Geo-Environmental Report (CAT1)

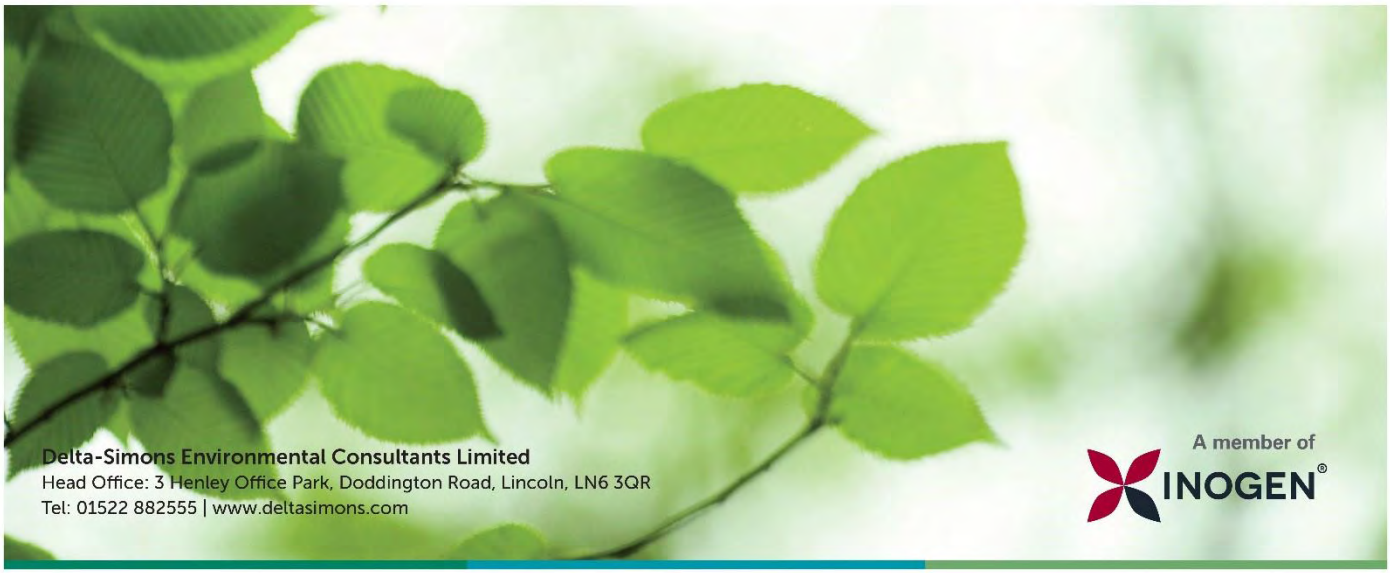
Turing House Free School, Hospital Bridge Road, Hounslow, TW2 6LH

Presented to **Bowmer and Kirkland**

Issued: April 2018

Delta-Simons Project No. 18-0170.01

deltasimons



Delta-Simons Environmental Consultants Limited
Head Office: 3 Henley Office Park, Doddington Road, Lincoln, LN6 3QR
Tel: 01522 882555 | www.deltasimons.com

A member of INOGEN®

Report Details

Client	Bowmer and Kirkland
Report Title	Geo-environmental Report – (CAT1)
Site Address	Hospital Bridge Road, Hounslow, TW2 6LH
Project No.	18-0170.01
Report Date	April 2018
Delta-Simons Contact	Paul Huteson (paul.huteson@deltasimons.com)

Quality Assurance

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
1	Final	11/04/2018				
				David Piris Geo-Environmental Consultant	Paul Huteson Principal	Paul Bennett Unit Director

About us

Delta-Simons is a trusted, multidisciplinary environmental consultancy, focused on delivering the best possible project outcomes for customers.

Specialising in Environment, Health & Safety and Sustainability, Delta-Simons provide support and advice within the property development, asset management, corporate and industrial markets. Operating from nine locations – Lincoln, Birmingham, Dublin, Durham, Leeds, London, Manchester, Norwich and Nottingham - we employ over 70 environmental professionals, bringing experience from across the private consultancy and public sector markets.

Delta-Simons is proud to be a founder member of the Inogen® Environmental Alliance, enabling us to efficiently deliver customer projects worldwide by calling upon over 4,330 resources in our global network of consultants, each committed to providing superior EH&S and sustainability consulting expertise to our customers. Inogen® Environmental Alliance offers its clients more consultants, with more services in more countries than the traditional multinational consultancy.

Table of Contents

1.0 INTRODUCTION 1
1.1 Authorisation 1
1.2 Context & Purpose 1
1.3 Scope 1
2.0 INVESTIGATION METHODOLOGY 3
2.1 Desk Study 3
2.2 Conceptual Site Model 3
2.3 Planning, Health & Safety (CDM), Setting Out & Services 4
2.4 Dynamic Sampler Boreholes 4
2.5 Cable Percussion Boreholes 4
2.6 Standpipe Installations 5
2.7 Dynamic Penetration Tests and Standard Penetration Tests 5
2.8 BRE365 Soakaway Testing 5
2.9 Trial Pits 5
2.10 Monitoring Groundwater & Ground Gas 5
2.11 Chemical Analysis 5
2.12 Geotechnical Testing 5
2.13 Generic Quantitative Risk Assessment (GQRA) 5
3.0 RESULTS & INTERPRETATION 7
3.1 Previous Report Review and Environmental Setting 7
3.2 Fieldworks Interpretation 11

Figures

Figure 1 Site Location Map
Figure 2 Relevant Feature Plan
Figure 3 Approximate Intrusive Location Plan

Appendices

Appendix A Limitations
Appendix B Risk Definitions
Appendix C Key to Logs, Field Records & Compliance Certificates
Appendix D BRE365 Infiltration Report Sheets
Appendix E Monitoring Records
Appendix F Chemical Analysis
Appendix G Geotechnical Testing
Appendix H Generic Assessment Criteria

1.0 Introduction

1.1 Authorisation

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by Bowmer and Kirkland (the "Client") to undertake a site investigation at land located off Hospital Bridge Road, Hounslow, TW2 6LH (hereafter referred to as the "Site"), prior to development of a three storey teaching block, two storey sports block and associated sports pitches, landscaped areas and access and parking. The location of this Site is shown on Figure 1.

1.2 Context & Purpose

This Report has been undertaken generally in accordance with British Standard BS 5930:2015 Code of practice for site investigations, and is intended as a Geotechnical Category 1 (CAT1) report in accordance with British Standard BSEN1997-1:2004 Eurocode 7: Geotechnical Design – Part 1: General rules, or as part of a preliminary investigation in a Geotechnical Category 2 situation.

In addition, this Report provides a brief review of previous third party reports pertaining to the Site:

- Geo-Environmental and Geotechnical Desk Study, Hospital Bridge Road, Hounslow, Project No. 11677-14, dated September 2017, by Campbell Reith LLP; and
- Phase II Environmental and Geotechnical Site Investigation Report, Hospital Bridge Road, Twickenham. Project No. HLEI49195/001R. Dated August 2017,by Campbell Reith LLP.

The purpose of this investigation was to obtain further information on the geo-environmental ground conditions following the third party investigations and obtain data on chemical and geotechnical parameters at the Site for use by the Client considering potential development planning, design and engineering for construction.

This Report has been based on a review of the previous third party desk study together with fieldworks comprising soil sampling. Selected soil samples were scheduled for laboratory chemical analysis and geotechnical testing. Monitoring was carried out on the Site for water levels and concentrations of hazardous ground gas.

The results of the sampling, with the relevant laboratory work, have been presented in the Appendices.

The methods of the fieldworks have been described in Section 2.

The interpretation of the results has been presented as a table in Section 3 with a revised conceptual site model (CSM) and risk assessment based on the source-pathway-receptor principle and recommendations for aspects of planning design and construction.

Foundation design may be undertaken by engineers using methods as described in Building Regulations/Standards, National House Building Council (NHBC) Standards, Building Research Establishment (BRE) guidance or if appropriate British Standard BS 8103-1:2011 Structural design of low-rise buildings — Part 1: Code of practice for stability, site investigation, foundations and ground floor slabs for housing. Recommendations with respect to the ground conditions for the assistance of the engineer as designer based on local knowledge and experience of past projects in the region is also provided.

