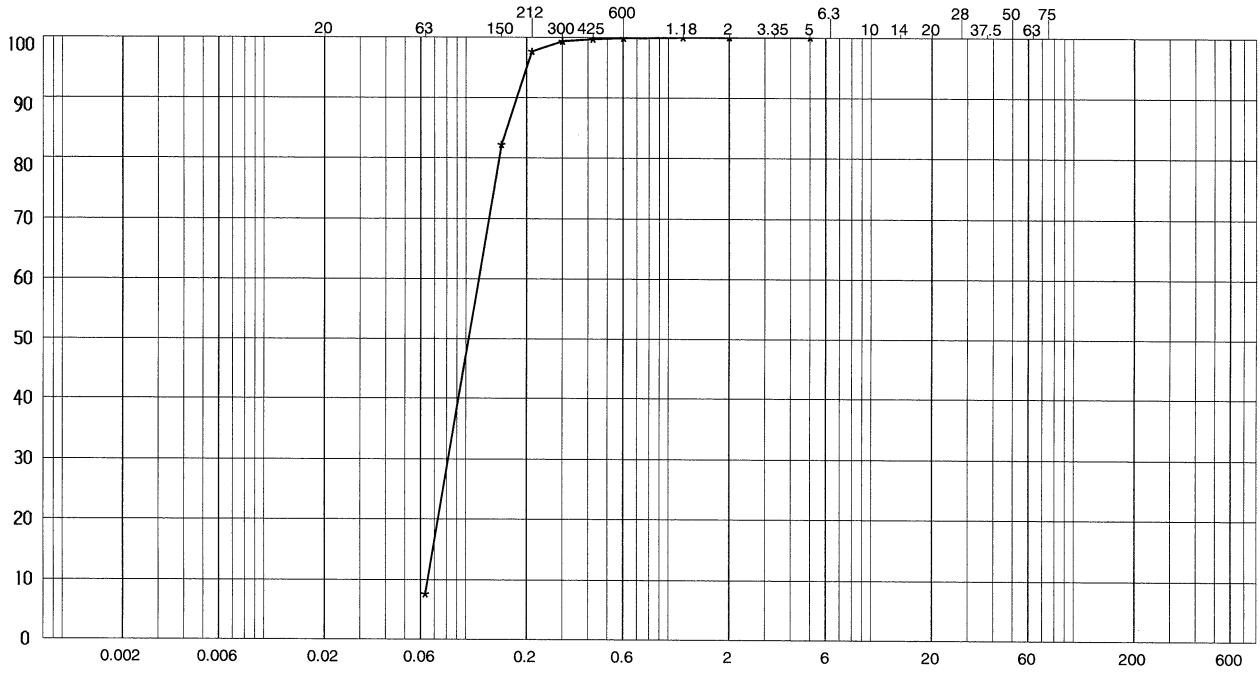
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH02	22.00 -22.45	B18	Olive silty SAND	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)															Size (mm)													
Sieve Size												63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve												8	82	98	99	100	100	100	100	100	-	-	-	-	-	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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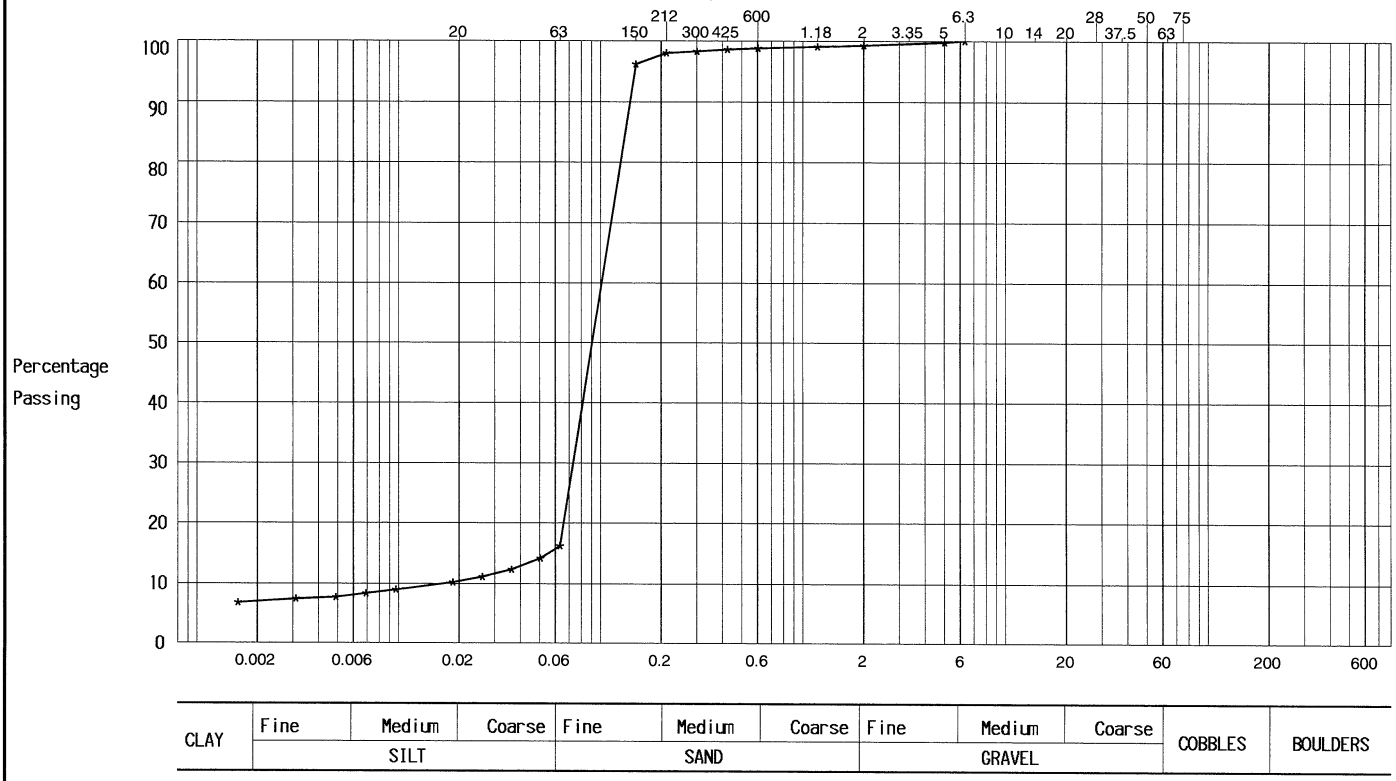
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH02	28.00 -28.45	B22	Dark olive grey clayey silty SAND	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

	Size (microns)																Size (mm)										
Sieve Size	1.6	3.1	4.9	6.9	9.7	18.6	26	36.3	50.4	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	7	7	8	8	9	10	11	12	14	16	96	98	98	99	99	99	99	100	100	-	-	-	-	-	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

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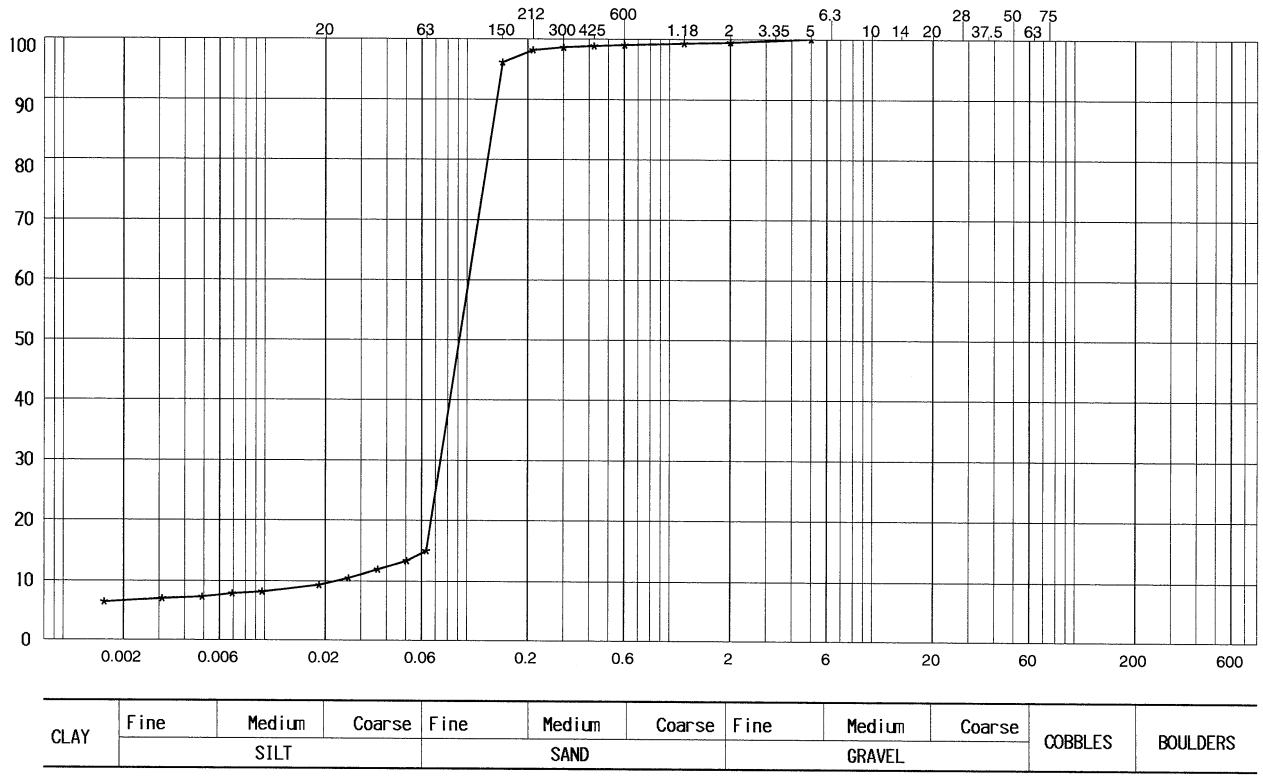
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH02	32.50 -32.95	B25	Dark olive grey clayey silty SAND	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

	Size (microns)																Size (mm)											
Sieve Size	1.6	3.1	4.9	6.9	9.7	18.6	26	36.2	50.4	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75	
Percentage by Mass passing Sieve	6	7	7	8	8	9	10	12	13	15	96	98	99	99	99	99	99	100	-	-	-	-	-	-	-	-	



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

TEST REPORT.

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

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Serial No. S29734

UKAS TESTING 0998

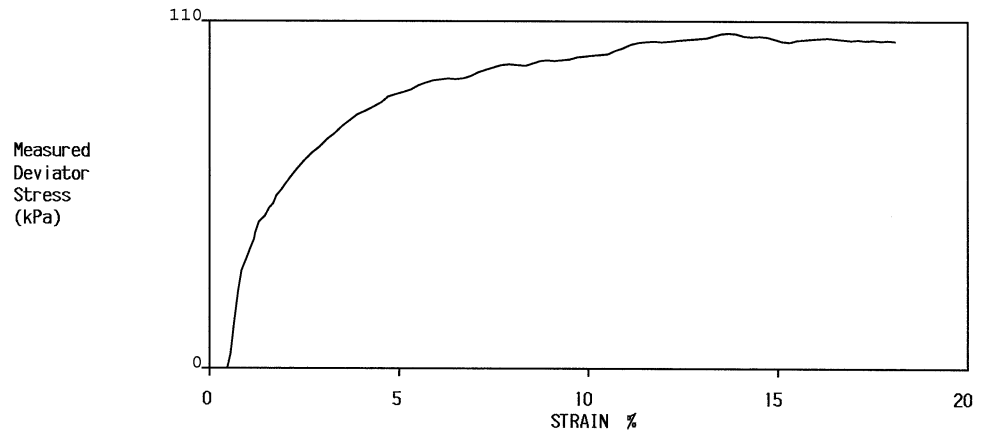
DETERMINATION OF UNDRAINED SHEAR STRENGTH

IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U1-BH03	7.00 -7.45	U10	Firm (Medium strength) dark grey CLAY with frequent black organic speckling and grey mottling	

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m) 7.05	71.0	38.0	144	43	1.79	1.25

TEST INFORMATION — Rate of Strain 1.4 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at Failure	Measured Cell Pressure $\sigma 3$ (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress $\sigma 1 - \sigma 3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma 1 - \sigma 3)_f$ (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI °
	73	13.7	2.3	/	105	52		

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

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

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

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

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

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UKAS TESTING 0998

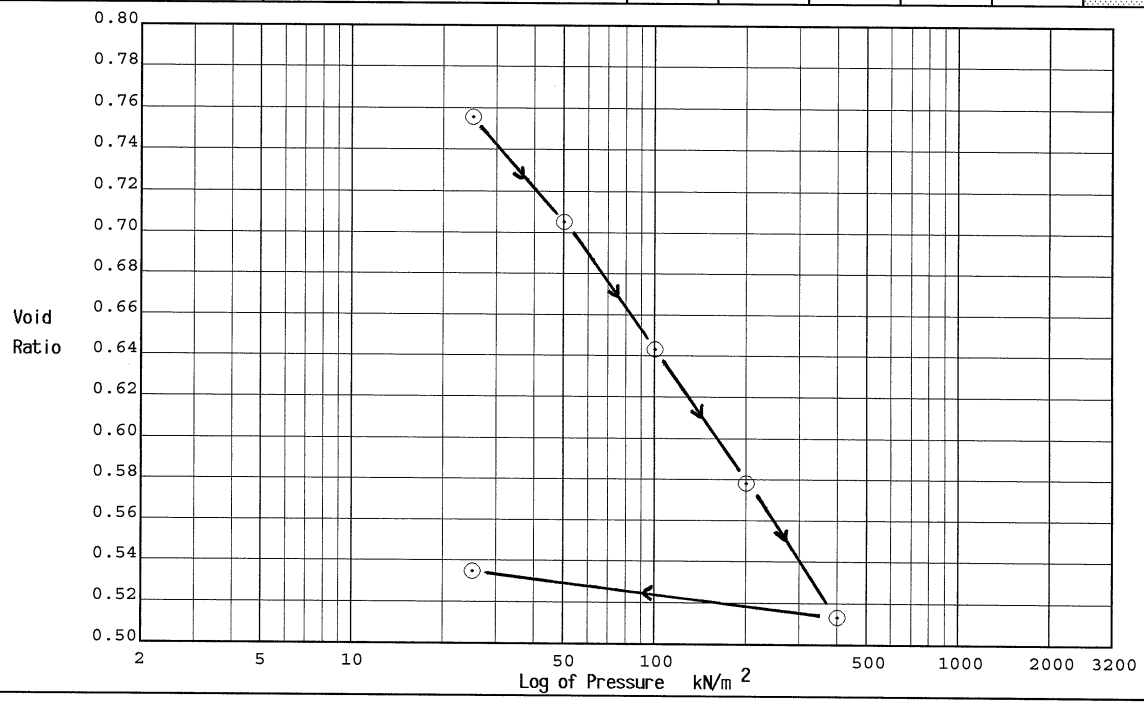
DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth m.	Sample	Specimen Depth/Location m. H/V	Moisture Content %	Description	Remarks
U1-BH03	4.00 -4.45	B4		35	Very soft dark grey locally oxidised to brown organic slightly sandy silty CLAY	Sample remoulded into oedometer ring

INITIAL CONDITIONS

Height	18.81 mm	Particle Density	2.65 Assumed
Diameter	75.07 mm	Void Ratio	0.937
Wet Weight	153.70 g	Degree of Saturation	99 %
Moisture Content	35 %	Swelling Pressure	kN/m^2
Bulk Density	1.85 Mg/m^3	Dry Density	1.37 Mg/m^3

Increment No.	Load kN/m^2	Change in Height (mm)	Void Ratio	Cv (m^2/yr)	Mv (m^2/MN)	Temp °C	Corrected Cv
1	25	1.752	0.757	0.44	3.7	20	0.44
2	50	2.240	0.706	0.49	1.1	20	0.49
3	100	2.841	0.645	0.65	0.73	21	0.64
4	200	3.474	0.579	0.75	0.40	21	0.74
5	400	4.106	0.514	1.0	0.21	21	0.98
6	25	3.894	0.536		0.04	20	



METHOD OF PREPARATION: BS 1377:PART 5:1990:3.3 & 3.4 METHOD OF TIME FITTING USED : Square Root

METHOD OF TEST : BS 1377:PART 5:1990:3.5

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

COMMENTS :

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

TEST REPORT.