1.3 Scope

The scope of works performed for this Report were provided by the Clients Engineer (Curtins) and comprised the following:

- Review of previous third party reports pertaining to the Site;
- Appointment of a specialist service avoidance contractor;
- Appointment of a specialist unexploded ordnance (UXO) contractor for the duration of the works;

- Drilling of 3 no. cable percussion boreholes (CP101 to CP103) with standard penetration tests (SPTs) to depths of 10.0 m bgl;
- Drilling of 8 no. dynamic sampler boreholes (DS101 to DS108) with dynamic penetration tests (DPTs) to a maximum depth of 4.0 m bgl;
- Installation of CP102, CP103, DS104 and DS105 as 50 mm internal dimeter ground gas and groundwater level monitoring wells;
- Excavation of 4 no. trial pits (TP101 to TP104) to a maximum depth of 0.5 m bgl around the previous third party location (HP08) for asbestos delineation works;
- Completion of 6 no. TRL Dynamic Cone Penetrometer (DCP) tests;
- Excavation and soil sampling within the existing soil mounds for waste classification testing;
- Full time Site attendance during the investigation works with soil logging to BS5930:2015;
- Geotechnical testing of disturbed and undisturbed samples for determination of representative moisture content, liquid and plastic limits in clay soil/PSD in granular soil;
- Chemical testing for soils for 10 heavy metals, speciated PAH, TPH/ sTPH, and asbestos screen;
- Completion of 3 no. BRE365 soakaways (SA101 to SA103);
- Testing of three locations (Core 1 to Core 3) of the existing asphalt to determine the presence of coal tar;
- Collection of 3 no. samples for Waste Acceptance Criteria (WAC) from the existing soil mounds;
- Three (3 no.) return visits for monitoring ground gas and groundwater level in the borehole standpipes; and
- Provision of Factual and Interpretative Report.

According to BSEN 1997-1:2004+A1:2013, Geotechnical Category 1 (GC1) should only include small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations with negligible risk. The designer/engineer is responsible for checking the Client's requirements for compliance with the Eurocodes, and GC1.

This Report may exceed the minimum standards by inclusion of some quantitative data to support local knowledge and experience in making recommendations.

2.0 Investigation Methodology

2.1 Desk Study

Guidance on desk study practice and interpretation for contaminated land is provided in British Standard BS10175:2011+A1:2013 *Code of practice for investigation of potentially contaminated sites*, and the Environment Agency publication CLR11 *Model Procedures for the management of land contamination*, plus associated documents including Department of the Environment Industry Profiles.

Desk study practice for geotechnical aspects is described in BS5930:2015 and to a limited extent in British Standard BSEN1997-2:2007 *Eurocode 7: Geotechnical Design – Part 2: Ground investigation and testing*. As part of a limited investigation, the full requirements of a geotechnical desk study may not be completed.

The desk study report is intended to comply with NHBC Standards Chapter 4.1 *Land quality - managing ground conditions*, and typical minimum requirements for local planning authorities (LPAs) for low risk projects.

It is considered that the previous third party desk study report, dated 2017, remains suitable and is summarised briefly as part of this Report.

2.2 Conceptual Site Model

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors. Where all three components may be present on a risk basis an identification and assessment of Possible Pollutant Linkages (PPL) is achieved. Assessing risk in land contamination underpins the “suitable for use” approach adopted for Part 2A of the EPA 1990 regulatory regime and government guidance on land affected by contamination (published 12 June 2014 on gov.uk web site).

Risk is based on the assessor’s judgement and a Delta-Simons standard approach. The standard approach is derived from government guidance and uses defintions and a matrix system derived from government guidance and CIRIA document C552 (Contaminated land risk assessment. A Guide to Good Practice).

Sources are listed as part of hazard identification and for this report typically comprise soil and groundwater contaminants on-Site, or off-site where potentially mobile across property boundaries. Ground gas hazards are always considered mobile and subject to ground conditions. Waste items including asbestos are also considered, as are; soil stockpiles, chemical stores and obviously presented invasive weeds.

Relevant potential receptors are considered to include:

- R1 - Construction workers.
- R2 - Third parties during construction (adjacent site users and adjacent residents).
- R3 - Future residents.
- R4 - The underlying Aquifer / Controlled waters.
- R5 - The Built Environment (new buildings and infrastructure).
- R6 – Plants, trees and shrubs in proposed landscaped areas.

Relevant potential pathways are considered to include:

- P1 - Direct contact, ingestion or inhalation of soil bound contaminants / dust during redevelopment.
- P2 - Inhalation of vapours associated with contamination.
- P3 - Migration of ground gas into on-site buildings causing asphyxiation or risk of explosion.
- P4 - Leaching of contamination into groundwater followed by migration to the wider environment or surface waters.
- P5 - Direct contact between aggressive ground conditions and new infrastructure.
- P6 – Plant uptake

Where hazards are identified, a Preliminary Risk Assessment (PRA) is undertaken to assess the PPL, and to apply a justified risk ranking (very low - high). Where the PPL is sufficient to result in land being considered as 'contaminated land' under the terms of Part 2A of the Environmental Protection Act (EPA) 1990, a Significant Pollutant Linkage (SPL) may be defined.

An initial CSM and PRA is presented within the third party desk study report, dated 2017, which is considered to remain relent. A revised CSM is presented within this Report which takes into account the relevant findings of Delta-Simons field and laboratory outcomes.

Appendix B also contains the applied risk definitions and matrices.

2.3 Planning, Health & Safety (CDM), Setting Out & Services

Unless otherwise stated, the investigation has been planned on a scope of works agreed with the Client which is typically based on multiples of one day on-Site with various drilling and sampling equipment, or a measured amount of drilling and testing.

For most projects Delta-Simons adopts a role equivalent to principal contractor (PC) where none exists for the project and complies a construction phase plan (CPP) The CPP is incorporated into a comprehensive Health and Safety Plan with relevant information, risk assessments and method statements where applicable intended to keep the field staff safe.

Clients are requested to provide all service plans in original form from suppliers so a service avoidance risk assessment (SARA) can be undertaken as part of a formal Site-specific Health and Safety Plan. The SARA is based on guidance provided in HSG47 Avoiding danger from underground services.

Exploratory hole and subsequent sample locations are selected to provide suitable coverage of the Site, having regard for the likely presence of services and any other constraints such as existing structures and sub-structures. Where applicable, suspected emissions locations, or geological variations may have been targeted.

The locations of the investigations are shown on Figure 3 and the field records are provided in Appendix C.

2.4 Dynamic Sampler Boreholes

Dynamic sampler borehole systems are not explicitly described in Eurocodes, or in the relevant British Standard BSENISO 22475-1:2006 Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution.

The dynamic sampler system comprises a series of varying diameter metal tubes of 1 m or 2 m length, which allows a liner to be inserted. The tubes are driven into the ground using a percussive weight falling through a standard drop onto an anvil attached to solid rods, and withdrawn by use of a hydraulic jack. The soil is pushed into the tube/liner during the driving, and samples are recovered from the tube once it has been split for description. Alternatively, liners are omitted and the metal tubes have slots or windows cut into the sides where samples can be taken directly by hand. The liner method potentially offers a lower degree of sample disturbance.

The system can achieve typical depths of around 3 m to 5 m in favourable soil conditions. The system is limited by coarse gravel or other large fragments, and also in wet sands where the hole collapses. Some casing systems exist. The details of the ground conditions encountered are presented on the relevant field record sheets, which also detail the type and depths of samples taken and the results of any in-situ tests. Other relevant information may also be recorded including groundwater levels and details of any standpipe installations.

2.5 Cable Percussion Boreholes

Cable percussion borehole techniques are described in British Standard BSENISO 22475-1:2006 Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution.

2.6 Standpipe Installations

Two of the cable percussion and two of the dynamic sampler boreholes have been fitted with a gas/water monitoring standpipe of 50 mm internal diameter UPVC slotted and plain casing to the required depth as appropriate, capped by a gas tap bung and cover generally in accordance with BSENISO 22475-1:2006 for an open standpipe. The locations of the monitoring installations are shown on Figure 3.

2.7 Dynamic Penetration Tests and Standard Penetration Tests

Dynamic penetration testing is undertaken in accordance with BS EN ISO 22476-2:2005+A1:2011 *Geotechnical investigation and testing. Field testing. Dynamic probing*.