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

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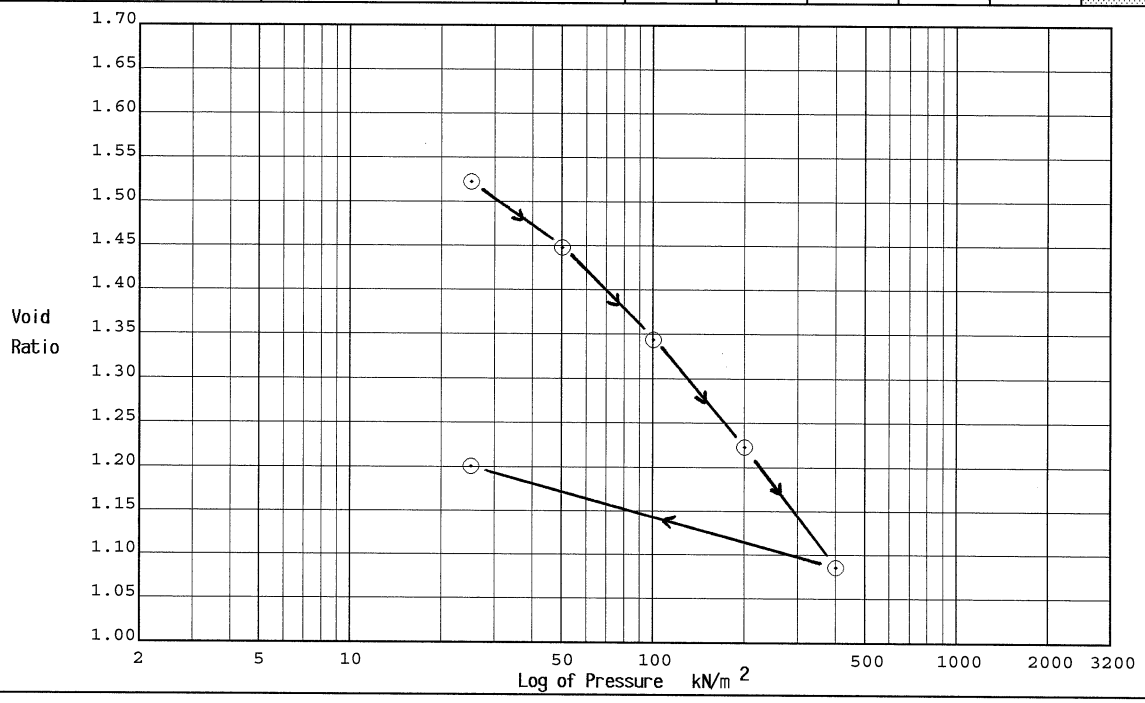
DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth m.	Sample	Specimen Depth/Location m. H/V	Moisture Content %	Description	Remarks
U2-BH02	5.00 -5.45	B5		58	Soft dark grey organic CLAY with occasional black mottling and rare peat pockets	Oedometer ring pushed into bulk sample

INITIAL CONDITIONS

Height	18.80 mm	Particle Density	2.78 Assumed
Diameter	75.04 mm	Void Ratio	1.623
Wet Weight	139.67 g	Degree of Saturation	100 %
Moisture Content	58 %	Swelling Pressure	kN/m^2
Bulk Density	1.68 Mg/m^3	Dry Density	1.06 Mg/m^3

Increment No.	Load kN/m^2	Change in Height (mm)	Void Ratio	Cv (m^2/yr)	Mv (m^2/MN)	Temp °C	Corrected Cv
1	25	0.696	1.526	0.31	1.5	20	0.31
2	50	1.237	1.450	0.27	1.2	20	0.27
3	100	1.978	1.347	0.27	0.84	21	0.26
4	200	2.846	1.226	0.25	0.52	21	0.24
5	400	3.831	1.088	0.25	0.31	21	0.25
6	25	3.004	1.204		0.15	20	



METHOD OF PREPARATION: BS 1377:PART 5:1990:3.3 & 3.4 METHOD OF TIME FITTING USED : Square Root

METHOD OF TEST : BS 1377:PART 5:1990:3.5

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

COMMENTS :

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

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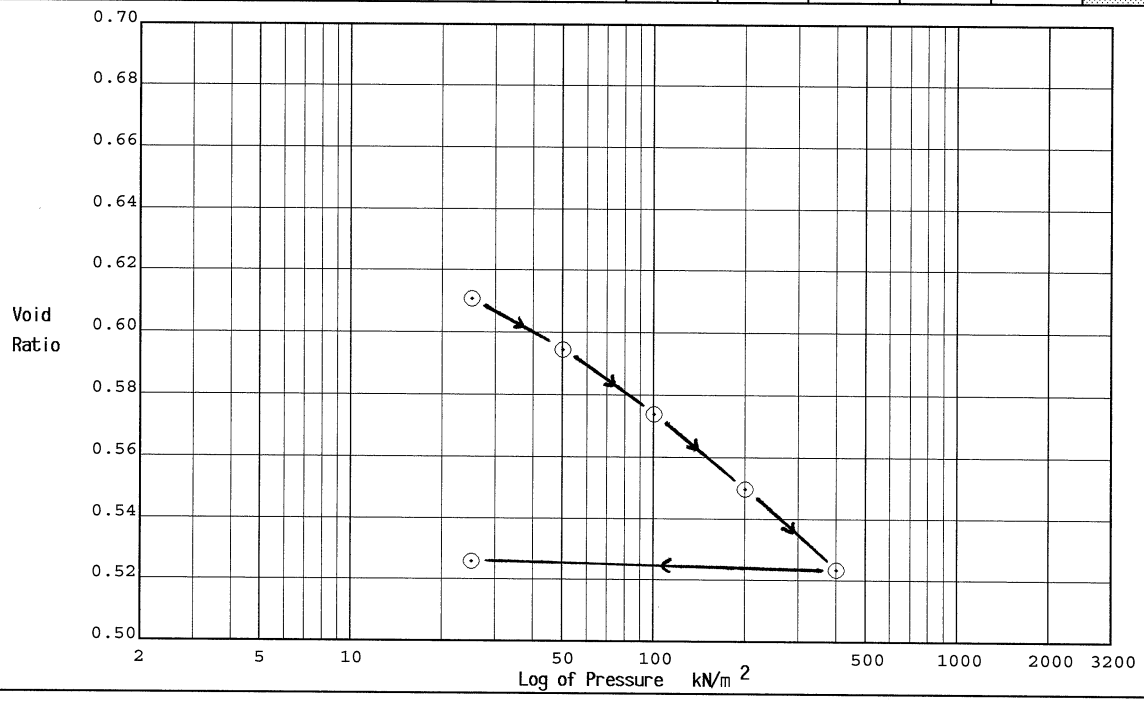
DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth m.	Sample	Specimen Depth/Location m. H/V	Moisture Content %	Description	Remarks
U2-BH02	9.00 -9.45	B9		26	Very soft dark grey slightly gravelly sandy silty CLAY. Gravel is black and white fine and medium angular to subrounded	Sample remoulded into oedometer ring - gravel excluded from test specimen

INITIAL CONDITIONS

Height	19.01 mm	Particle Density	2.75 Assumed
Diameter	75.02 mm	Void Ratio	0.722
Wet Weight	169.34 g	Degree of Saturation	100 %
Moisture Content	26 %	Swelling Pressure	kN/m^2
Bulk Density	2.02 Mg/m^3	Dry Density	1.60 Mg/m^3

Increment No.	Load kN/m^2	Change in Height (mm)	Void Ratio	Cv (m^2/yr)	Mv (m^2/MN)	Temp °C	Corrected Cv
1	25	1.220	0.611	2.9	2.6	20	2.9
2	50	1.398	0.595	2.2	0.40	20	2.2
3	100	1.627	0.575	5.0	0.26	21	4.9
4	200	1.894	0.550	5.2	0.15	21	5.1
5	400	2.184	0.524	5.5	0.09	21	5.4
6	25	2.157	0.527		0.00	20	



METHOD OF PREPARATION: BS 1377:PART 5:1990:3.3 & 3.4 METHOD OF TIME FITTING USED : Square Root

METHOD OF TEST : BS 1377:PART 5:1990:3.5

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

COMMENTS :

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

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	16-04474-1
Initial Date of Issue:	02-Mar-2016
Client	Soil Property Testing
Client Address:	18 Halycon Court St Margarets Way Stukeley Meadows Huntingdon Cambridgeshire PE29 6DG
Contact(s):	Jon Garner Simon Townend
Project	S29734 - Greenwich View Place, London

Quotation No.:		**Date Received:**	25-Feb-2016
Order No.:		**Date Instructed:**	25-Feb-2016
No. of Samples:	20	**Target Date:**	02-Mar-2016
Turnaround (Wkdays):	5	**Results Due:**	02-Mar-2016
Date Approved:	02-Mar-2016		

Approved By:

Details: Glynn Harvey, Laboratory Manager

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Results - Soil

Project: S29734 - Greenwich View Place, London

Client: Soil Property Testing				Chemtest Job No.:	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474
Quotation No.:				Chemtest Sample ID.:	259463	259464	259465	259466	259467	259468	259469	259470	259471	259472	259473	259474
Order No.:				Client Sample Ref.:	U1-BH02	U1-BH02	U1-BH02	U1-BH02	U1-BH03	U1-BH03	U1-BH03	U1-BH03	U1-BH03	U1-BH03	U1-BH03	U2-BH02
				Client Sample ID.:	B12	B16	B20	B25	B2	B3	B13	B19	B21	B23	B4	B3
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	10.00	16.00	22.00	29.50	2.00	3.00	9.00	16.00	19.00	22.00	4.00	3.00
				Bottom Depth (m):	10.45	16.45	22.45	29.95	2.45	3.45	9.45	16.45	19.45	22.45	4.45	3.45
Determinand	**Accred.**	**SOP**	**Units**	**LOD**												
Moisture	N	2030	%	0.020	6.5	11	22	25	14	14	7.7	16	8.3	21	28	11
pH	U	2010		N/A	8.9	9.1	8.6	8.7	10.0	9.3	8.4	9.5	8.9	8.7	8.0	8.1
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.048	< 0.010	< 0.010	0.015	0.32	0.16	0.11	0.053	< 0.010	< 0.010	0.16	0.49
Total Sulphur	U	2175	%	0.010	0.022	0.018	0.045	0.079	0.16	0.13	0.096	0.15	0.012	0.029	0.12	0.065
Chloride (Extractable)	U	2220	g/l	0.010	0.051	0.037	0.056	0.15	0.12	0.074	0.049	0.049	0.081	0.074	0.062	0.052
Nitrate (Extractable)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Ammonium	U	2425	mg/kg	0.50	2.6	8.5	3.8	20	2.0	2.0	11	27	5.4	6.8	28	6.5
Sulphate (Acid Soluble)	U	2430	%	0.010	0.023	< 0.010	< 0.010	< 0.010	0.20	0.10	0.018	< 0.010	< 0.010	< 0.010	0.060	0.13

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Results - Soil

Project: S29734 - Greenwich View Place, London

Client: Soil Property Testing				Chemtest Job No.:	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474	16-04474
Quotation No.:				Chemtest Sample ID.:	259475	259476	259477	259478	259479	259480	259481	259482
Order No.:				Client Sample Ref.:	U2-BH02	U2-BH02	U2-BH02	U2-BH02	U2-BH02	U2-BH02	U2-BH02	U2-BH02
				Client Sample ID.:	B5	B9	B11	B14	B16	B18	B22	B25
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	5.00	9.00	11.50	16.00	19.00	22.00	28.00	32.50
				Bottom Depth (m):	5.45	9.45	11.95	16.45	19.45	22.45	28.45	32.95
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	39	16	4.1	6.9	21	23	30	28
pH	U	2010		N/A	7.9	8.6	8.8	9.0	8.8	8.4	7.6	7.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	0.013	< 0.010	< 0.010	< 0.010	< 0.010	0.018	0.024	0.039
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.068	0.13	0.017	0.021	0.010	0.14	0.20	0.33
Total Sulphur	U	2175	%	0.010	0.21	0.17	0.050	0.014	0.011	0.11	0.26	0.27
Chloride (Extractable)	U	2220	g/l	0.010	0.021	0.20	0.10	0.028	0.053	0.19	0.24	0.22
Nitrate (Extractable)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Ammonium	U	2425	mg/kg	0.50	26	5.4	1.9	5.1	33	7.5	5.2	5.5
Sulphate (Acid Soluble)	U	2430	%	0.010	0.13	0.024	< 0.010	< 0.010	< 0.010	0.020	0.11	0.095

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

TEST REPORT.

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

DATE OF ISSUE : 18/03/16 **PAGE 1 of 18 Pages**

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

CLIENT:

Geosphere Environmental Ltd.
Brightwell Barns
Brightwell
Ipswich
IP10 0BJ

Soil Property Testing Ltd.

15,16 & 18 Halcyon Court, St Margarets Way,
Stukeley Meadows, Huntingdon,
Cambs. PE29 6DG.

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

SAMPLES SUBMITTED BY:

Geosphere Environmental Ltd.

APPROVED SIGNATORIES:

☑ **J.C.GARNER B.Eng (Hons.) FGS**
Technical Director

☐ **S.P.TOWNEND FGS**
Quality Manager

☐ **W.JOHNSTONE**
Materials Lab Manager

SAMPLES LABELLED:

Greenwich View Place, London

DATE RECEIVED: 02/03/16

SAMPLES TESTED BETWEEN 02/03/16 **and** 18/03/16

REMARKS: For the attention of Mr S Gilchrist
Your reference 1580,GI
BRE SD1 Suites subcontracted to Chemtest - results included as Appendix A to this Test Report

NOTES:

1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.

2 (a) UKAS - United Kingdom Accreditation Service.
(b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.

4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 2 of 18

Contract Greenwich View Place, London

Serial No. S29809

SCHEDULE OF LABORATORY TESTS

Bh./ Tp No.	Sample Ref	Depth (from)	711:BRE SD1 Suite	1:Moisture Content Determination	4:Liquid/Plastic limit 1 point	31:One Dimensional Consolidation	7:PSD by Wet Sieve BS1377	5:Wet Sieve Preparation for Limit	Remarks
U2-BH03	B4	6.00	*	*	*	*			
	B7	9.00				*			
	B10	13.00	*			*			
	B12	16.00	*	*	*		*		
	B14	19.00				*			
	B19	26.50				*			
U4-BH02	B8	8.00	*	*	*	*			
	B10	10.00	*			*			
	B12	13.00				*			
	B13	14.50				*			
	B15	17.50	*			*			
	B18	22.00	*			*			
-	-	-	7	3	3	2	9	1	<— Total Number of Tests ——

Scheduled by: Geosphere Environmental Ltd.

Target Date: 16/03/16

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 3 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

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

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	SAMPLE PREPARATION				Description	CLASS
								Method S/N	Ret'd 0.425mm (%)	Corr'd M/C <0.425mm	Curing Time (hrs.)		
U2-BH03	6.00	B4	46	79	32	47	0.30	N	0(A)		79	Firm very dark grey organic CLAY locally oxidised to brown	CVO
U2-BH03	16.00	B12	12	35	16	19		S	69(M)		80	Black, brown and white fine to coarse rounded and subrounded GRAVEL in a soft olive slightly sandy silty clay matrix	CL/ CI
U4-BH02	8.00	B8	71	108	42	66	0.44	N	0(A)		79	Soft dark grey organic CLAY	CEO

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

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

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

COMMENTS :

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

TEST REPORT.

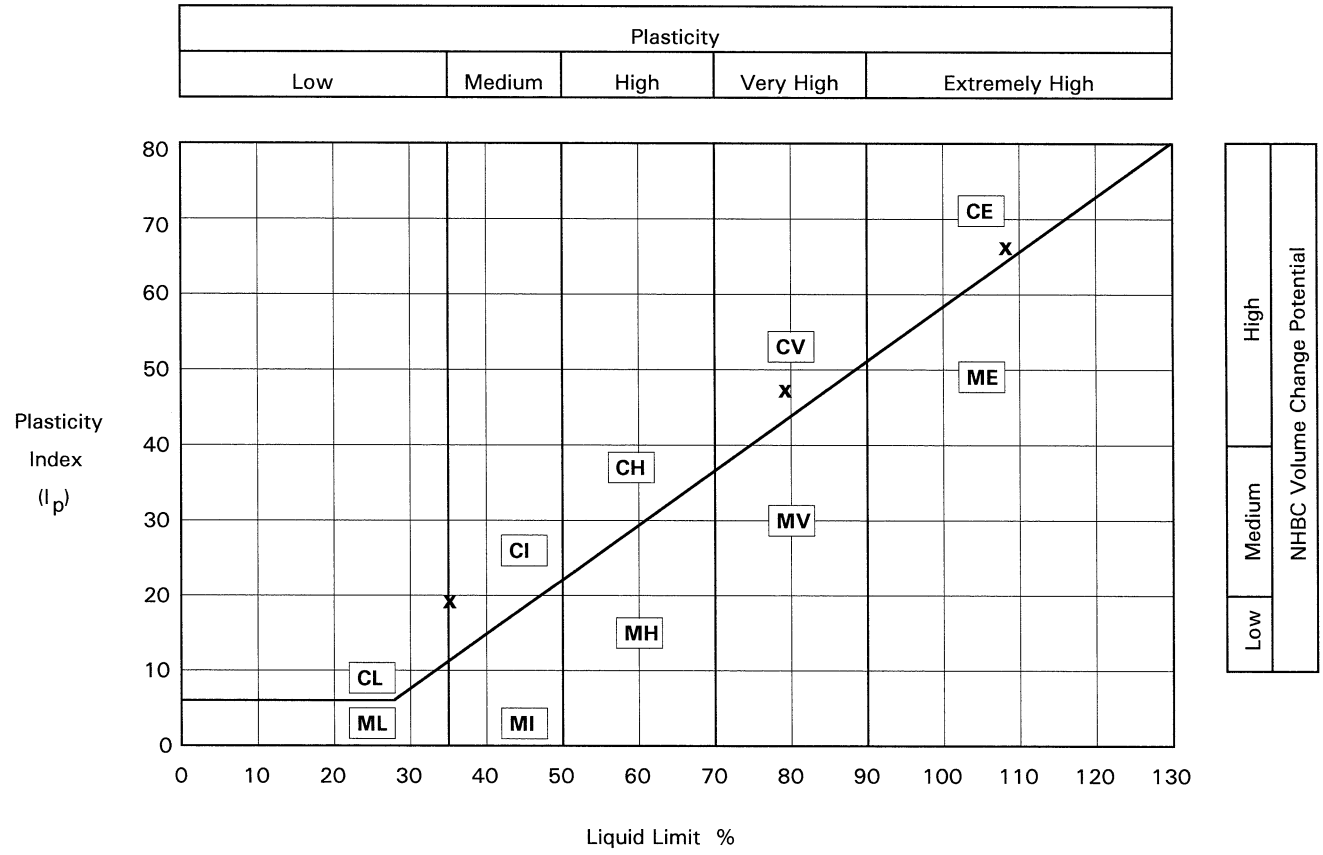
ISSUED BY : **SOIL PROPERTY TESTING LTD.**

DATE OF ISSUE : As page 1 **PAGE** 4 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



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

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

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

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 5 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

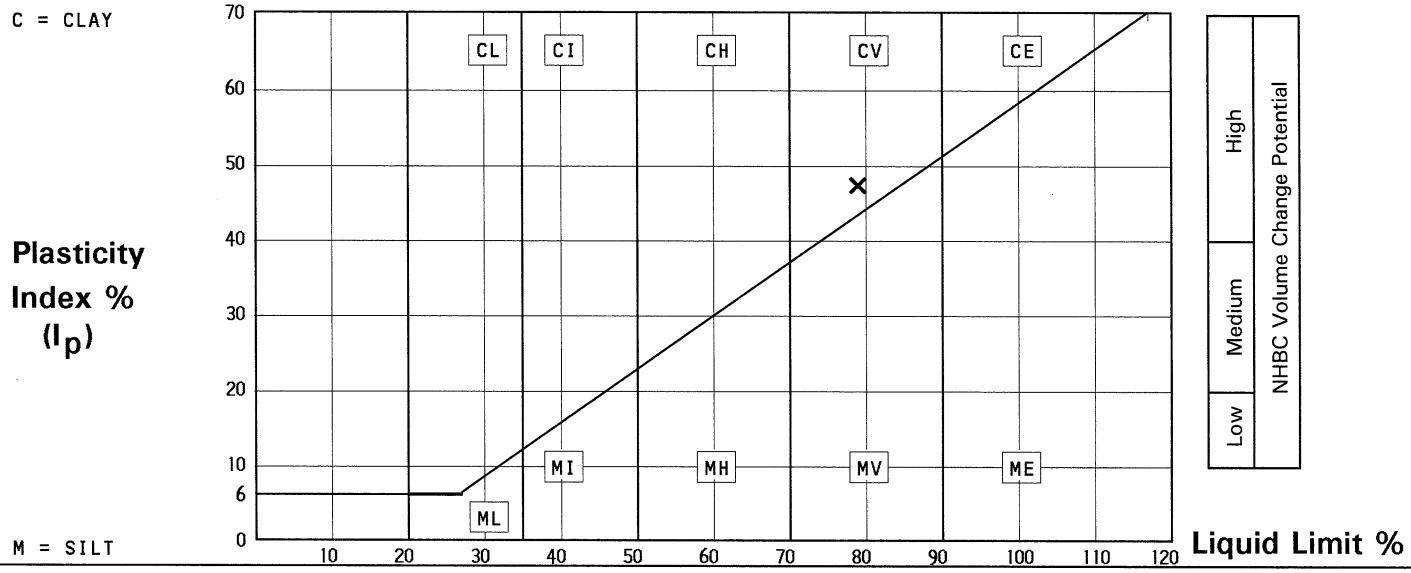
UKAS TESTING 0998

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

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U2-BH03	6.00	B4	46	Firm very dark grey organic CLAY locally oxidised to brown	

PREPARATION

Method of Preparation	Specimen from Natural Soil	Liquid Limit	79 %
Sample retained 0.425 sieve	(Assumed) 0 %	Plastic Limit	32 %
Corrected moisture content for material passing 0.425mm	%	Plasticity Index	47 %
Curing Time	79 Hours	Liquidity Index	0.30
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



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

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

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

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 6 **of** 18

Contract Greenwich View Place, London

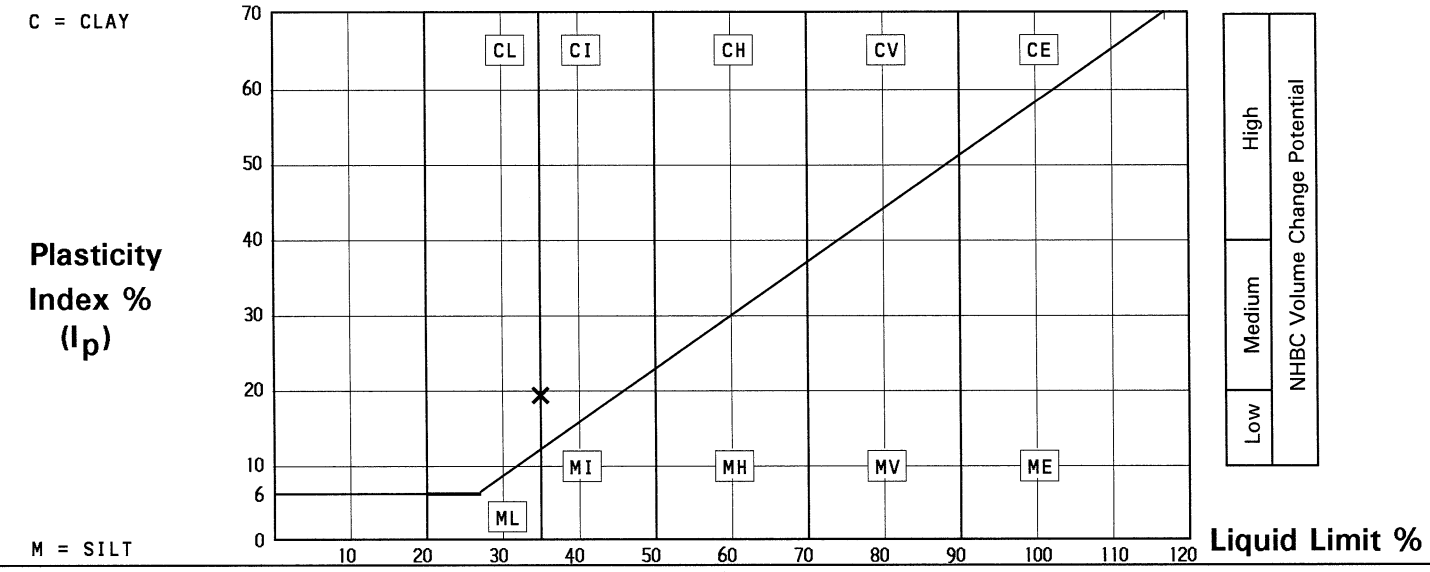
Serial No. S29809

UKAS TESTING 0998

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

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U2-BH03	16.00	B12	12	Black, brown and white fine to coarse rounded and subrounded GRAVEL in a soft olive slightly sandy silty clay matrix	

PREPARATION			
Method of Preparation	Sieved Specimen	Liquid Limit	35 %
Sample retained 0.425 sieve	(Measured) 69 %	Plastic Limit	16 %
Corrected moisture content for material passing 0.425mm	%	Plasticity Index	19 %
Curing Time	80 Hours	Liquidity Index	
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



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

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

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

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100)
Corrected moisture content and liquidity index not reported due to material type - 65% retained on 2mm sieve.

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 7 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

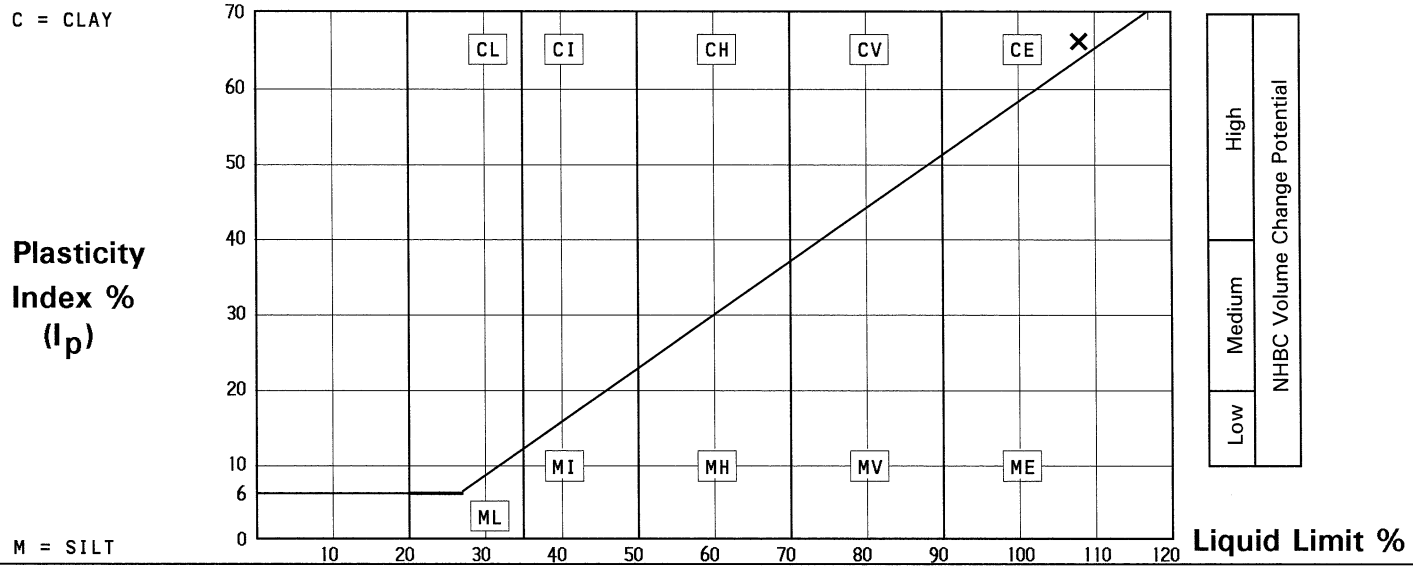
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
U4-BH02	8.00	B8	71	Soft dark grey organic CLAY	

PREPARATION

Method of Preparation	Specimen from Natural Soil
Sample retained 0.425 sieve	(Assumed) 0 %
Corrected moisture content for material passing 0.425mm	%
Curing Time	79 Hours

Liquid Limit	108 %
Plastic Limit	42 %
Plasticity Index	66 %
Liquidity Index	0.44
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



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

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

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

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 8 of 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

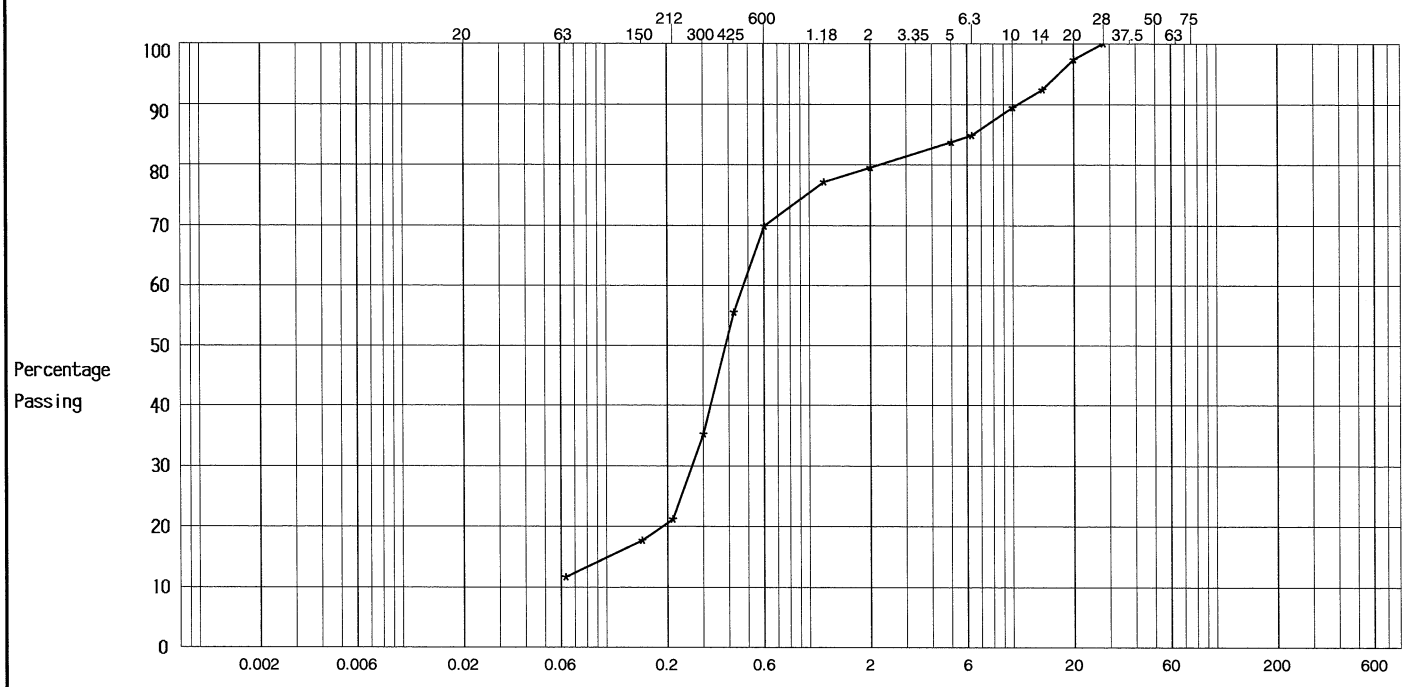
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH03	9.00	B7	Dark brownish grey clayey silty very gravelly SAND. Gravel is black, brown and white angular to subrounded	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)						Size (mm)									
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	12	18	21	35	56	70	77	79	84	85	89	92	97	100	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 9 of 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