2.8 BRE365 Soakaway Testing

Soakaway testing is not covered in Eurocodes. In the absence of such guidance, the standard methodology is taken from BRE Digest 365 *Soakaway design*. A trial pit is excavated with a mechanical excavator to the required depth. A gravel pack is then installed along with two monitoring pipes. The remaining hole is backfilled with arisings. The gravel pack is filled with water and the water level measured at suitable intervals until either sufficiently empty or the time exceeds 24 hours. The test is repeated three times, unless instructed otherwise, and the infiltration rate calculated following BRE365 methods. The results are presented graphically as infiltration rate and included as Appendix D.

2.9 Trial Pits

Trial pits are mentioned in Eurocodes, and the relevant British Standard BSENISO 22475-1:2006 Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution. However, they are not specifically covered in detail compared to most borehole systems. Block sampling from trial pits is covered in BSENISO 22475-1:2006, but such sampling has not been necessary for this project.

In the absence of full Eurocode guidance, trial pits are undertaken generally in accordance with British Standard BS5930:2015 and other relevant publications such as BRE Digest 381 Site investigation for low-rise building: trial pits.

2.10 Monitoring Groundwater & Ground Gas

Groundwater monitoring is undertaken using an electronic dip meter, which records the depth to water in a standpipe. Ground gas composition and flow monitoring is undertaken where standpipes have been installed. Both flow (litres per hour) and composition (%) are measured using an infra-red gas monitor, calibrated for methane, carbon dioxide & oxygen. Records are also taken of atmospheric pressure. The monitoring field records are presented in Appendix E.

2.11 Chemical Analysis

The results of the chemical analysis are presented in Appendix F.

2.12 Geotechnical Testing

The results of the geotechnical testing are presented in Appendix G.

2.13 Generic Quantitative Risk Assessment (GQRA)

Human Health

In the absence of a statutory contamination thresholds in the UK a set of Generic Assessment Criteria (GAC derived principally using the Contaminated Land Exposure Assessment (CLEA) Framework have been adopted to assess the significance of the contamination encountered. The values adopted are for a residential without plant uptake end-use. The GAC adopted are principally for risks to human health and are detailed in Appendix H.

The Delta-Simons methodology for GQRA comprises comparison of limited chemical analysis results with the criteria for the most sensitive plausible end-use scenario in the proposed scheme.

Exceedance of criteria indicates that risk above “minimal” level may exist in a worst-case scenario across the whole Site. The precautionary principle is applied with respect to protection of human health recommending; further risk assessment (increased characterisation including extents/zones), or site-wide remediation.

If no criteria exceedance is observed, recommendations for further risk assessment, or remediation due to uncertainty over full characterisation of the Site.

Post-report action should be Site-specific and based on a Client’s resource/risk profile in undertaking developments in accordance with any regulator requirements. Under the planning control, the responsibility for a safe development remains with the Developer.

Controlled Waters

For the purposes of assessment of risks to controlled waters, where water samples have been obtained these have been compared to appropriate water quality standards.

Ground Gas

three rounds of ground gas monitoring have been undertaken to supplement previous as part of this assessment, the results of which are provided in Appendix E.

3.0 Results & Interpretation

3.1 Previous Report Review and Environmental Setting

Delta-Simons has undertaken a review of the previous 2017 third party reports, which are summarised in the following Section. It is considered the previous reports remain suitable for the proposed development.

Site Description & Walkover (Reconnaissance, Internet Air Photography)	A walkover at the Site was undertaken by Campbell Reith Hill LLP on 30th May 2017 and an updated walkover was undertaken by Delta-Simons on 6th March 2018. The Site at the time of the walkover dated March 2018 comprised a large open field with a number of smaller buildings present across the central areas, which were assumed (anecdotal evidence) to have been used for horses. The Site is relatively flat at approximately 20 m AOD. The Site walkover confirmed the third party desk study findings, with the Site being predominantly vacant flat land. An area in the east of the Site is used by the adjacent Garden Centre as a laydown and storage area. The walkover also noted a long ditch within the northern boundary, which was dry at the time of visiting. To the east of this ditch a shallow cutting is present leading down to a railway. The eastern boundary, with Hospital Bridge Road, comprises an embankment approximately 2-2.5m in height. This embankment rises towards the northern Site area forming a road bridge over the railway line. In addition, three earth mounds were noted during the walkover, all covered in vegetation. One is approximately 2m high and approximately 8m in length, situated to the south of the garden centre storage area. The other two are smaller, approximately 1m in height, and situated in the south west corner of the storage area and towards the central area of the Site, respectively. One or more of the mounds may be the result of fly tipping. The presence Asbestos Containing Materials (ACMs) cannot be discounted within the mounds. The Site, which lies in a largely residential area, is bound to the north by housing and a railway line. The eastern boundary comprises Hospital Bridge Road which rises up to cross the railway line. Beyond Hospital Bridge Road is housing. Beyond the south western boundary is housing along Stirling Road. A recreation ground, garages, and the gardens to houses on Springfield Road are present to the south west. A cemetery is present to the west. A plant nursery with associated growing areas, stockpiles of aggregate and vehicle parking is present directly adjacent the south eastern boundary.
Third Party Assessment Review	*Geo-Environmental and Geotechnical Desk Study, Hospital Bridge Road, Hounslow, Project No. 11677-14, dated September 2017.* The Site is mapped as being located on superficial River Terrace Deposits (Taplow Gravels). Bedrock is indicated as the London Clay Formation and is expected to be around 4.0 m in depth. Limited Made Ground is considered to be present given the history of the Site. The Site is not in an area affected by coal mining or other forms of mining although it should be noted that some surrounding areas have been worked for gravel. The Site is not located in an SPZ, the superficial deposits are classified as a Principal Aquifer and the bedrock as Unproductive Strata. No groundwater abstractions are located in close proximity to the Site.

	Historical boreholes suggest high groundwater levels in the area. A drainage ditch runs along the northern boundary. The River Crane is located approximately 700 m south-west. No surface water abstractions are located within close proximity to the Site. Reference to the Health Protection Agency Radon Atlas, UK Radon Map and BRE211 indicates that the Site is in an area where less than 1% of homes are above the action level and where full or basic radon protection measures are not required. The 1869 map edition shows the Site as undeveloped. From 1920, the south and north-eastern parts of the Site are occupied by orchards. By 1966, a drain had been introduced along the northern boundary of the Site. Bridge Farm nursery and additional small buildings were constructed in the southeast of the Site in the 1999 map edition. The present-day Site status comprises approximately ten small buildings with an assumed equestrian use. Off-Site historical land uses from the 1869 map edition shows Windsor Railway line which ran north south along the eastern boundary of the Site. Other parcels of land are shown to be undeveloped and comprised either orchards or undefined land. By 1874, buildings are shown to the northeast of the land beyond the railway. Lodge house was shown to be present approximately 10m southwest of the Site. The 1896 edition shows additional railway tracks added approximately 250 m north of the Site to link east and north railway lines. Between 1932 and 1938, land 150 m northwest of the Site underwent residential development, a school approximately 250 m north of the Site is developed and further residential development (to the south and north of the Site) was undertaken. By 1946, the area north of the Site was developed into a residential area. Between 1960 and 1966, large buildings were developed alongside the east side boundary and a cemetery was recorded to the west of the Site. Bridge Farm Nursery was established to the south east, and an area labelled “recreation ground” was established. A clay borrow pit was present to the south of the nursery. By 1966, the borrow pit is no longer shown. Further housing is shown to have been constructed to the east and north of the Site by 1975. No significant changes are then made until present day. Given the proximity of the Site to central London, a UXO assessment was required. The Site is located approximately 800 m southeast of Hounslow Heath used historically as military grounds. Considering this information, the Site was classified to have a moderate risk of UXO being encountered at the Site. A detailed UXO risk assessment was therefore recommended to be required before any intrusive activities could take place. Based on the information provided by the desktop assessment, the likely sources of contamination identified comprise Made Ground, vehicle parking areas, potential fly tipped material associated with mounds and railway associated fill material being used for levelling grounds. Based on the Site history and surrounding land use, the Site therefore was considered to present a low risk with regards to potential contamination. *Phase II Environmental and Geotechnical Site Investigation Report, Hospital Bridge Road, Twickenham. Project No. HLEI49195/001R. Dated August 2017.* The ground investigation associated with this report undertook the following scope of works: ▲ Three cable percussion boreholes (BH1-BH3) to depths of approximately 7.00 m bgl;

	▲ Standard Penetration Testing (SPT) and geotechnical soil sampling throughout the depth of each borehole; ▲ Installation of groundwater/ gas monitoring wells in each borehole; ▲ Dynamic Cone Penetrometer (DCP) in eight locations; and ▲ Twelve hand dug pits to depths of up to 0.50 m bgl. The identified ground conditions comprised: ▲ Made Ground (light brown gravelly clayey fine to medium sand with gravel of flint and brick) to depths between 0.30 and 0.45 m bgl; ▲ Taplow Gravel Formation (orangish brown sandy fine to coarse subrounded to rounded flint gravel) to depths between 3.05 and 4.30 m bgl where proven; and ▲ London Clay Formation (grey clay) to a maximum depth of 7.00 m bgl. Groundwater strikes could not be identified during intrusive works due to water being added to aid drilling through granular strata. Depth to groundwater recorded during return monitoring ranged between 2.40 m bgl and 2.62 m bgl. No visual or olfactory evidence of contamination was identified in soils or groundwater. Fifteen soil samples were collected from the borehole arisings and submitted for analysis of 10 heavy metals, hexavalent chromium, speciated TPH CWG (including benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tert-butyl ether (MTBE) and monohydric phenol), sPAH and asbestos screen. Soil samples collected from BH1-BH3 and HP1-HP12 were submitted for WAC analysis. No inorganic determinands, PAH, TPH CWG (incl. BTEX/MTBE) or total phenols were detected in any of the samples tested. Asbestos chrysotile fibres were recorded in a sample of Made Ground from hand pit HP8 located in the southwest corner of the Site, at a depth of approximately 0.25 m bgl. Testing on groundwater samples collected from monitoring wells BH1-BH3 concluded that no contaminants were recorded at concentrations in excess of relevant guidance values. The Waste Characterisation results stated that all submitted samples from all intrusive locations were classified as “Non-Hazardous” waste. Two samples from Made Ground and two samples from the Taplow Gravel Formation were submitted for WAC analysis. Both sets of samples were classified as “Non-Hazardous” waste. Leachate data for both sets of samples recorded one exceedance of the inert WAC threshold in a sample collected from HP1 at 0.20 m bgl. It was therefore recommended that the Made Ground samples are suitable for disposal to a non-hazardous waste landfill facility. The Taplow Gravel Samples were therefore deemed to be suitable for disposal at an inert waste landfill facility. SPT values for the Taplow Gravel Formation ranged between N=19 and N=50. Values recorded for the London Clay Formation ranged between N=11 and N=25. Following three rounds of ground gas monitoring a peak carbon dioxide concentration was identified at 4.6 % v/v with negligible methane concentrations.

	Oxygen concentrations ranged between 15.7 % v/v and 19.7 % v/v. A peak flow value of 0.3 l/hr was recorded, however steady flow values never exceeded <0.1 l/hr. Atmospheric pressure across all three monitoring events ranged between 1003mb and 1010mb. Volatile organic compounds (VOCs) were identified between <0.1 ppm and 2.6 ppm. Based on the findings of the report, significant contamination was not identified that warranted further investigation or specific remediation. However, the following recommendations were considered appropriate: ▲ Shallow soils and Made Ground should be excavated and disposed off-Site around the location of hand pit HP8; ▲ Based upon SPT data and geotechnical results, a traditional foundation solution for light to moderately loaded structures was recommended; ▲ Given the CBR data, a value of 5% was recommended; and ▲ From the gas monitoring data, the Site was classified as Characteristic Situation 1 (CS1) in accordance with BS8485:2015 or Green in accordance with NHBC guidance. As such, no ground gas protection measures were recommended in the construction of new dwellings. *Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment. Redfern Avenue, Hounslow. Project No. P6117. Dated August 2017.* The UXO report has identified that the most probable threat to the Site is posed by unexploded WWII German HE bombs, whilst IB's and British AAA projectiles could also be a residual threat. The Site area lies within Twickenham Municipal Borough which recorded 18 HE bomb strikes per 100 hectares. Luftwaffe aerial reconnaissance photography did not record any primary bombing targets associated with the Site, or within 1,000 m of the Site area. Railway lines immediately to the north of the Site, and an engine repair shed 655 m to the west may have been considered as secondary targets. ARP have no recorded any on-Site bomb strikes but have recorded five HE bomb strikes within 140 m of the Site boundary; 40 m to the south, 80 m and 140 m to the west and 95 m and 140 m to the north. Despite the Site area being undeveloped during WWII, it was identified that buildings were damaged approximately 220 m north and 390 m northeast of the Site. Prior to WWII, the Site area comprised orchards and undeveloped grounds. It is therefore unlikely that a UXB entry holes would have been observed and reported. The Site, being bound by a railway line, may have been inspected for UXB entry holes by the railway authorities nonetheless. Given the proximity of recorded bomb strikes, combined with the nature of the Site, and lack of redevelopment, the risk level associated with UXO is considered "Very High". The following is therefore recommended to mitigate against the designated risk level: ▲ Operation UXO Emergency Response Plan: Detailed outline of actions to be taken should a suspected or real UXO discovery take place; ▲ UXO Safety and Awareness Briefings: All personnel working on-Site should be briefed on the threat UXO poses, how to identify a UXO, and what actions should be taken to keep people and equipment away from such a hazard;

	▲ EOD Banksman Support: An EOD engineer should trial a non-intrusive geophysical UXO survey across the Site and if successful, employed to clear the Site of any potential UXB/UXO in advance of intrusive works; and ▲ Intrusive Magnetometer Survey: Should a piling foundation solution be implemented, a downhole magnetometer or MagCone survey is strongly recommended.

3.2 Fieldworks Interpretation

Scope of Investigation	The detailed scope of works undertaken as part of this assessment is detailed in Section 1.3, however is briefly summarised below: Dynamic Sampler Boreholes – 8 No. Dynamic Penetration Tests – 8 No. Cable Percussion boreholes with SPTs – 3 No. BRE Infiltration Tests – 3 No. TRL DCP – 5 No. Laboratory CBR – 2 No. Trial pits with soil mounds – 3 No. Trail pits around HP08 (asbestos delineation) – 4 No.
Site Specific Investigation Limitations	Boreholes were set out to avoid service locations. Three fills were not undertaken in SA102 and SA103 in line with BRE365 guidance given slow infiltration rates.
Geology from the Investigation Works	Made Ground or topsoil was encountered from the surface generally to depths of between 0.2 m and 0.7m bgl. The Made Ground/topsoil comprised brown clayey sandy gravel of flint. The underlying natural soils comprised brown sand and gravel of the Taplow Gravel Member, to a maximum depth of 5.4m bgl. Soft to stiff brown clay, London Clay Formation, was encountered to a proven depth of 10m bgl There were no visual or olfactory indications of significant contamination in the topsoil or the natural soil. The natural soil was considered to be generally representative of the published superficial geology for the Site and not significantly affected by mineral extraction. Groundwater was encountered in CP101 to CP103 at approximately 3.5 m bgl and rose to approximately 2.4 to 2.6 m bgl after 20 minutes.
Penetration Test Data *(DPTs or SPTs)*	The penetration testing recorded variable low to moderate resistance to penetration to depths of up to 2.0 m bgl. Very low resistance to penetration (including consecutive blow counts of 1) was recorded in DPT103 to DPT105 between approximately 3.0 and 4.0 m bgl.
Groundwater in Standpipes	Three monitoring visits of standpipes in CP102, CP103, DS104 and DS105 were completed between 14/03/2018 and 04/04/2018.

A summary of the readings is given below:

Borehole ID	Depth to water (m bgl)		Depth to base (m bgl)
	Max.	Min.	
CP102	2.30	2.30	10.00
CP103	2.12	1.85	4.80
DS104	2.48	2.41	3.30
DS105	2.28	1.31	2.50

See Appendix E for further details.

Gas in Standpipes

Three monitoring visits of standpipes in CP102, CP103, DS104 and DS105 were completed between 14/03/2018 and 04/04/2018 and the worst case gas scenario is summarised below.