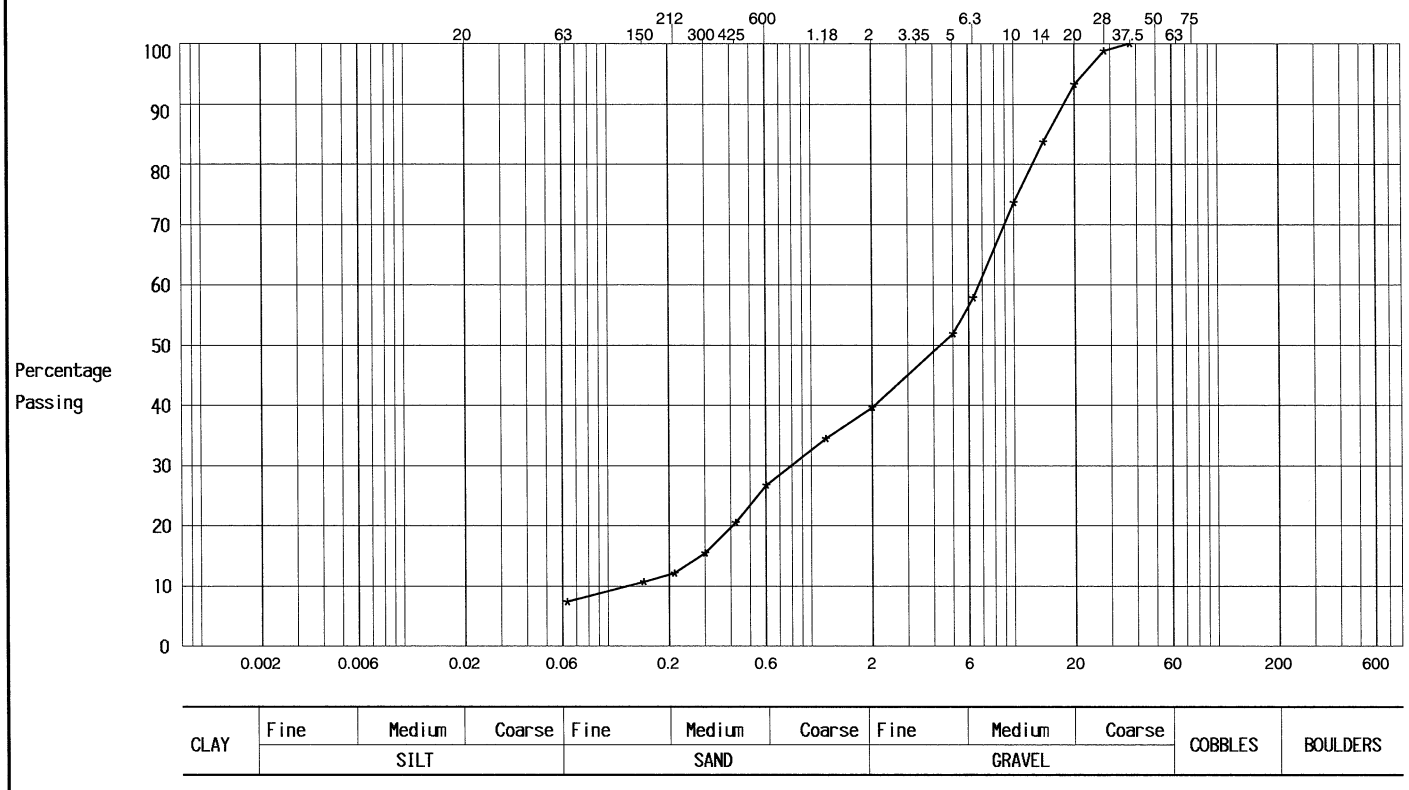
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH03	13.00 -13.45	B10	White, black and brown silty very sandy rounded to subangular GRAVEL with occasional soft dark grey clay lumps. Sand is very dark grey	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)														Size (mm)												
Sieve Size													63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve													7	11	12	15	20	27	34	40	52	58	74	84	93	99	100	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 10 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

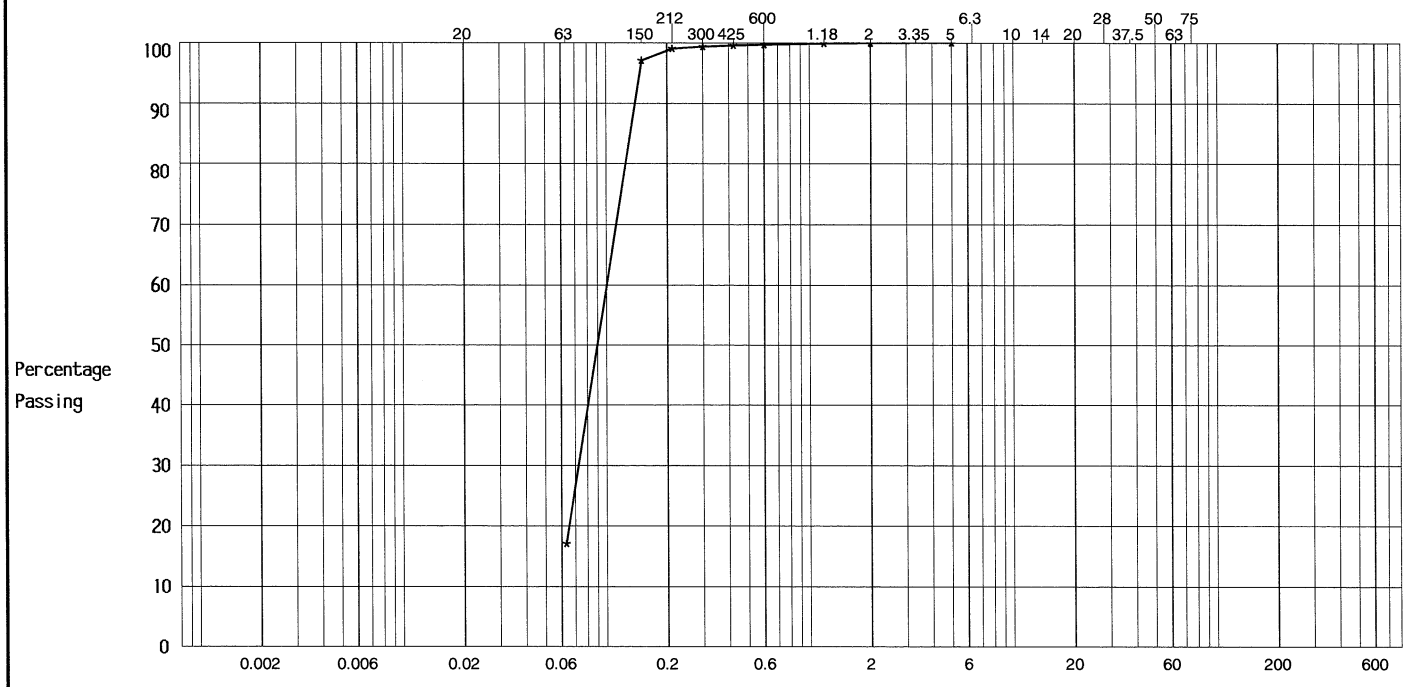
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH03	19.00	B14	Dark grey clayey silty SAND	

Method of Test: Wet Sieve + Hydrometer

Method of pre-treatment: Not required

	Size (microns)												Size (mm)											
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75							
Percentage by Mass passing Sieve	17	97	99	99	100	100	100	100	100	-	-	-	-	-	-	-	-							



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

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

COMMENTS :

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 11 **of** 18

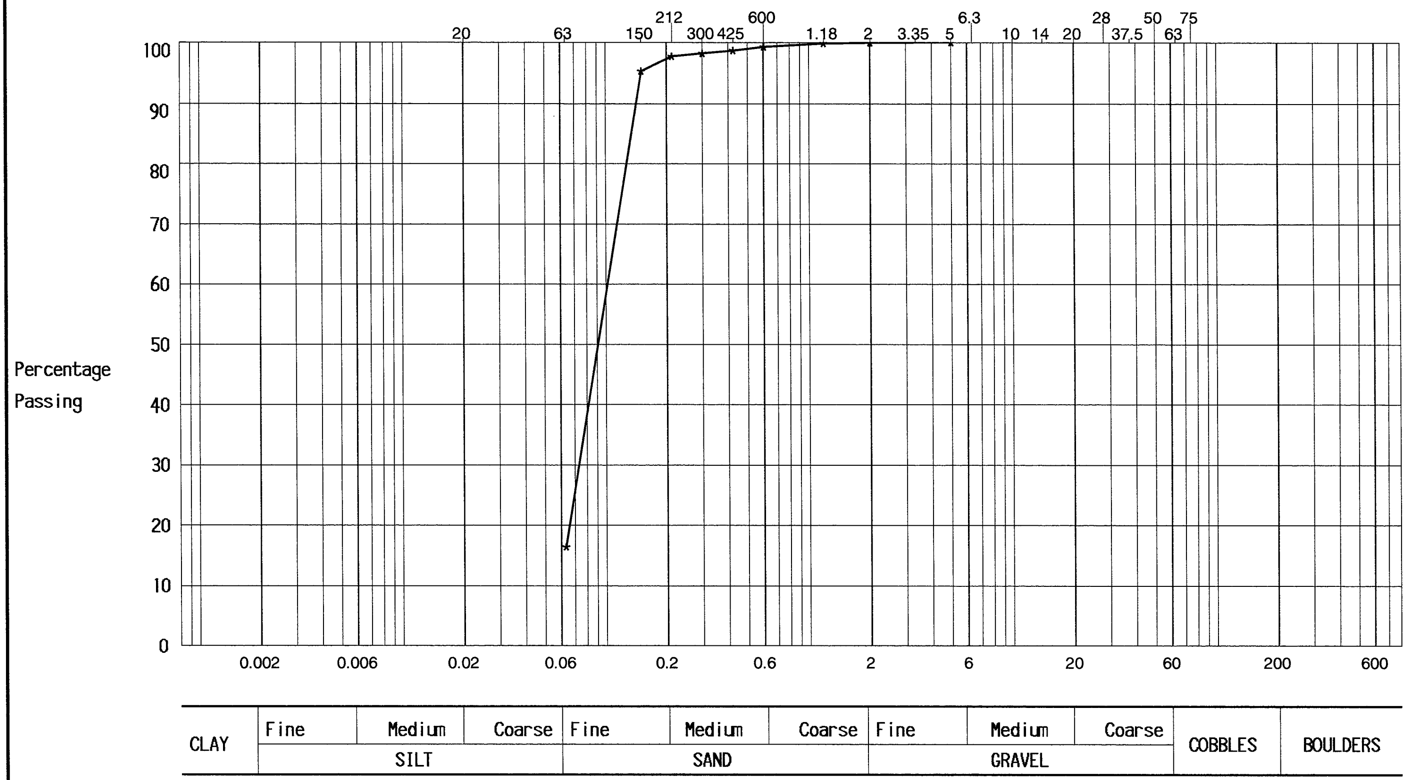
Contract **Serial No.**
Greenwich View Place, London S29809

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U2-BH03	26.50	B19	Dark grey slightly clayey silty SAND	

Method of Test: Wet Sieve	Method of pre-treatment:

	Size (microns)						Size (mm)											
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	16	95	98	98	99	99	100	100	100	-	-	-	-	-	-	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

UKAS TESTING 0998

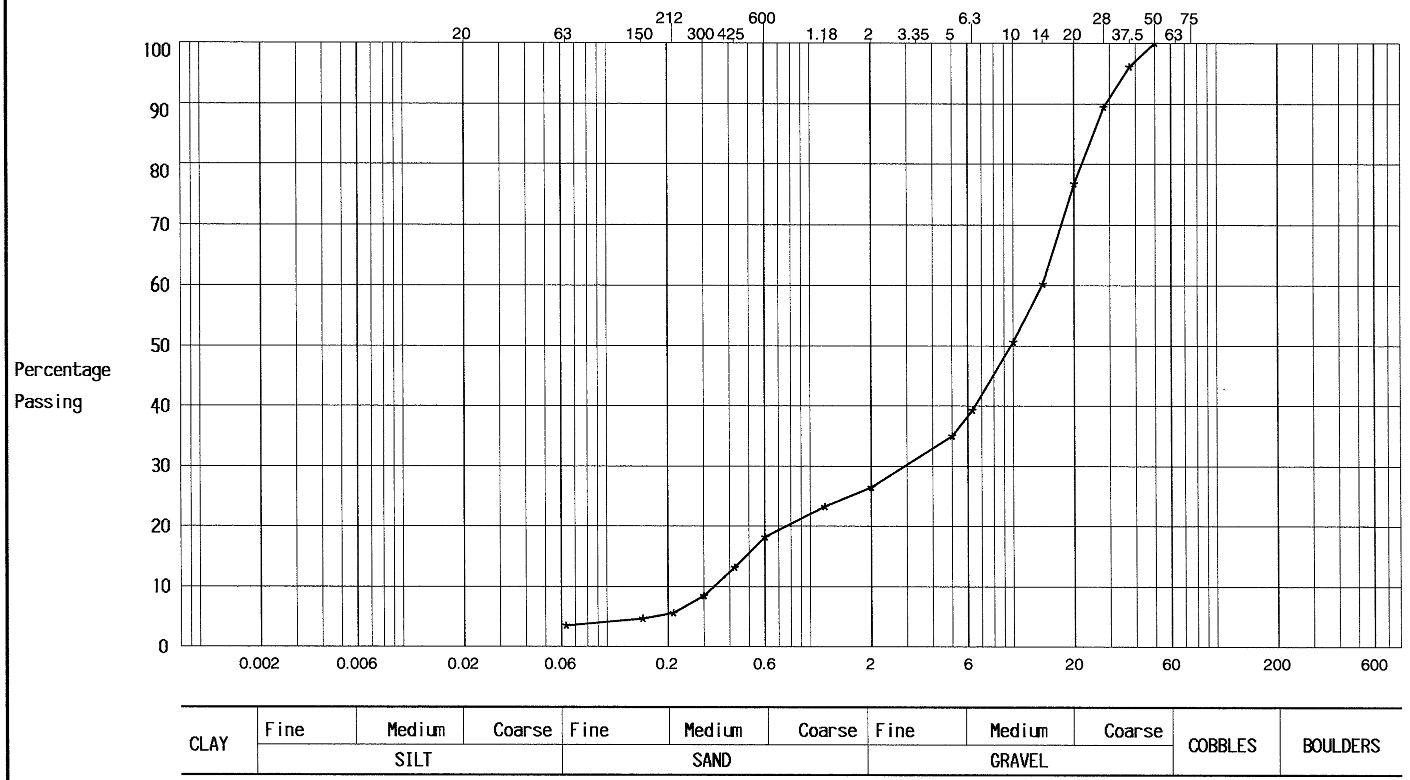
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U4-BH02	10.00	B10	White, black and brown slightly clayey slightly silty very sandy angular to rounded GRAVEL. Sand is dark grey	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)																Size (mm)										
Sieve Size											63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve											3	5	6	8	13	18	23	26	35	39	51	60	77	89	96	100	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 13 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