Monitoring Location	No. of Monitoring Events	Methane (%v/v)	Carbon Dioxide (%v/v)	Oxygen (%v/v)	Flow Rate (l/hr)
		Max	Max	Min	Max
CP102	3	<0.1	3.3	18.9	2.2
CP103	3	<0.1	3.8	12.0	0.1
DS104	3	0.2	4.8	16.5	0.1
DS105	3	<0.1	3.8	16.8	0.1

Date	Conditions During Monitoring Round	
	Atmospheric Pressure (mb)	Weather Conditions
14/03/18	1002-1003 (Falling)	Dry, Overcast
21/033/18	1029	Dry, Overcast
04/04/18	993	Intermittent rain

See Appendix E for further details.

Chemical Analysis

Nine samples were scheduled for the following analytes: selected heavy metals suite, Total Petroleum Hydrocarbons (TPH) (total), speciated Polycyclic Aromatic Hydrocarbons (PAH) (EPA-16) and asbestos screen.

None of the samples tested exceeded the applied Generic Assessment Criteria for the proposed end use scenario with the exception of DS104, which identified marginally elevated concentrations of benzo(a)pyrene and dibenz(a,h)anthracene above their respective GAC for a residential with plant uptake end-use, however were identified below the guidance values for the public open space (residential) end use.

TPH was above the laboratory method detection recording a maximum concentration of 51 mg/kg.

Asbestos fibres were not detected in the samples tested from across the Site area. In addition, samples collected from the vicinity of HP08 (previously advanced location by third party) did not identify any further asbestos.

Asphalt Testing

Three asphalt samples were collected from existing hardstanding areas and submitted for the following analytes: Total Petroleum Hydrocarbons (TPH) (total), speciated Polycyclic Aromatic Hydrocarbons (PAH17) and leachable phenols.

Concentrations of marker compounds indicating the presence of potential coal tar were not identified and as such, it is considered that the existing asphalt is bitumen based.

WAC Testing

A total of three WAC samples were collected from the existing soil mounds on Site, which were noted to comprise of topsoil and sandy gravels with rare brick fragments and abundant roots. The WAC tests results should be submitted to a suitable disposal facility to confirm their classification, however it is likely that the soil mounds would be classified as non-hazardous for waste disposal purposes.

	In addition, the material from the soil mounds is suitable for re-use beneath areas of hardstanding and in conjunction with an appropriate Materials Management Plan (MMP).
Geotechnical Testing	Moisture content determinations, liquid and plastic limits, particle size distribution test and California Bearing Ratio (CBR) test were carried out. Moisture content was in the range 2.7 to 30 %. Clay of high volume change potential has been identified according to NHBC guidance. CBR was between 5.0 % and 6.3 %.
Foundation Recommendations	It is understood that the proposed structures at the Site are to comprise a three-storey teaching block and a two-story sports block. The natural ground conditions encountered in the boreholes comprised variable sand and gravel to underlain by clay typically encountered between 3.4m and 4m bgl. The clay was described as soft and firm. High to moderate resistance was recorded to depths of 3 m bgl however very low resistance to penetration was recorded at depths between approximately 3 to 4 m bgl however, increased with depth below 4m bgl. It is considered the lower resistance is consistent with encountering groundwater. Traditional strip or pad foundations are considered potentially suitable for the proposed structures dependent upon final load requirements. Using judgement and experience with check calculations, initial assessments indicate that a presumed safe bearing pressure of no more than 250 kN/m2 would be appropriate at a minimum depth of 1.0 m below existing ground level and beneath any Made Ground or unsuitable soil, however, the potential for increased settlement will be influenced by final loads and deepening of foundations where softer zones are impacted. Where the loadings or service performance described is insufficient for the purpose of the engineering design of suitable structures, alternative foundations such as piles may be required. Reinforcement of foundations is recommended where variable ground conditions are encountered or the foundations deepened wholly to found within one material type. Specialist contractor advice should be sought. Ground improvement or raft foundations are unlikely to be suitable at this location due to the variable depth of soft clay and the presence of shallow groundwater, however specialist advice should be sought. Should obviously loose/soft zones be encountered, foundation depth should be increased to more competent strata or the foundation designed to span the zone. The developer is not recommended to deepen the formation below soft zones because the ground may become weaker closer to the groundwater. Foundation casting should be undertaken in dry conditions and inspected by an engineer to prevent adverse effects from groundwater (running sands and water ingress) on the foundations and underlying strata. Measures to deal with ingress of water are likely to be required in excavations below standing groundwater level or should the excavation be left open for a period of time. Shallow foundations, services and earthworks excavations at the Site should be considered unstable, therefore, temporary support of all excavations should be considered when excavating on Site.

	Following the removal of Topsoil and Made Ground, ground bearing floor slabs are considered to be suitable on the underlying sands and gravels. However, should clays be identified at the Site, these have been identified as having high volume change potential and the potential for heave should be considered, however clay soils were identified below the likely final finished floor slab depth. No excavations should be entered until a full risk assessment is completed to assess stability requirements and safety issues. Vigilance is required during groundworks for unusual ground conditions, although considered unlikely, if encountered should be reported to the Client and may warrant further investigation. Care is required during groundworks not to adversely impact the formation.
Pavement Design	A total of five TRL DCP tests were undertaken across the Site to compliment previous DCP tests undertaken by a third party. The results of the additional DCP results (DCP101 to DCP105) at the likely formation depth (500 mm to 600 mm) ranged between 4.8 and 32%, with the exception of DCP103, which identified a value of 1.6 % at 200 mm depth. these results are consistent with the previous report, which identified values of between 5% and 130% at the likely formation level. A total of two laboratory CBRs were undertaken across the Site and identified values between 5.0 % and 6.3 % for brown gravelly sandy clay from between 0.2 and 0.6 m bgl. As such a design value of 5 % is recommended. CBR is dependent on the condition of the strata and could be different upon excavation to the formation subject to seasonal conditions. Clay soils are likely to be frost susceptible. The use of a geotextile is recommended where variable ground conditions are encountered or across changes in strata to protect against potential differential settlement.
Contamination	The Site does not have a clearly identified significant former industrial land use and there are no related key contaminants. None of the samples tested exceeded the applied Generic Assessment Criteria for the proposed end use scenario. TPH was above the laboratory method detection limit recording a maximum concentration of 51mg/kg, which is considered to be very low and representative of background concentrations. Asbestos fibres were not detected in the samples tested from across the Site or in the vicinity of the previously identified asbestos contamination around HP08. Following testing of the existing asphalt for coal tar content, elevated levels of marker compounds were not identified and as such, the existing asphalt is considered to be bitumen based. Although no contamination was recorded, it is possible for low concentrations of contaminants to be present between borehole locations. A clean cover in exposure areas (soft landscaping) may be a suitable robust remediation method. A minimum 300 mm thickness of clean cover of ‘suitable for use’ subsoil and topsoil may be appropriate subject to approval with the planning authority. Existing topsoil may be suitable following further sampling.

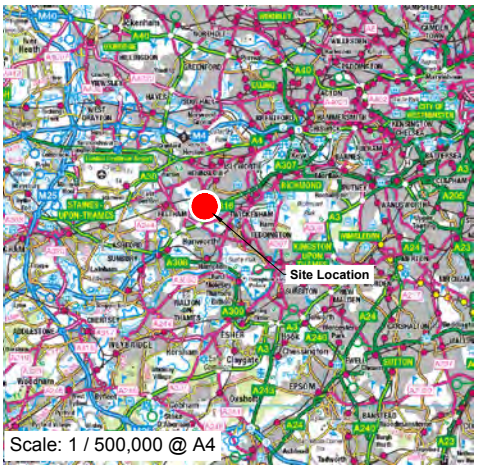
	Existing soil mounds are likely to be classified as non-hazardous for off-Site disposal, however, any waste materials should be inspected for ACM and removed from Site by a licensed contractor. Care is required during these processes not to contaminate the ground.
Fresh Water Pipes	The local water authority should be contacted at an early stage in order that any abnormal costs can be calculated, if required.
Concrete Grade	Water soluble sulphate concentrations were all found to be low and the Site can provisionally be classified as Design Sulfate Class DS-1 and Aggressive Chemical Environment Class ACEC AC-1 in accordance with the BRE Special Digest 1.
Ground Gas	No significant potential sources of ground gas on or off-Site have been identified. The gas monitoring recorded low concentrations of ground gases and low flow during a total of six monitoring rounds (three previous investigation and three current investigation). As such the Site has been classified as a CS1 where specific ground gas protection measures are not required.
Groundwater/ Drainage	The natural ground conditions at the Site were found to be variable sand, clay and gravel to a depth of 5.0 m bgl. Groundwater was encountered during drilling at approximately 3.5 m bgl which rose to approximately 2.4 m bgl in 20 minutes. Groundwater was encountered during return monitoring at approximately 1.3 to 2.0 m bgl. Three BRE365 infiltration tests were completed at the Site, the results of which identified that SA102 and SA103 failed to reach 75% effective depth. SA101 obtained a value of $6.9x10^{-06}$. Without further testing to corroborate the results, it is considered that SA102 and SA103 would be more representative of the conditions at the Site. Alternatives such as discharge to an existing facility should be investigated.
Excavations	Trench excavation sides cannot be guaranteed to be stable at this Site, therefore, batters and/or suitable support would be required for excavations. If deep excavations for services are required, then dewatering should be considered due to the shallow perched water especially following high rainfall. This would also be required where human entry is necessary.
Materials Management	Excavated soils may be suitable for use elsewhere subject to suitability for use and any necessary regulator protocols. Additional testing may be required for optimised off-Site disposal of spoil.

Potential Pollutant Linkage (PPL) Assessment				
Source(s)	**Pathway(s)**	**Receptor(s)**	**Risk Rating**	**Justification**
Previously identified asbestos contamination from around HP08. Detectable concentrations of sPAH, heavy metals and hydrocarbons in shallow soils. Potentially contaminated soils in areas not directly investigated. Potential sources of contamination from off-Site sources.	Direct contact, ingestion or inhalation of soil bound contaminants / dust during redevelopment.	Construction workers. Third parties during construction (adjacent site users and adjacent residents). Future Site users.	**Low Risk**	Significantly elevated concentrations of target contaminants have not been identified during this or previous investigations. It is recommended that given the previously identified asbestos contamination is not wide spread and is located at 0.5 m bgl it is recommended that the soils in this area are left in-situ. Should removal of the soils in this area be required these should be removed off-Site to an appropriately licensed facility. It is recommended that a layer of clean topsoil is required in landscaped areas, up to 300 mm thick, to act as an appropriate cover layer. Existing topsoil may be suitable subject to further testing. Groundworkers should be made aware of encountering potential contamination, including asbestos contamination in the south-western part of the Site and as such, appropriate PPE should be provided and tool box talks be undertaken. A 'hotspot' protocol should be put in place for groundworkers to act upon should suspected contamination be identified.
	Inhalation of vapours associated with contamination.	Future Site users.	**Very Low Risk**	No significant sources identified or elevated concentrations of contaminants identified.
	Direct contact between aggressive ground conditions and new infrastructure.	The Built Environment (new buildings and infrastructure)	**Low Risk**	Detectable concentrations of hydrocarbons have been identified. It is recommended that consultation is undertaken with the Local Water Authority for the requirements of upgrade water pipes, if required.
	Leaching of contamination into groundwater to the wider environment or surface waters.	The underlying Aquifer / Controlled waters.	**Very Low Risk**	Significant soil contamination has not been identified and as such, the risk to controlled waters is considered very low. Furthermore, the site will be covered in hardstanding, further mitigating the risk of infiltration sand mobilisation of contamination.

Standard risk definitions and matrices are presented in Appendix B.

Potential Pollutant Linkage (PPL) Assessment				
Source(s)	**Pathway(s)**	**Receptor(s)**	**Risk Rating**	**Justification**
Potential ground gas (from unrecorded on/off-Site sources)	Migration of ground gas into on-site buildings causing asphyxiation or risk of explosion.	The Built Environment (new buildings and infrastructure) Future residents.	**Low Risk**	No significant sources identified. A total of six rounds of ground gas monitoring has been undertaken during the current and previous investigation. Elevated concentrations and flows of hazardous ground gas has not been identified and as such the Site is classified as a CS1, where ground gas protection measures are not required.

Figure 1 – Site Location Map



Scale: 1 / 500,000 @ A4

LEGEND

Site Boundary

Scale: 1 / 10,000 @ A4

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Site Location Map
Turing House
Hounslow

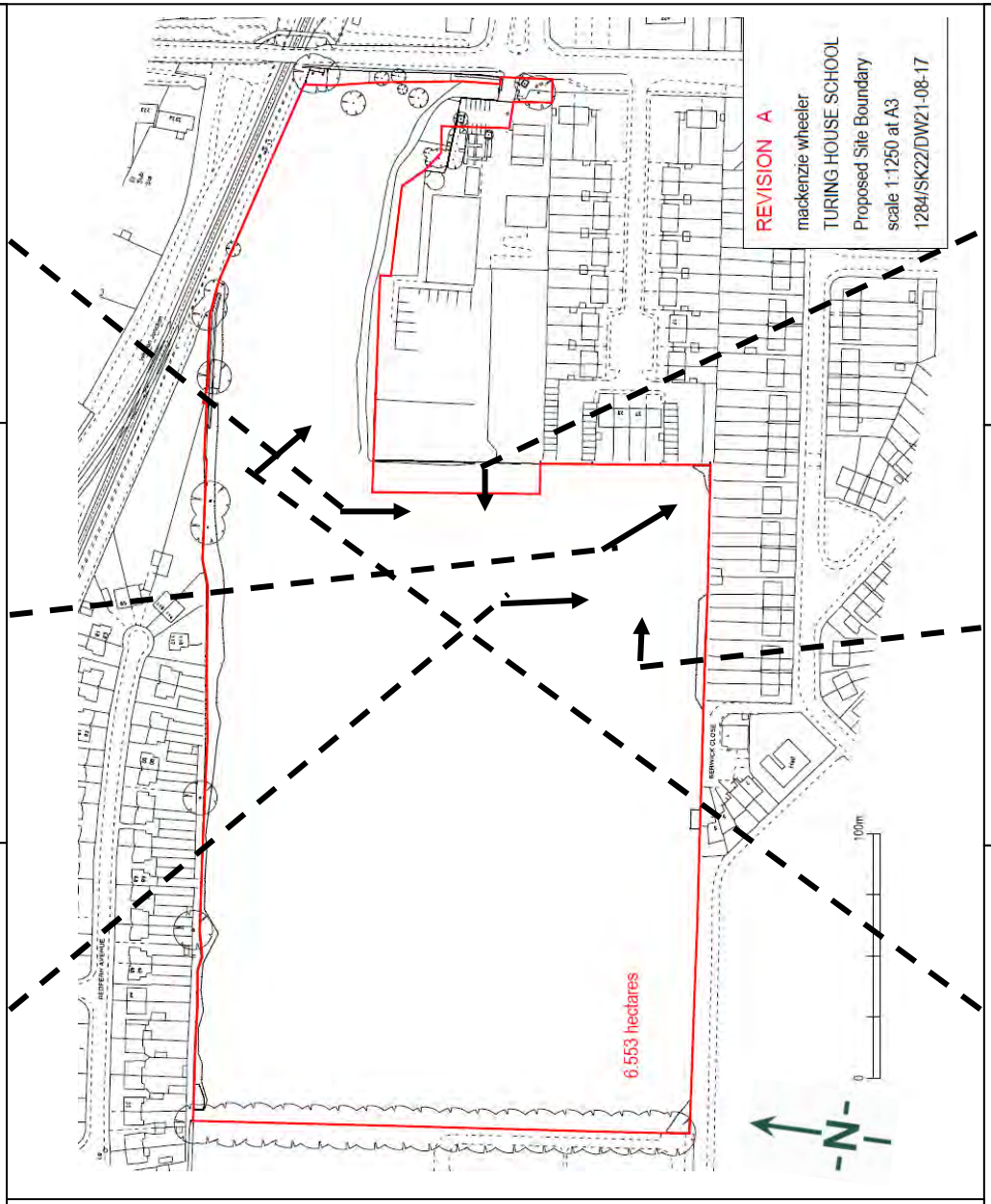
DRAWN BY:	SCALE:	PROJECT NO:
AW	To Scale@A4	18-0170.01
CHECKED BY:	REVISION:	FIGURE NO:
DP	1	1
DATE: 21 March 2018		