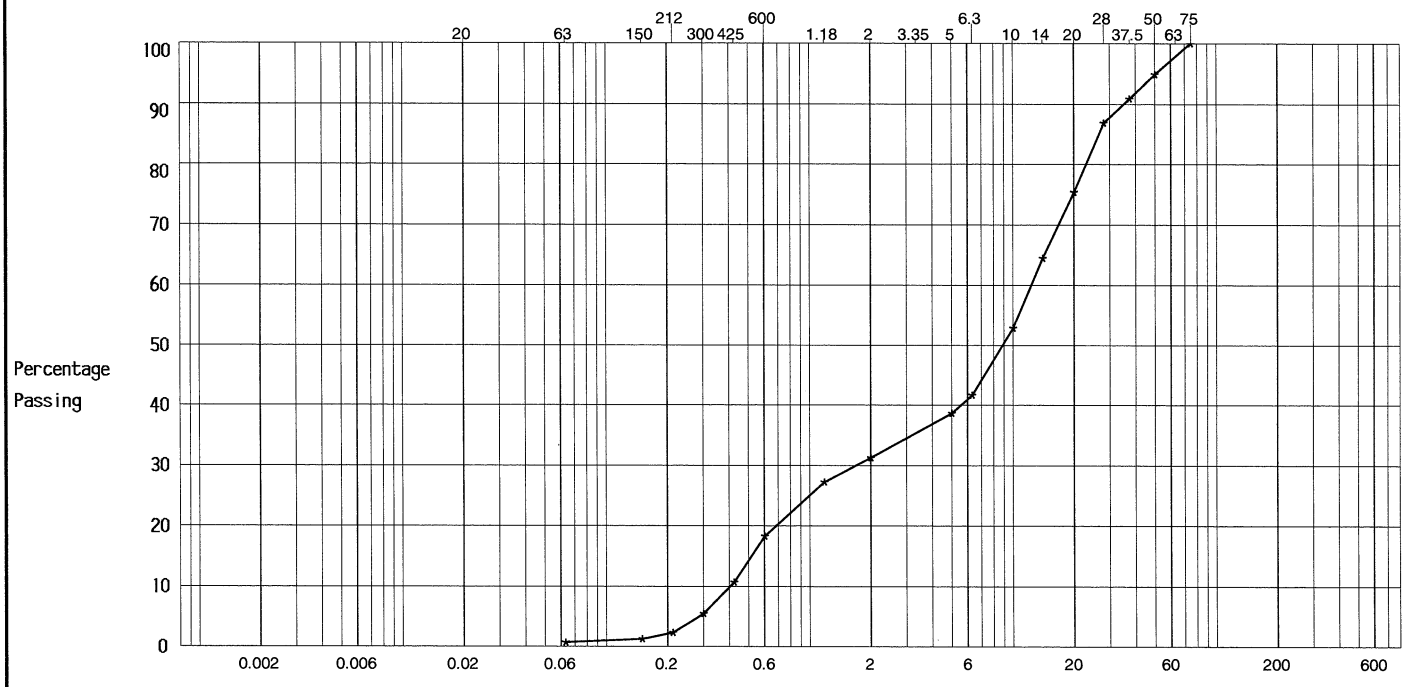
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U4-BH02	13.00	B12	White, black and brown slightly silty very sandy angular to rounded GRAVEL. Sand is light yellowish brown	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)													Size (mm)												
Sieve Size													63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve													1	1	2	5	11	18	27	31	39	42	53	64	75	87	91	95	100



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 14 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U4-BH02	14.50	B13	Light olive slightly silty gravelly SAND with occasional soft dark green organic clay lumps. Gravel is white, black and brown angular to rounded	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)													Size (mm)												
Sieve Size														63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve														4	8	19	43	62	75	85	88	93	95	97	98	98	100	-	-	-

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 15 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

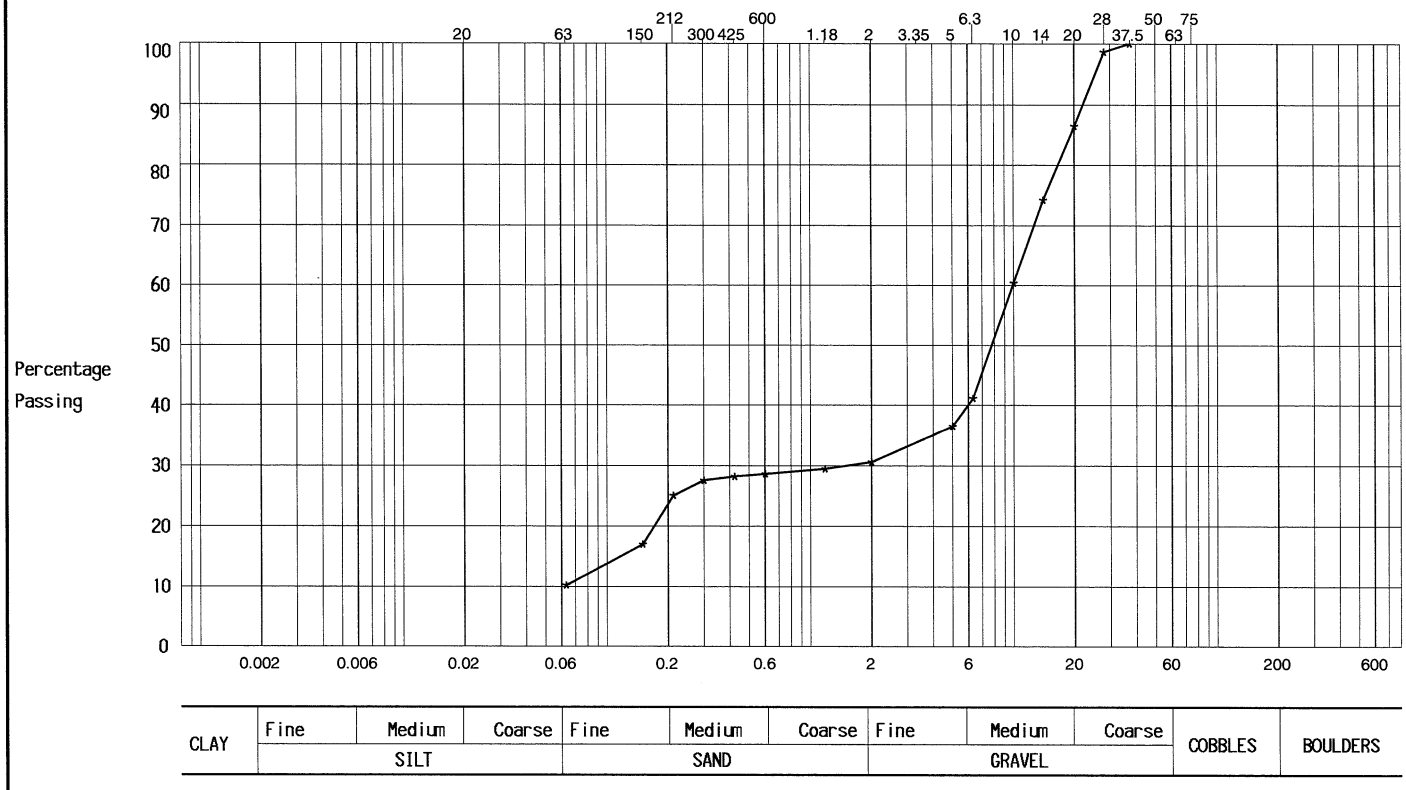
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U4-BH02	17.50	B15	White, black and brown rounded to subangular GRAVEL in a soft olive and dark olive sandy silty clay matrix	

Method of Test: Wet Sieve

Method of pre-treatment:

Size (microns)															Size (mm)														
Sieve Size															63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve															10	17	25	28	28	29	29	31	36	41	60	74	86	99	100	-	-



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 16 of 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

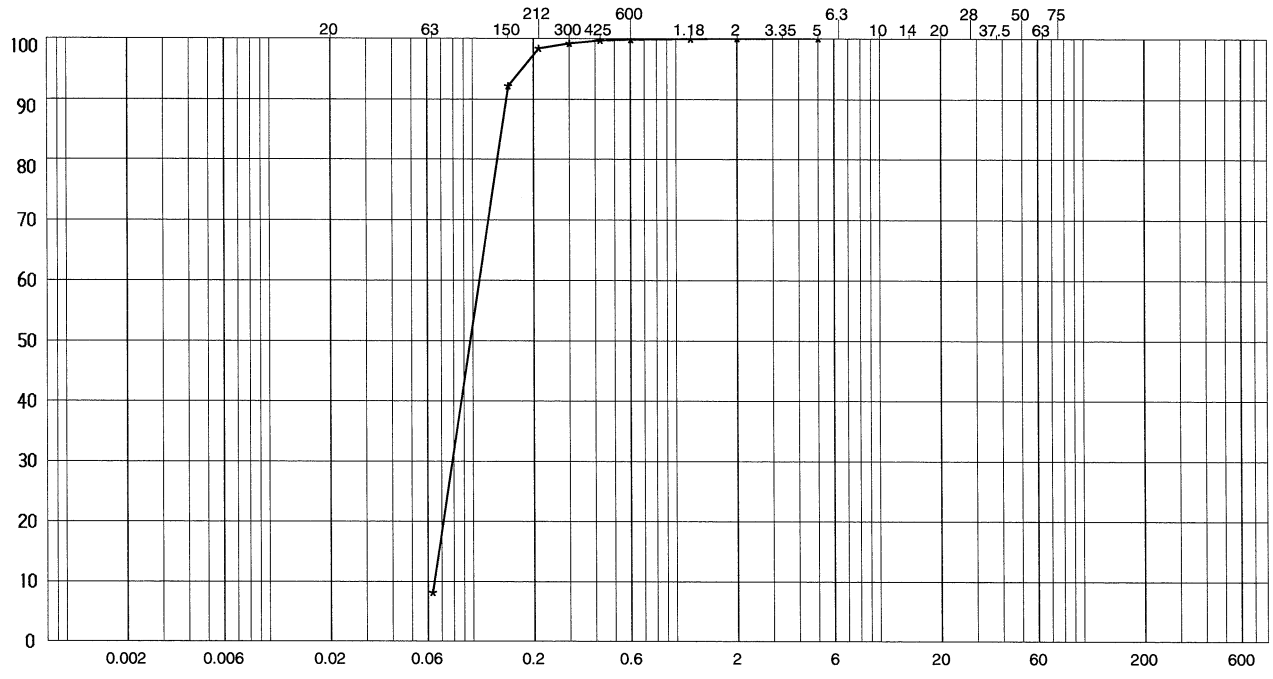
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
U4-BH02	22.00	B18	Dark grey silty SAND	

Method of Test: Wet Sieve

Method of pre-treatment:

	Size (microns)												Size (mm)												
Sieve Size	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75								
Percentage by Mass passing Sieve	8	92	98	99	100	100	100	100	100	-	-	-	-	-	-	-	-								



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

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

COMMENTS :

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

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 **PAGE** 17 **of** 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

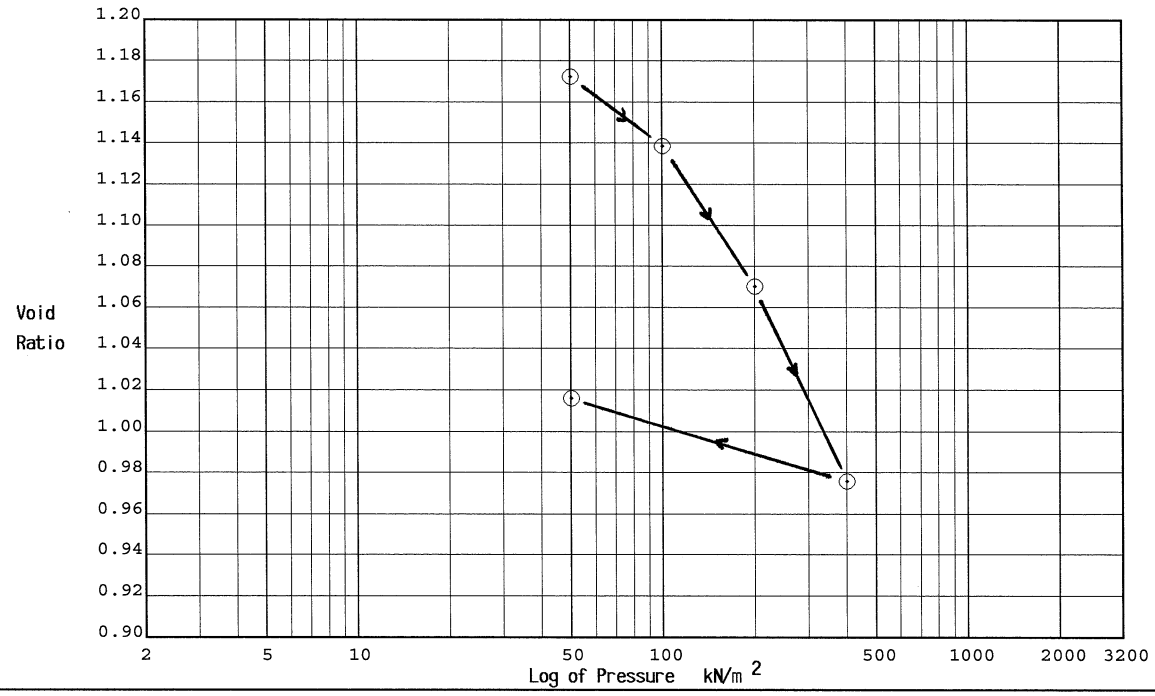
DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth m.	Sample	Specimen Depth/Location m. H/V	Moisture Content %	Description	Remarks
U2-BH03	6.00	B4		45	Firm very dark grey organic CLAY locally oxidised to brown	Oedometer ring pushed into intact portion of sample

INITIAL CONDITIONS

Height	18.70 mm	Particle Density	2.65 Assumed
Diameter	74.98 mm	Void Ratio	1.203
Wet Weight	144.18 g	Degree of Saturation	99 %
Moisture Content	45 %	Swelling Pressure	kN/m^2
Bulk Density	1.75 Mg/m^3	Dry Density	1.20 Mg/m^3

Increment No.	Load kN/m^2	Change in Height (mm)	Void Ratio	Cv (m^2/yr)	Mv (m^2/MN)	Temp °C	Corrected Cv
1	50	0.249	1.173	4.0	0.27	20	4.0
2	100	0.534	1.140	0.85	0.31	19	0.88
3	200	1.116	1.071	0.98	0.32	20	0.98
4	400	1.918	0.977	0.77	0.23	20	0.77
5	50	1.577	1.017		0.06	20	



METHOD OF PREPARATION: BS 1377:PART 5:1990:3.3 & 3.4 METHOD OF TIME FITTING USED : Square Root

METHOD OF TEST : BS 1377:PART 5:1990:3.5

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

COMMENTS :

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

TEST REPORT.

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

DATE OF ISSUE : As page 1 **PAGE** 18 of 18

Contract Greenwich View Place, London

Serial No. S29809

UKAS TESTING 0998

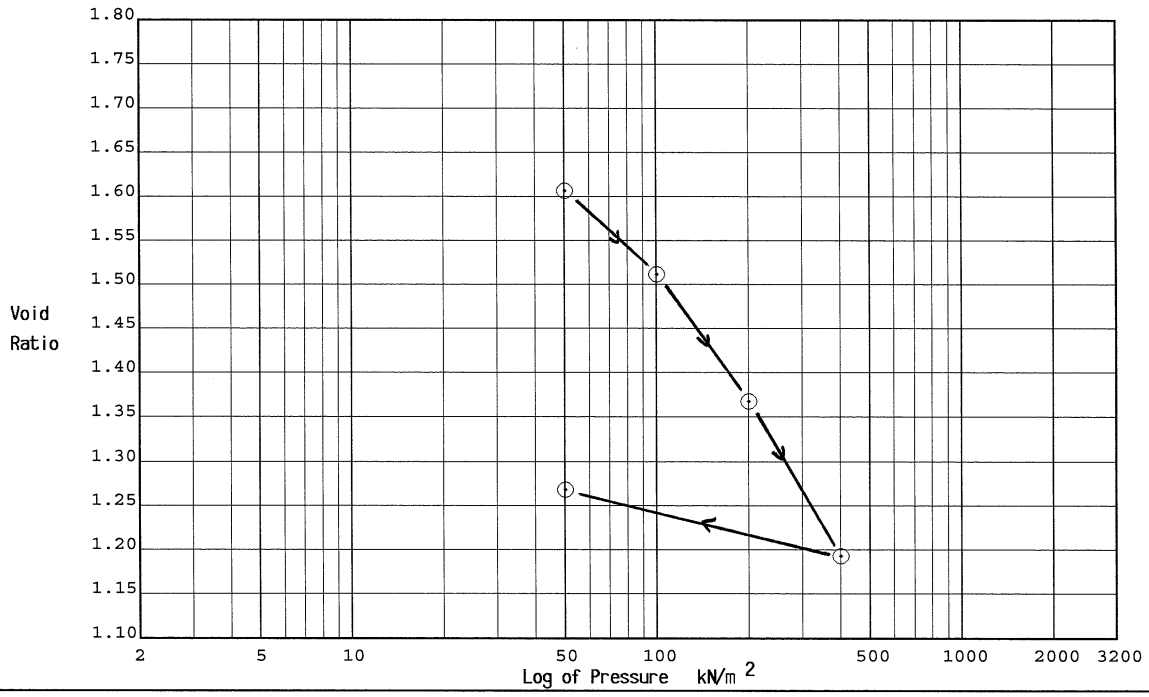
DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth m.	Sample	Specimen Depth/Location m. H/V	Moisture Content %	Description	Remarks
U4-BH02	8.00	B8		65	Soft dark grey organic CLAY	Oedometer ring pushed into intact portion of sample

INITIAL CONDITIONS

Height	18.80 mm	Particle Density	2.65 Assumed
Diameter	75.09 mm	Void Ratio	1.740
Wet Weight	132.82 g	Degree of Saturation	99 %
Moisture Content	65 %	Swelling Pressure	kN/m^2
Bulk Density	1.60 Mg/m^3	Dry Density	0.97 Mg/m^3

Increment No.	Load kN/m^2	Change in Height (mm)	Void Ratio	Cv (m^2/yr)	Mv (m^2/MN)	Temp °C	Corrected Cv
1	50	0.896	1.610	0.76	0.95	20	0.76
2	100	1.549	1.515	0.50	0.73	19	0.52
3	200	2.540	1.370	0.42	0.57	20	0.42
4	400	3.738	1.196	0.41	0.37	20	0.41
5	50	3.223	1.271		0.10	20	



METHOD OF PREPARATION: BS 1377:PART 5:1990:3.3 & 3.4 METHOD OF TIME FITTING USED : Square Root

METHOD OF TEST : BS 1377:PART 5:1990:3.5

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

COMMENTS :

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	16-06055-1
Initial Date of Issue:	17-Mar-2016
Client	Soil Property Testing
Client Address:	18 Halycon Court St Margarets Way Stukeley Meadows Huntingdon Cambridgeshire PE29 6DG
Contact(s):	Jon Garner
Project	29809 Greenwich View Place, London

Quotation No.:		**Date Received:**	15-Mar-2016
Order No.:	29809	**Date Instructed:**	15-Mar-2016
No. of Samples:	7	**Target Date:**	17-Mar-2016
Turnaround (Wkdays):	3	**Results Due:**	17-Mar-2016
Date Approved:	17-Mar-2016		

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 29809 Greenwich View Place, London

Client: Soil Property Testing				Chemtest Job No.:	16-06055	16-06055	16-06055	16-06055	16-06055	16-06055	16-06055
Quotation No.:				Chemtest Sample ID.:	267090	267091	267092	267093	267094	267095	267096
Order No.: 29809				Client Sample Ref.:	U2-BH03	U2-BH03	U2-BH03	U4-BH02	U4-BH02	U4-BH02	U4-BH02
				Client Sample ID.:	B4	B10	B12	B8	B10	B15	B18
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	6.00	13.00	16.00	8.00	10.00	17.50	22.00
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Moisture	N	2030	%	0.020	20	0.072	8.4	35	0.037	0.11	23
pH	U	2010		N/A	8.4	8.1	9.3	8.1	8.5	8.9	8.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	0.018	< 0.010	< 0.010	0.012
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.18	0.20	0.037	0.34	0.24	0.021	0.14
Total Sulphur	U	2175	%	0.010	0.11	0.11	0.030	1.0	0.10	0.040	0.10
Chloride (Extractable)	U	2220	g/l	0.010	0.075	0.070	0.11	0.15	0.053	0.10	0.23
Nitrate (Extractable)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Ammonium	U	2425	mg/kg	0.50	280	44	16	380	44	15	5.0
Sulphate (Acid Soluble)	U	2430	%	0.010	0.092	0.058	< 0.010	0.20	0.056	< 0.010	0.037

Chemtest
The right chemistry to deliver results

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

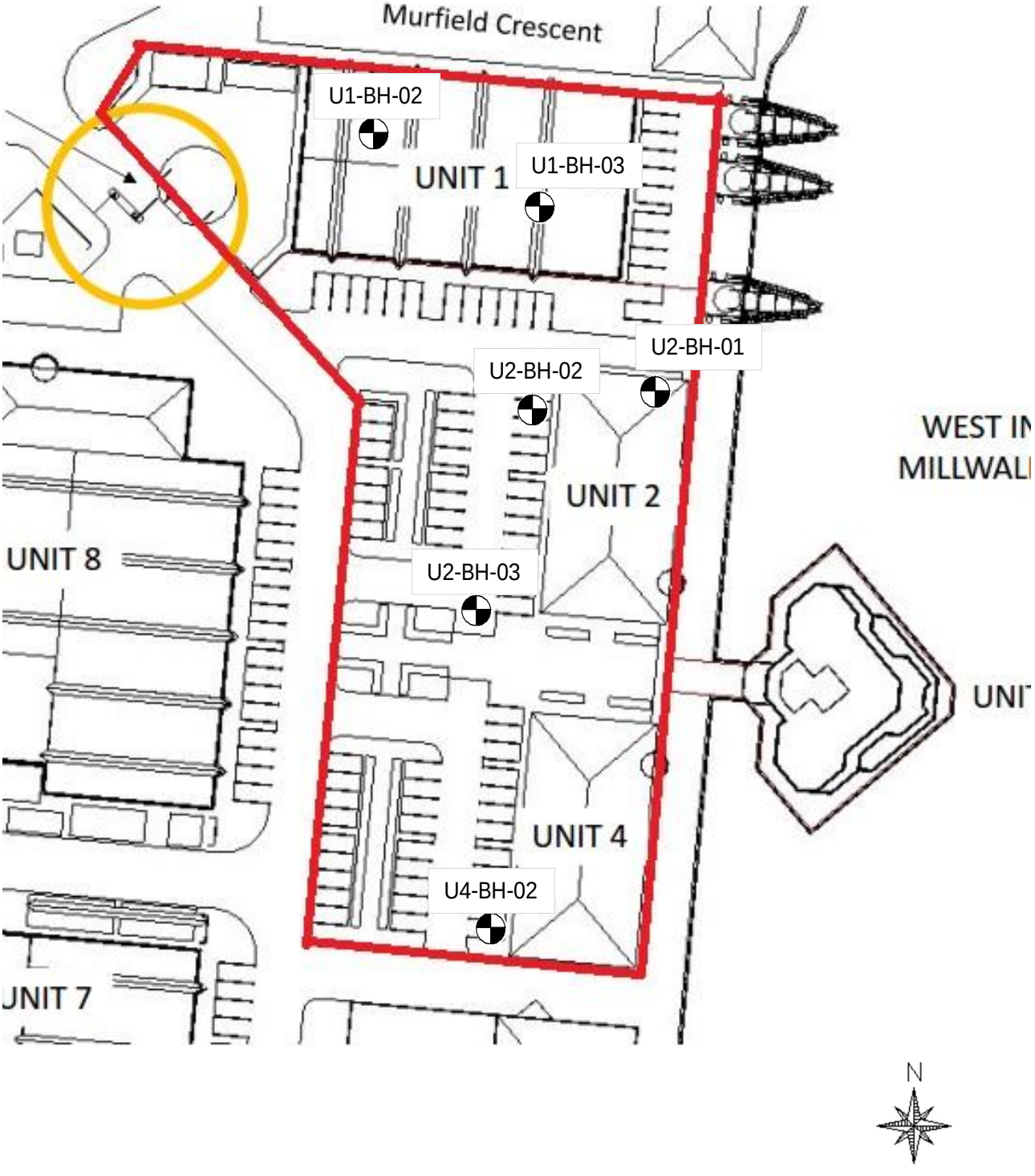
If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

APPENDIX 8 – DRAWINGS

Exploratory Hole Location Plan – Drawing ref. 1580,GI 001/Rev 0

geosphere environmental ltd

Investigate design resolve



LEGEND:

Site boundary

Borehole location

geosphere environmental ltd

Brightwell Barn, Ipswich Road, Brightwell, Suffolk, IP10 0BJ T 01603 298 076 F 01603 289 075 E info@geosphere-environmental.co.uk

SITE	TITLE	REPORT NO.	DRAWING NO.	DATE
Units 1,2 and 4 Greenwich View Place, Isle of Dogs, London	Exploratory Hole Location Plan	1580,SI	001 / Rev 0	May 2016
	CLIENT: ARC:MC	DRAWN BY: SG	CHECKED: CJ	SCALE: Not to scale

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ADDRESS
Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

TELEPHONE
01603 298076

FAX
01603 298075

EMAIL
info@geosphere-environmental.co.uk

Appendix B – SUPPLEMENTARY SOIL INVESTIGATION REPORT

April 2021

geosphere environmental ltd
investigate design resolve

Geosphere Environmental Ltd
Brightwell Barns
Ipswich Road
Brightwell
Suffolk
IP10 0BJ

T: 01603 298 076 F: 01603 298 075
E: info@geosphere-environmental.co.uk
w: www.geosphere-environmental.co.uk

Our Ref 1580,GI,Ltr02,SG-18-04-17
Your Ref

Date 18 April 2017

ARC:MC
c/o TH Real Estate
201 Bishopsgate
London
EC2M 3BN

For the attention of Adie Yates

By Email
- Adrian.Yates@threalestate.com

CC: Tom Graham - tom.graham@futurepd.co.uk
Russell Franks - Russell.Franks@Saradan.co.uk
Mat Bacon - Mat.Bacon@arcmc.eu
Mark Allan - MAllan@metnor.co.uk

Dear Adie

SUPPLIMENTARY SOIL INVESTIGATION AT UNIT 1, THE POINT, GREENWICH VIEW PLACE, ISLE OF DOGS, LONDON BOROUGH OF TOWER HAMLETS E14 9NN

1. Introduction

This letter report has been prepared for TH Real Estate on behalf of The Client, ARC:MC, for the purposes of satisfying Condition 3 of the planning document PA/16/01026 dated 31 October 2016, and subsequent refusal document PA/16/03393 dated 31 January 2017, produced by The London Borough of Tower Hamlets.

The primary objectives of this site investigation are to:

- Assess the ground conditions at the site;
- Assess the potential risk to human health and the environment.

These are to be achieved by:

- Sampling the soils on the site and noting any visual or olfactory evidence of contamination;
- Undertaking a schedule of chemical analysis based on the previous use and historical development of the site;
- Undertaking assessment of the laboratory results in accordance with guidance to develop a refined Conceptual Site Model and determine the potential risk to receptors;
- Providing additional data to enable a Quantitative Risk Assessment of the site, if required;
- Provide recommendations to assist the development of the proposed scheme.

This letter follows from previous investigation of the site, prior to construction taking place, documented within an updated report reference 1580,GI – GEO/SG,JD/06.06.16/FINAL,V2 dated 16 June 2016, and revised on 17 March 2017. The findings of the above reference report have been briefly summarised within section 2, below.

This letter has been written specifically for the purposes of assessing the soils around the former Unit 1 structure.

2. Previous Reports

A full synopsis of previous reports can be found within the report referenced within section 1, above, which should be read in conjunction with this letter. The findings of the previous investigation have been summarised below.

The findings of a previous Desk Study, undertaken by others, indicated a number of sources of contamination to be present that required further investigation, however a re- assessment of the desk study findings by Geosphere Environmental Ltd, indicated the majority of sources to be beyond the boundaries of the site. Based upon the reassessment, it was considered that there was a risk of contamination from Made Ground sources associated with historical developments and from off-site sources of organics and hydrocarbons. An electricity substation was noted to the north west of Unit 1, which may present a risk of Polychlorinated Biphenyls, (PCB), to site workers during the redevelopment of the site, and therefore it was recommended this area is subject to a targeted geo-environmental investigation in order to quantify the risk to the receptor.

Results of chemical analysis on soils indicate detectable concentrations of analytes, such as lead and benzo(a)pyrene to be present within the Made Ground, but not in significantly elevated concentrations compared to thresholds for commercial developments. Therefore the risk of contamination was considered to be such that a Remediation Method Statement was not required. However, it was recommended that short term mitigation measures should be implemented to protect ground workers during the development of the site and a Discovery Strategy should be in place for the site clearance, demolition and concrete slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment to ensure contaminated soils are dealt with appropriately.

At the stage of the above investigation, no targeted investigation around the area of the former substation had been undertaken due to live service restrictions and therefore a supplementary post-demolition investigation was recommended.

3. Site Works

3.1 Methodology

This site investigation was carried out on the basis of the practices set out in BS 10175: 2001, (ref. R.3), with the location of exploratory holes has been planned, where possible, in general accordance with CLR 4, (ref. R.8).

Based upon the previous report, this supplementary soil investigation was to be targeted around the former electricity substation. Furthermore, on the basis of the Refusal Document, further soil sampling around the proposed new Unit 1 structure was to be undertaken to ensure no further contaminants, above threshold concentrations, existed.

3.2 Scope

Site works were carried out between 21 March and 4 April 2017 and comprised of the following:

- Excavation of six machine dug trial pits, (TP201 – TP206), extended to a maximum depth of 2.0m bgl;
- Representative soil sampling from throughout the depth of the soil profile.

An exploratory hole location plan is presented as 1580,GI 002/Rev 0, within Appendix 5.

3.3 Ground Conditions Encountered

Soil conditions within all of the trial pits encountered Made Ground to the full depth of the investigation, which comprised of type 2/type 3 granular surfacing overlying a sandy gravel of brick and concrete.

A number of concrete slabs were noted to exist, varying in depths from 0.4m to 2.0m bgl. The concrete slabs were not penetrated.

Groundwater was not noted within any of the exploratory holes formed during the investigation.

With the exception of anthropogenic construction materials, (brick, concrete, wood, etc), no evidence of gross contamination was noted within any of the exploratory holes.

4. Laboratory Testing

4.1 Methodology

Representative disturbed soil samples were collected for environmental purposes in amber glass jars and airtight plastic pots and distributed to the chemical analysis laboratories in a cool box.

No field techniques were undertaken for the soil samples, all analyses of the soil samples took place in the laboratory.

The environmental laboratory used, (QTS Environmental Ltd), is an accredited laboratory by the United Kingdom Accreditation Service, (UKAS), and at least 50% of individual parameters are from methods pending accreditation to the Environment Agency Monitoring Certification Scheme, (MCERTS), for the range of analyses undertaken as part of this investigation. The MCERTS performance standard for the chemical testing of soil is an application of ISO 17025: 2000 specifically for the chemical testing of soil.

The chemical analyses were carried out on three samples of Made Ground soils for a general suite of contaminants. The nature of the analyses is detailed below:

- Metals screen - arsenic, cadmium, chromium, lead, mercury, selenium, boron (water soluble), beryllium, copper, nickel, vanadium and zinc;
- Organic screen - total petroleum hydrocarbons, (TPH) – with specific carbon banding; benzene, toluene, ethylbenzene and xylenes, (BTEX); polyaromatic hydrocarbons, (PAH) – USEPA 16 suite;
- Inorganics screen - cyanide (total), sulphate (water soluble);
- Others - pH, organic matter, asbestos.