Figure 2 – Relevant Feature Plan

PH01:

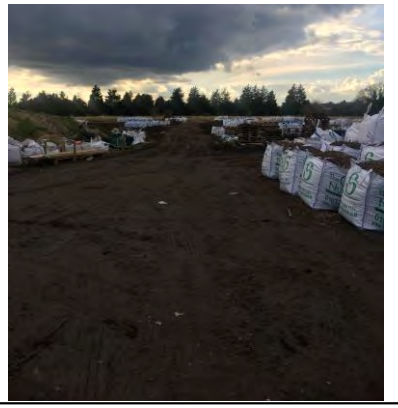
PH02:

PH03:



Note: There is uncertainty as unrecorded land use may have occurred and caused contamination that has not been identified by the observations,

PH04:



PH05:

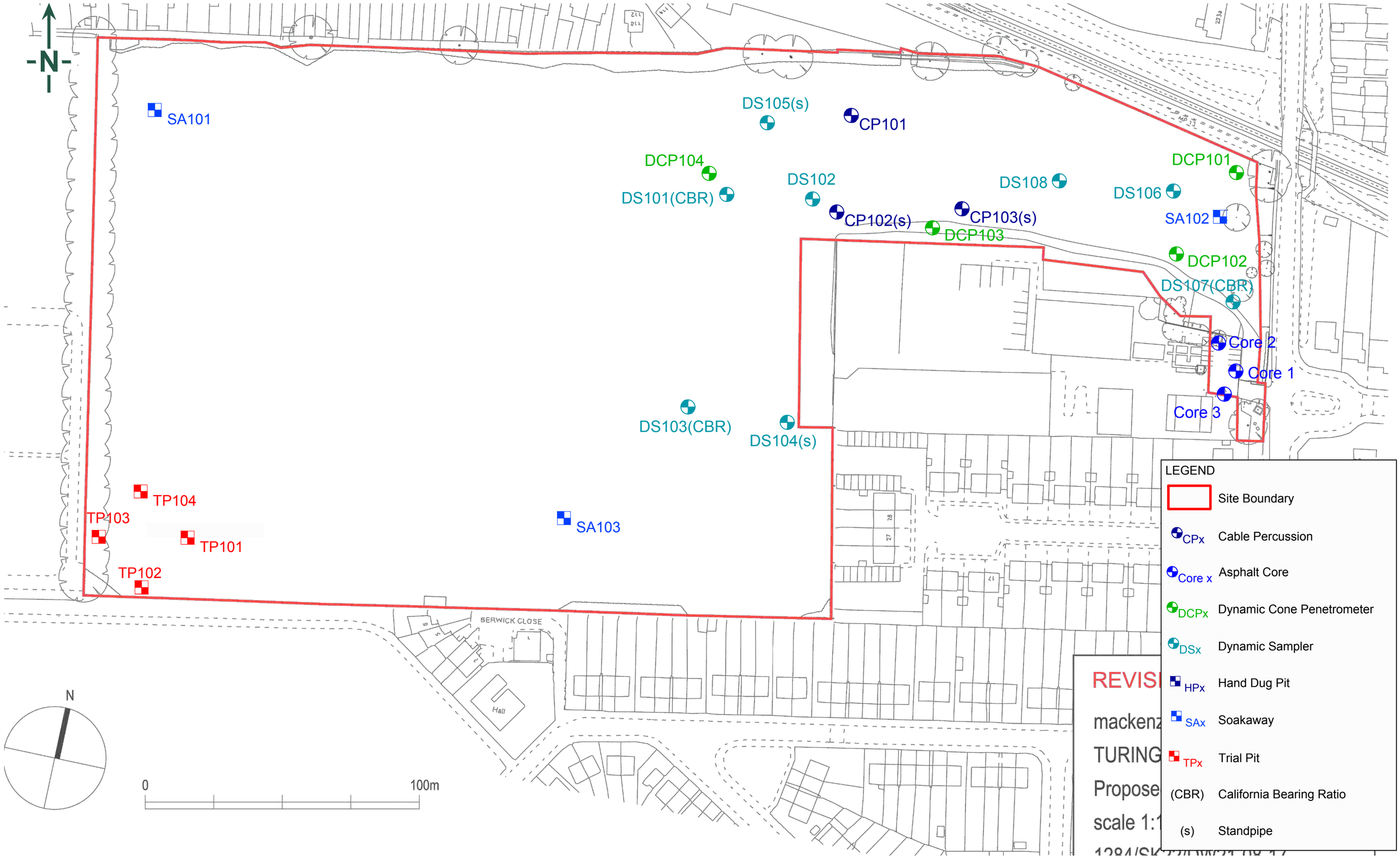
PH06:

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Relevant Features Plan
Turing House
Hounslow

DWN: DP	SCA: Not to scale	PROJECT NO.: 18-0170.01	
CHK: PH	REV: -	FIGURE NO.: 2	
DATE: March 2018			

Figure 3 – Approximate Intrusive Location Plan



Site Plan Provided by Client

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Approximate Intrusive Location Plan
Turing House
Hounslow

DRAWN BY: AW	SCALE: Not to Scale	PROJECT NO: 18-0170.01	
CHECKED BY: DP	REVISION: 1	FIGURE NO: 3	
DATE: 21 March 2018			

Appendix A - Limitations

Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B - Risk Definitions

Land Contamination Risk Definitions

The following methodology is based on the methodology presented in CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice 2001. It requires the classification of the:

- Magnitude of the potential consequence (severity) of the Risk occurring: and
- Magnitude of the Probability (likelihood) of the Risk occurring.

The classifications are then compared to indicate the risk presented by each pollutant linkage.

Consequence to Receptor Definition Matrix

	Human Health	Controlled Waters	Buildings/Services
Severe Consequence	Acute or chronic permanent impact on human health.	Sensitive controlled water pollution ongoing, or just about to occur.	Catastrophic collapse
Medium Consequence	Chronic permanent impact on human health	Gradual pollution of sensitive controlled water	Degradation of materials
Mild Consequence	Chronic temporary impact on human health	Gradual pollution of non-sensitive controlled water	Damage to building rendering it unsafe.to occupy (eg foundation damage resulting in instability).
Minor Consequence	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc).	Slight discoloration of water	Easily repairable effects of damage to buildings, structures and services, i.e discoloration of concrete

Probability Definitions

Probability	Definition in Context
Higher	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution. Positive evidence of source, pathway and receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. Suspect source, pathway, and receptor
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term No evidence of hazard, pathway, and receptor

Standard Risk Matrix

		Consequence/ Magnitude of impact			
		Severe	Medium	Mild	Minor
Probability	High	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/low	Low
	Low Likelihood	Moderate	Moderate/low	Low	Very Low
	Unlikely	Moderate/low	Low	Very Low	Very Low

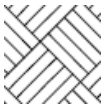
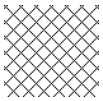
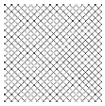
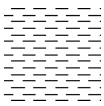
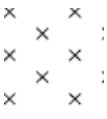
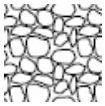
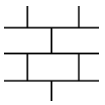
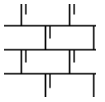
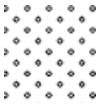
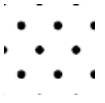
Classified risks and likely action

Significance Level	**Definition/Comments**
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required. Demonstrable contaminated land situation, highest threat & liability level, urgent action recommended.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term. Likely contaminated land situation, risk assessment and action recommended.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, if is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. Plausible contaminated land situation, risk assessment and possible action recommended.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Unlikely contaminated land situation, possible risk assessment and possible action.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. Negligible risk, no action recommended except vigilance for changes in conditions.

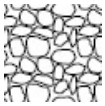
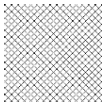
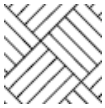
Appendix C - Key to Logs, Field Records & Compliance Certificates

KEY TO BOREHOLE AND TRIAL PIT LOGS

MATERIAL LEGENDS

	Topsoil		Made Ground		Made Ground 2
	Concrete		Clay		Silt
	Sand		Gravel		Peat
	Cobbles		Boulders		Mudstone
	Siltstone		Sandstone		Limestone
	Chalk		Coal		Breccia
	Conglomerate		Igneous		Metamorphic
	Volcanoclastic		Gypsum		Shale
	Ironstone		Bedrock (Unidentified)		Void

INSTALLATION / BACKFILL LEGENDS

	Sand		Gravel		Bentonite
	Cement/Grout		Arisings		Concrete
	Plain Pipe		Slotted Pipe		Piezometer Tip

Legend symbols in general accordance with BS 5930 (1999) and AGS.