In addition to which, a single sample of soil was analysed under the current Waste Acceptance Criteria suite of analyses, including simulated leaching testing.

A copy of the laboratory test results is included in Appendix 4.

5. Risk Assessment

5.1 Risk to Human Health

5.1.1 Methodology

The results of the soil analyses have been compared to soil quality screening values where deemed applicable, such as:

- The LQM/CIEH S4ULs for Human Health Risk Assessment, (ref. R.21);
- Defra/CL:AIRE Final C4SLs, (ref. R.20);
- The LQM/CIEH, EIC/AGS/CL:AIRE Generic Assessment Criteria, (GAC), (ref. R.15).

Where the concentrations determined on site are at or below the respective screening concentrations, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated.

The land use scenario that this Human Health risk assessment is based upon is for Commercial land use. It is assumed that there will be no soft landscaping, grass or planting/ educational garden areas. If these types of "heightened exposure" areas are undertaken on site, a re-assessment of the risk from the ground conditions must be undertaken.

5.1.2 Asbestos

Whilst not indicated within the previous desk study report, there were indications that asbestos may have resided within the building fabric of the former Unit 1.

The results of the analyses recorded no quantifiable amounts of asbestos detected within the analysed soil samples. Based upon the above, the risk to receptors from asbestos exposed from the soils on site is low.

Any suspected asbestos encountered within the soils during the demolition and construction phase of the proposed development should be left in situ and temporarily fenced off, until its identification and removal/treatment has been established. Works in the immediate area of the suspected asbestos should cease during this period until a suitably qualified and authorised person has given permission for works to continue.

5.1.3 Metals and PAHs

Although the proposed development is to be for commercial use, the guideline threshold values for residential developments is presented to highlight the potential risk to construction workers, or others, exposed to or in direct contact with the Made Ground soils. A comparison of chemical analysis results with the soil screening values has been undertaken and is presented within Table 1, below:

Table 1 – Summary of Soil Screening Values Exceedances (metals and PAHs)				
Contaminant	Guideline Concentration Threshold Value (mg/kg)	Sampling Location	Concentration (mg/kg)	Depth (mbgl)
Lead	82 - 210 *(pC4SL - residential)* 1100 – 6000 *(pC4SL – commercial)*	TP202	480	1.10
		TP203	287	1.50
		TP204	837	0.50
		TP205	681	1.10
		TP206	240	1.50
Benzo(a)pyrene	3.2 *(S4ULs – residential)* 35 *(S4ULs – commercial)*	TP205	3.55	1.10

The above results indicate that no samples of Made Ground soil exhibit lead concentrations in excess of a lower C4SL screening value for lead in a commercial land use setting. Similarly, the concentrations of a single PAH congener, (Benzo(a)pyrene), are below the thresholds compared to commercial S4UL screening concentrations. However, all of the above exceed the thresholds for a residential land use, (with plant uptake). Corresponding recommendations are provided below.

5.1.4 Poly Chlorinated Biphenyls (PCB)

A total of two soil samples; TP204 at 0.50m bgl and TP205 at 1.10m, were used to determine the presence of PCB's and were taken from within trial pits adjacent to the former electricity sub-station to the north west of the former Unit 1 structure.

In both instances, the results of analysis indicated concentrations to be below the detection limit of the laboratory analysis equipment and therefore it can be determined that the risk of PCB is very low.

5.1.5 Waste Soil Classification Assessment

As mentioned previously, a single sample of soil (TP202 at 1.1m bgl) was analysed for a Waste Acceptance Criteria, (WAC), suite to assist waste classification. The results of the WAC analyses are provided within Appendix 4. This can be utilised in conjunction with the other soil quality data within this report, to determine a waste classification for the soils due to be removed as part of the proposed development. A full waste classification of the soils at site, is outside of the scope of this report. However, some initial assessment is provided below.

It is assumed that within the scope of the redevelopment there shall be a quantity of excavated soils that will not be re-used on site, therefore they will be classed as waste. On the basis of which, soils excavated as part of the development should be removed from site and disposed of off-site, at a waste facility licenced to receive or treat the material. Some facilities may enable re-use of the soil, including the Made Ground, but this is dependent upon their licence and the exact nature of the Made Ground. Whilst the results of chemical analysis indicates the quantity of any contaminant present, materials disposed of off-site, should be further

assessed or classified in accordance with the current Landfill Regulations, 2010, (England and Wales), (amendment), and the, (European), Waste Framework Directive.

The results of WAC analysis on a number of soils is provided within the chemical analysis results presented in Appendix 4: "the results indicate waste soil to be classified as "Stable Non-Reactive Hazardous".

Taking into consideration this and the various components of waste classification process, the *combined* laboratory results indicate soils across the site may be considered as inert waste soil classification. This should be assessed by the potential waste receivers and their site-specific receipt thresholds. Further assessment may be warranted.

5.2 Risk to Controlled Waters

The risks to Controlled Waters have been assessed qualitatively with respect to soil contamination only, as groundwater analysis was beyond the scope of this investigation.

The exposure pathway for contaminants to reach the groundwater or adjacent West India and Millwall docks, (Millwall Outer Docks), was considered and detailed within previous reports. Based upon the results of the recent chemical analysis, there may be a potential for leachable concentrations of lead to reach the groundwater, however, since the site is being developed to comprise of buildings and large areas of hardstanding, the precipitation infiltration volume is anticipated to be low. Thus the potential for any elevated concentrations of analytes to leach into the underlying aquifer is also considered to be low and therefore mitigation measures are not likely to be required.

Any hydrocarbons encountered within the soils during the demolition and construction of the proposed development should be excavated and replaced with certified clean soils or engineered fill. A Discovery Strategy should be in place, and a document such as a Remediation Method Statement may also be required by the Regulatory Authorities.

5.3 Risk to Plants

It is understood that no planting is proposed within the development. However, a review of the commonly occurring phytotoxic chemicals boron, copper, nickel and zinc, has been undertaken based upon the now superseded ICRCL guidance. Although the ICRCL trigger threshold levels have been withdrawn, there are no equivalent guidance values for phytotoxicity.

Concentrations of metals were recorded at concentrations below the thresholds considered to have phytotoxic effects.

5.4 Risk to Services

A comparison has been undertaken of the recent contamination levels with the WRAS standard, (ref. R.17). The requirements of the Thames Water pipe laying documentation is understood to be based upon this WRAS document.

It is advised that the WRAS standard, (ref. R.17), is adopted and consultation with the local water company is sought prior to laying any services.

However, as an interim assessment, it is likely that any potable water pipes due to traverse through Made Ground on site, may require protection or be of a foil-lined specification. The routes of potable water pipes should be assessed in detail with the locations of elevated hydrocarbons and PAHs, following remediation.

5.5 Risk to Humans

Risks to humans include construction workers, site neighbours and end users of the site. Theoretically, exposure to contaminants can take the form of direct contact with the skin, consumption of contaminants through transfer of contaminants to the food chain, or the inhalation of contaminants through wind-blown soils or vapours.

To reduce the risks of exposure and transfer of contaminants during construction, short term mitigation measures specified in the Additional Information, (B – page 24), section of this report should be adhered to and, where applicable, be incorporated in to the development Construction Phase Health and Safety Plan or similar document.

The exposure of contaminants to the end user is only considered to be a risk where soil is exposed, for example in garden areas or areas of soft landscaping. Where soils are covered by proposed on-site structures or areas of paving, the pathway by which contaminants can reach the end user is removed and the risk to the end user is considered negligible.

The proposed development of the site is understood to be covered by either proposed structures or areas of hardstanding; therefore a pathway for contaminants to reach the end user is negligible.

5.6 Conceptual Model

Based upon the results of the recent investigation, it is not considered that an update to the conceptual model is necessary since an increase in contamination risk has not been identified.

It is therefore recommended that a Discovery Strategy should be in place for the site clearance, demolition and slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment. Should any new areas of contaminated soils be deemed a significant risk, it is recommended that a suitably qualified and experienced geo-environmental sub-contractor be tasked in determining the risk, which may require further soil analysis.

Should any remediation of soils or decommissioning of any contamination sources, noted within the implemented Discovery Strategy, be undertaken, a document such as a Remediation Method Statement may be required by the Regulatory Authorities detailing the recommended method. The above may also require validation, subsequent to Local Authority Approval of an appropriate remediation solution, together with report documenting the appropriate measures and its effectiveness.

6. Conclusions and Recommendations

The purpose of this report was to extend previous soil investigation to cover an area surrounding the former Unit 1 structure, particularly targeting an area to the west where service constraints did not permit any previous investigation and where a risk of PCB soil contamination existed.

Based upon laboratory analysis results and comparison with published threshold values for the intended end-use of the site; commercial, the risk of contamination to sensitive receptors remains low and no specific

requirements for remediation are required. However, it is recommended that short term mitigation measures, i.e. appropriate PPE and hygiene precautions, together with a Discovery Strategy should be in place for the site clearance, demolition and slab removal phases and extending throughout the groundworks/ground disturbance phase of the redevelopment.
Should any new areas of contaminated soils be deemed a significant risk, it is recommended that a suitably qualified and experienced geo-environmental sub-contractor be tasked in determining the risk, which may require further soil analysis.

Should any remediation of soils or decommissioning of any contamination sources, noted within the implemented Discovery Strategy, be undertaken, a document such as a Remediation Method Statement may be required by the Regulatory Authorities detailing the recommended method. The above may also require validation, subsequent to Local Authority Approval of an appropriate remediation solution, together with report documenting the appropriate measures and its effectiveness.

We trust the above is clear and acceptable, however if you have any further comments or queries please do not hesitate to contact us.

Yours sincerely,

Stephen Gilchrist
Senior Geotechnical Consultant
Geosphere Environmental Ltd
stephen@geosphere-environmental.co.uk

Enclosures:
Appendix 1 – Acronyms and Abbreviations
Appendix 2 – Report Limitations and Conditions
Appendix 3 – References
Appendix 4 –Laboratory Results
Appendix 5 – Drawings

ADDITIONAL INFORMATION

A. Consultation

During the development of a contaminated site, consultation may be required for a number of reasons with a number of Regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required. The remediation strategy would have to be agreed with the following:

- Local Authority. Consultation is likely to be required with a designated Contaminated Land Officer within the Environmental Health Department, as part of the planning process. The Local Authority is generally concerned with human health risks. Some Authorities now require 'Completion Certificates' to be signed off following remediation works.

- Environment Agency. Where a site is within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.

In addition to which, the following may also be involved in the consultation process:

National House Building Council, NHBC. Section 4.1 of the NHBC Standards requires land management to be addressed.

- Water Authorities. They are likely to impose constraints on the nature of water supply pipes that are to be laid in contaminated land. Guidance on the selection of materials for water pipes is provided by the Water Regulations Advisory Scheme, (ref. R.17).

Based upon the results of any consultation, there may be specific remediation requirements imposed by one or more of the aforementioned Authorities.

B. Short-Term Mitigation Measures

During site preparatory works of any potential development/construction works, some short-term mitigation measures will be required to protect the site workers, neighbouring sites users and the environment from the potential effects of exposure to potentially contaminated materials and soils. The majority of the proposed measures represent good practice for the construction industry and include:

- Briefing all of the site workers of the identified contamination on site, and ensuring they are aware of the potential health effects from exposure.

- Where appropriate, workers who are at potentially risk due to their working in areas of identified contamination will be provided with suitable PPE.

- Ensuring good hygiene is enforced on site and washing facilities are maintained on the site. Workers are discouraged from smoking, eating or drinking without washing their hands first.

- Ensuring site personnel report any unusual complaints, such as skin rashes, nausea, light-headedness etc. which may be attributable to the contamination on the site.

- Ensuring that dust suppression measures are put into practice where contamination is becoming airborne.

- Site drainage should be prevented from entering the adjacent watercourse.

- Where necessary contamination will be prevented from dirtying adjacent highways, a wheel-wash or other method for cleaning vehicles may be required.

Where contaminated materials are being removed from the site they should be disposed of at a suitably licensed landfill, with a 'duty of care' system in place and maintained throughout the disposal operations. The classification of contaminated soils for disposal is dependent upon the individual landfill operator, which is in term dependent upon the operator's license.

C. Discovery Strategy

There is the possibility that other sources of contamination may be present on the site which were not detected during the investigation. Should such contamination be identified or suspected during the site clearance or ground works, these should be dealt with accordingly. A number of options are available for handling this material, which include:

- The removal from site and disposal to a suitably licensed tip of all material suspected of being contaminated.

- Short-term storage of the suspected material while undertaking verification testing for suspected contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area.

- Treatment of the identified contamination in accordance with the site-specific Remediation Method Statement.

- Having a suitably experienced Environmental Engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

Should any anomalous materials be identified within the soils, the Regulatory Authorities should be informed and where necessary the remedial strategy agreed.

APPENDICES

APPENDIX 1 - ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ACM	Asbestos containing material
ADE	Average daily exposure
ASPT	Average score per Taxon
BOD	Biochemical oxygen demand
BH	Borehole
BRE	Building Research Establishment
BS	British Standard
BTEX	Benzene, Toluene, Ethyl benzene and Xylenes
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CLR	Contaminated Land Research reports
DEFRA	Department of the Environment, Food and Rural Affairs (formerly the DoE and DETR)
DETR	Department of the Environment, Transport and the Regions (formerly the DoE and now Defra)
DO	Dissolved oxygen
DoE	Department of the Environment (then DETR and later Defra)
DQRA	Detailed quantitative risk assessment (Tier 2)
EA	Environment Agency
EPH	Extractable petroleum hydrocarbons
EQI	Environmental Quality Index
EQS	Environmental Quality Standards
GQRA	Generic quantitative risk assessment (Tier 1)
mAOD	Metres above ordnance datum
mbgl	Metres below ground level
NGR	National grid reference
NHBC	National House Building Council
NRA	National Rivers Authority (now the Environment Agency)
PACM	Potentially asbestos containing material

APPENDIX 2 – REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports, and most importantly CLR Report 3 ref. R.1.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use should another end-use been intended a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The report is limited to those aspects of land contamination specifically reported on and is necessarily qualified accordingly, no liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present unrecorded land uses both on~ and off~ site and the potential for associated contaminant migration. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

APPENDIX 3 – REFERENCES

R.1. The Environmental Protection Act, Part IIA, Section 78, 1990.

R.2. Environment Act 1995, Section 57, DoE 1995.

R.3. British Standards Institute: BS 10175 'Code of practice for the investigation of potentially contaminated sites', BSI 2011+A1:2013.

R.4. British Standards Institute: BS 5930 'Code of practice for ground investigations', 2015.

R.5. CLR 1, 'A framework for assessing the impact of contaminated land on groundwater and surface water', Report by Aspinwall & Co., DoE 1994.

R.6. CLR 2, 'Guidance on preliminary site inspection of contaminated land', Report by Applied Environmental, DoE 1994.

R.7. CLR 3, 'Documentary research on industrial sites', Report by RPS Consultants Ltd, DoE 1994.

R.8. CLR 4, 'Sampling strategies for contaminated land'. Report by The Centre for Research into the Built Environment, the Nottingham Trent University, DoE, 1994.

R.9. CLR 6, 'Prioritisation & categorisation procedure for sites which may be contaminated', Report by M J Carter Associates, DoE 1995.

R.10. CLR 8, 'Potential contaminants for the assessment of contaminated land'. Defra/EA, March 2002. (Withdrawn)

R.11. CLR 11, 'Model procedures for the management of contaminated land: Risk assessment procedure', DoE 2011.

R.12. Methods for the determination of hazardous substances (MDHS) "100 Surveying, sampling and assessment of asbestos-containing materials" HSE, July 2001.

R.13. CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', The Chartered Institute of Environmental Health, May 2008.

R.14. Land Quality Management/Chartered Institute of Environmental Health Generic Assessment Criteria for Human Health Risk Assessment (2nd edition). Land Quality Press, Beeston, Nottingham, UK, 2009.

R.15. EIC/AGS/CL:AIRE. Soil Generic Assessment Criteria for Human Health Risk Assessment. Contaminated Land: Applications in Real Environments, London, UK, 2009.

R.16. BRE Digest 465, 'Cover Systems for Land Regeneration – Thickness Cover Systems for Contaminated Land', 2004.

R.17. Water Regulations Advisory Scheme, Information and Guidance Note, October 2002, 'The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land'.

R.18. Anglian Water "Standards for Mainlaying in Contaminated Land", Standard No. WSV-STD-001, September 2001.

R.19. MCERTS performance standard for laboratories undertaking chemical testing of soil, Briefing note 7: Estimation of Soil Organic Matter (SOM) October 2005; http://publications.environment-agency.gov.uk/pdf/GEHO1005BKBE-e-e.pdf?lang=_e.

R.20. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2), Contaminated Land: Applications in Real Environments (CL:AIRE) September 2014.

R.21. Land Quality Press, The LQM/CIEH S4ULs for Human Health Risk Assessment.

APPENDIX 4 – LABORATORY RESULTS

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QTS Environmental Report No: 17-56842

Site Reference:	Greenwich View Place
Project / Job Ref:	1580,GI
Order No:	None Supplied
Sample Receipt Date:	23/03/2017
Sample Scheduled Date:	24/03/2017
Report Issue Number:	1
Reporting Date:	30/03/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

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4480

Soil Analysis Certificate							
QTS Environmental Report No: 17-56842	**Date Sampled**	21/03/17	21/03/17	21/03/17		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	**TP / BH No**	TP201	TP202	TP203		
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.50	1.10	1.50		
Reporting Date: 30/03/2017	**QTSE Sample No**	259938	259939	259940		

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	7.0	7.8	8.2		
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	49	107	71		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.05	0.11	0.07		
Organic Matter	%	< 0.1	MCERTS	3.5	1.6	1.3		
Arsenic (As)	mg/kg	< 2	MCERTS	13	15	18		
Barium (Ba)	mg/kg	< 5	NONE	61	193	104		
Beryllium (Be)	mg/kg	< 0.5	NONE	0.9	0.6	0.6		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3	0.5	0.4		
Chromium (Cr)	mg/kg	< 2	MCERTS	28	21	16		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	21	84	43		
Lead (Pb)	mg/kg	< 3	MCERTS	52	480	287		
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		
Molybdenum (Mo)	mg/kg	< 1	NONE	< 1	1.5	1.1		
Nickel (Ni)	mg/kg	< 3	MCERTS	19	18	17		
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3		
Vanadium (V)	mg/kg	< 2	NONE	51	38	35		
Zinc (Zn)	mg/kg	< 3	MCERTS	90	322	131		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Graham Revell

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis $^{(S)}$

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4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-56842	Date Sampled	21/03/17	21/03/17	21/03/17		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	TP / BH No	TP201	TP202	TP203		
Project / Job Ref: 1580,GI	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.50	1.10	1.50		
Reporting Date: 30/03/2017	QTSE Sample No	259938	259939	259940		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.90	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	0.17	1.21	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	0.68	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	1.71	1.33	0.34		
Anthracene	mg/kg	< 0.1	MCERTS	0.32	0.27	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	2.20	1.61	0.68		
Pyrene	mg/kg	< 0.1	MCERTS	1.73	1.35	0.59		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.60	0.58	0.26		
Chrysene	mg/kg	< 0.1	MCERTS	0.95	0.86	0.37		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.74	0.98	0.45		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.39	0.49	0.23		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.41	0.72	0.37		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.27	0.55	0.23		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.26	0.46	0.24		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	9.7	12	3.7		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Unit 1, Rose Lane Industrial Estate
Rose Lane
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Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-56842	Date Sampled	21/03/17	21/03/17	21/03/17		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	TP / BH No	TP201	TP202	TP203		
Project / Job Ref: 1580,GI	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.50	1.10	1.50		
Reporting Date: 30/03/2017	QTSE Sample No	259938	259939	259940		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21		
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21		
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - BTEX / MTBE							
QTS Environmental Report No: 17-56842	Date Sampled	21/03/17	21/03/17	21/03/17		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	TP / BH No	TP201	TP202	TP203		
Project / Job Ref: 1580,GI	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.50	1.10	1.50		
Reporting Date: 30/03/2017	QTSE Sample No	259938	259939	259940		

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-56842	**Date Sampled**	21/03/17	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: Greenwich View Place	**TP / BH No**	TP202	
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	
Order No: None Supplied	**Depth (m)**	1.10	
Reporting Date: 30/03/2017	**QTSE Sample No**	259939	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.9	3%	5%	6%
Loss on Ignition	%	< 0.01	4.30	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	12	100	--	--
pH[MU]	pH Units	N/a	7.8	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.5	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.07	0.04		0.5	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	0.02	0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.015	0.006		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	0.017		< 0.2	0.5	10	50
Antimony[U]	0.034	0.016		0.17	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	0.006	0.005		< 0.2	4	50	200
Chloride[U]	20	4		47	800	15000	25000
Fluoride[U]	5	2.9		30.5	**10**	150	500
Sulphate[U]	70	12		159	1000	20000	50000
TDS	173	63		710	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	15.5	6.6		72.6	500	800	1000

Leach Test Information						
Sample Mass (kg)	0.22					
Dry Matter (%)	80.3					
Moisture (%)	24.6					
Stage 1						
Volume Eluate L2 (litres)	0.31					
Filtered Eluate VE1 (litres)	0.13					

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-56842	
Geosphere Environmental Ltd	
Site Reference: Greenwich View Place	
Project / Job Ref: 1580,GI	
Order No: None Supplied	
Reporting Date: 30/03/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
259938	TP201	None Supplied	0.50	18.6	Brown clay
259939	TP202	None Supplied	1.10	8.9	Brown sandy gravel with stones
259940	TP203	None Supplied	1.50	11.2	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-56842
Geosphere Environmental Ltd
Site Reference: Greenwich View Place
Project / Job Ref: 1580,GI
Order No: None Supplied
Reporting Date: 30/03/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10 C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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QTS Environmental Report No: 17-57344

Site Reference:	Greenwich View Place
Project / Job Ref:	1580,GI
Order No:	None Supplied
Sample Receipt Date:	06/04/2017
Sample Scheduled Date:	06/04/2017
Report Issue Number:	2
Reporting Date:	18/04/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Ela Mysiara
Inorganics & ICP Section Head

QTSE is the trading name of DETS Ltd, company registration number 03705645

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Soil Analysis Certificate						
QTS Environmental Report No: 17-57344	**Date Sampled**	04/04/17	04/04/17	04/04/17		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	**TP / BH No**	TP204	TP205	TP206		
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.50	1.10	1.50		
Reporting Date: 18/04/2017	**QTSE Sample No**	261858	261859	261860		

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	8.9	8.3	9.7		
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	333	296	666		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.33	0.30	0.67		
Organic Matter	%	< 0.1	MCERTS	1.4	0.7	1.1		
Arsenic (As)	mg/kg	< 2	MCERTS	37	21	15		
Barium (Ba)	mg/kg	< 5	NONE	270	154	129		
Beryllium (Be)	mg/kg	< 0.5	NONE	0.8	0.6	0.7		
W/S Boron	mg/kg	< 1	NONE	< 1	1.6	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.9	0.4	0.4		
Chromium (Cr)	mg/kg	< 2	MCERTS	18	18	18		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	145	41	35		
Lead (Pb)	mg/kg	< 3	MCERTS	837	681	240		
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		
Molybdenum (Mo)	mg/kg	< 1	NONE	1	1.2	1.3		
Nickel (Ni)	mg/kg	< 3	MCERTS	19	15	15		
Selenium (Se)	mg/kg	< 3	NONE	3	< 3	< 3		
Vanadium (V)	mg/kg	< 2	NONE	39	38	33		
Zinc (Zn)	mg/kg	< 3	MCERTS	2000	119	142		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Graham Revell

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis [S]

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-57344	**Date Sampled**	04/04/17	04/04/17	04/04/17		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	**TP / BH No**	TP204	TP205	TP206		
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.50	1.10	1.50		
Reporting Date: 18/04/2017	**QTSE Sample No**	261858	261859	261860		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	1.08	0.37		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	0.16	1.57	0.36		
Fluorene	mg/kg	< 0.1	MCERTS	0.12	1.77	0.31		
Phenanthrene	mg/kg	< 0.1	MCERTS	1.89	13.80	3.93		
Anthracene	mg/kg	< 0.1	MCERTS	0.59	5.39	1.01		
Fluoranthene	mg/kg	< 0.1	MCERTS	4.68	12.20	4.43		
Pyrene	mg/kg	< 0.1	MCERTS	4.03	10	3.54		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.06	4.92	1.59		
Chrysene	mg/kg	< 0.1	MCERTS	2.12	4.77	1.68		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	2.53	4.36	1.85		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.12	1.92	0.70		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.84	3.55	1.36		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.08	1.73	0.83		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.13	0.25	0.12		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	1.03	1.36	0.77		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	23.4	68.7	22.8		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-57344	**Date Sampled**	04/04/17	04/04/17	04/04/17		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	**TP / BH No**	TP204	TP205	TP206		
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.50	1.10	1.50		
Reporting Date: 18/04/2017	**QTSE Sample No**	261858	261859	261860		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	18	< 10	< 10		
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21		
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	5	< 2		
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	9	43	15		
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	59	38	19		
Aromatic (C5 - C35)	mg/kg	< 21	NONE	68	86	34		
Total >C5 - C35	mg/kg	< 42	NONE	86	86	< 42		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 17-57344	Date Sampled	04/04/17	04/04/17	04/04/17		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Greenwich View Place	TP / BH No	TP204	TP205	TP206		
Project / Job Ref: 1580,GI	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.50	1.10	1.50		
Reporting Date: 18/04/2017	QTSE Sample No	261858	261859	261860		

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Soil Analysis Certificate - PCB (7 Congeners)						
QTS Environmental Report No: 17-57344	**Date Sampled**	04/04/17	04/04/17			
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Greenwich View Place	**TP / BH No**	TP204	TP205			
Project / Job Ref: 1580,GI	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.50	1.10			
Reporting Date: 18/04/2017	**QTSE Sample No**	261858	261859			

Determinand	**Unit**	**RL**	**Accreditation**					
PCB Congener 28	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 52	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 101	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 118	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 138	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 153	mg/kg	0.008	NONE	< 0.008	< 0.008			
PCB Congener 180	mg/kg	0.008	NONE	< 0.008	< 0.008			
Total PCB (7 Congeners)	mg/kg	< 0.1	NONE	< 0.1	< 0.1			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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4480

Soil Analysis Certificate - Sample Descriptions
QTS Environmental Report No: 17-57344
Geosphere Environmental Ltd
Site Reference: Greenwich View Place
Project / Job Ref: 1580,GI
Order No: None Supplied
Reporting Date: 18/04/2017

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
261858	TP204	None Supplied	0.50	10	Brown sandy gravel with stones
261859	TP205	None Supplied	1.10	6.4	Brown sandy gravel with stones
261860	TP206	None Supplied	1.50	7.4	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information

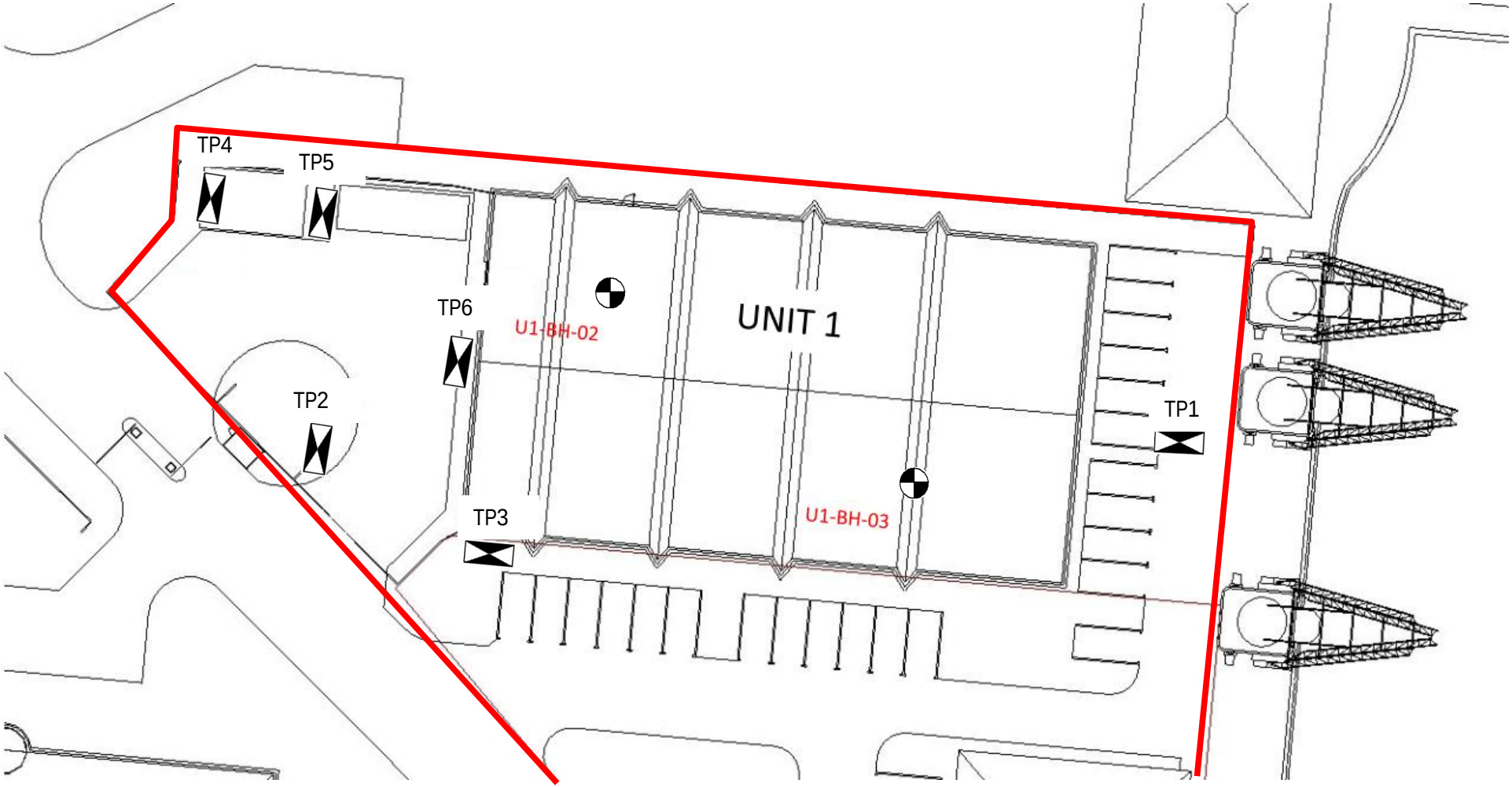
QTS Environmental Report No: 17-57344
Geosphere Environmental Ltd
Site Reference: Greenwich View Place
Project / Job Ref: 1580,GI
Order No: None Supplied
Reporting Date: 18/04/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

APPENDIX 5 – DRAWINGS

Exploratory Hole Location Plan – Drawing ref. 1580,GI,002/Rev 0



LEGEND:

- Former borehole locations
- Trial pit locations
- Site boundary

N

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SITE	TITLE	REPORT NO.	DRAWING NO.	DATE
Unit 1, The Point, Greenwich View Place, Isle of Dogs, London E14 9NN	Exploratory Hole Location Plan	1580,GI	002 / Rev 0	April 2017
	CLIENT: ARC:MC	DRAWN BY: SG	CHECKED: CJ	SCALE: Not to scale

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