KEY TO BOREHOLE AND TRIAL PIT LOGS

SAMPLE TYPES

ACM	Asbestos Containing Material Sample
B	Bulk Disturbed Sample
BLK	Block Sample
C	Core Sample
CBR	Undisturbed Sample for California Bearing Ratio Test – 154mm diameter
D	Disturbed Sample - Tub
ES	Soil Sample for Environmental Testing
EW	Water Sample for Environmental Testing
J	Disturbed Sample - Jar
U	Undisturbed Driven Tube Sample – 70/102mm diameter, 450mm long
U(P)	Undisturbed Pushed Piston Sample – 102mm diameter, 450mm long
U(TW)	Undisturbed Thin Walled Push In Sample – 100mm diameter, 450mm long
V	Disturbed Sample - Vial

TEST TYPES

CPT	Cone Penetrometer Test (kN/m^2)
FID	Flame Ionisation Detector Test (ppm)
HSV	In-Situ Hand Sheer Vane Test (kN/m^2)
PID	Photoionisation Detector Test (ppm)
SPT (S)	Standard Penetration Test – Split Spoon Sampler
SPT (C)	Standard Penetration Test – Solid 60 Degree Cone

CORE DETAILS

If	Fracture Spacing (mm) – Minimum, Average, Maximum
NI	Non-Intact where >25 fracture spacings per metre
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation (%)
AF	Air Flush Return (%)
WF	Water Flush Return (%)

WATER COLUMN DETAILS

	First Water Strike, Second Water Strike etc.
	Standing Water Level – First Strike, Second Strike etc.
	Seepage

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: CP101 | Page: 1 of 2

Project: Turing House, Hounslow

Cable Percussive Borehole Log

Date: 07/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Type	Ref	Test Details: Depth (m)	Results	Backfill
Brown clayey sandy fine to medium subrounded to subangular flint GRAVEL. (TOPSOIL)		0.70	(0.70)	64.06			0.10	D	1			
							0.60	D	2			
Brown gravelly medium SAND. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GRAVEL MEMBER)		1.20	(0.50)	63.56			1.20	D	3			
Very dense becoming medium dense with depth brown sandy fine to coarse subrounded to subangular flint GRAVEL. (TAPLOW GROUND MEMBER)							1.50 - 2.00	B	1	1.50	SPT(C)50 (7,9/50 for 215mm)	
							2.00	D	4			
			(2.30)			2.60						
						2.80						
						2.90						
							3.00	D	5	3.00	SPT(C)N=17 (2,2/2,2,3,10)	
						3.20						
						3.40 ▼						
		3.50		61.26			3.50	D	6			
Soft to firm brown slightly sandy silty CLAY. Sand is fine. (LONDON CLAY)		4.00	(0.50)	60.76	150		4.00	D	7	4.00	SPT(S)N=12 (1,2/2,2,4,4)	
Firm grey slightly silty CLAY with rare selenite crystals. (LONDON CLAY)							5.00	D	8			
							5.50	D	9	5.50	SPT(S)N=15 (1,2/3,4,4,4)	

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
07/03/2018		3.40 m	20 min 15 min 10 min 5 min	2.60 m 2.80 m 2.90 m 3.20 m	9.3-9.6	00:30

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513405.40 N173675.51	64.76	SI Drilling	TR2000	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: CP101 | Page: 2 of 2

Project: Turing House, Hounslow

Cable Percussive Borehole Log

Date: 07/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Firm grey slightly silty CLAY with rare selenite crystals. (LONDON CLAY)			(5.30)				6.00	D	10			
							7.00	D	11	7.00	SPT(S)N=17 (1,3/3,3,5,6)	
							8.00	D	12			
							8.50	D	13	8.50	SPT(S)N=17 (1,2/3,4,5,5)	
							9.00	D	14			
		9.30		55.46			9.30 - 9.60	D	15			
Stiff grey CLAY. (LONDON CLAY)			(0.70)									
		10.00		54.76			10.00	D	16	10.00	SPT(S)N=22 (3,3/5,5,5,7)	
Borehole complete at 10.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
07/03/2018		3.40 m	20 min 15 min 10 min 5 min	2.60 m 2.80 m 2.90 m 3.20 m	9.3-9.6	00:30

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513405.40 N173675.51	64.76	SI Drilling	TR2000	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: **18-0170.01**

Hole ID: **CP102**

Page: **1 of 2**

Project: **Turing House, Hounslow**

Cable Percussive Borehole Log

Date: **08/03/2018**

Client: **Bowmer and Kirkland**

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Brown clayey sandy fine to medium subrounded to subangular flint GRAVEL. (TOPSOIL)			(0.70)				0.30	D	1			
		0.70		64.32			0.70	D	2			
Very dense becoming dense with depth brown slightly sandy fine to coarse subrounded to subangular flint GRAVEL. (TAPLOW GROUND MEMBER)							1.50	D	1	1.50	SPT(C)50 (5,17/50 for 180mm)	
							1.50 - 2.00	B	3			
							2.00	D	4			
						2.50						
						2.60						
						2.70						
			(4.70)				3.00	D	5	3.00	SPT(C)N=28 (2,4/5,7,7,9)	
						3.10						
						3.50 ▼						
							4.00	D	6			
										4.50	SPT(C)N=5 (1,1/1,1,2,1)	
							5.00	D	7			
		5.40		59.62			5.40	D	8			
Soft to firm brown CLAY. (LONDON CLAY)			(0.50)				5.50	D	9	5.50	SPT(S)N=12 (1,2/2,3,3,4)	

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Groundwater encountered at 3.50 m bgl.
4. Backfilled with arisings.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
08/03/2018	08:15:00	3.50 m	20 min 15 min 10 min 5 min	2.50 m 2.60 m 2.70 m 3.10 m		

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513423.10 N173641.92	**65.02**	**SI Drilling**	**TR2000**	**DP**	**RS**	**PH**	**1:30**

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: **18-0170.01**

Hole ID: **CP102**

Project: **Turing House, Hounslow**

Cable Percussive Borehole Log

Date: **08/03/2018**

Client: **Bowmer and Kirkland**

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Soft to firm brown CLAY. (LONDON CLAY)		5.90		59.12								
Firm to stiff grey CLAY with rare selenite crystals. (LONDON CLAY)			(4.10)		150		6.00	D	10			
							7.00	D	11	7.00	SPT(S)N=14 (1,2/3,3,4,4)	
							8.00	D	12			
							8.50	D	13	8.50	SPT(S)N=19 (2,3/4,4,5,6)	
							9.00	D	14			
		10.00		55.02			10.00	D	15	10.00	SPT(S)N=21 (3,3/5,5,5,6)	
Borehole complete at 10.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Groundwater encountered at 3.50 m bgl.
4. Backfilled with arisings.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
08/03/2018	08:15:00	3.50 m	20 min 15 min 10 min 5 min	2.50 m 2.60 m 2.70 m 3.10 m		

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513423.10 N173641.92	**65.02**	**SI Drilling**	**TR2000**	**DP**	**RS**	**PH**	**1:30**

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: CP103 | Page: 1 of 2

Project: Turing House, Hounslow

Cable Percussive Borehole Log

Date: 06/03/2018 - 07/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Brown clayey sandy fine to medium subrounded to subangular flint GRAVEL. (TOPSOIL)		0.70	(0.70)	64.16			0.30	D	1			
							0.70	D	2			
Very dense to dense brown sandy fine to coarse subrounded to subangular flint GRAVEL. (TAPLOW GROUND MEMBER)							1.00	D	3			
							1.50 - 2.00	B	1	1.50	SPT(C)50 (8,15/50 for 225mm)	
							2.00	D	4			
			(3.30)			2.40						
						2.70						
						3.00	3.00	D	5	3.00	SPT(C)N=27 (5,5/7,6,6,8)	
						3.20						
						3.50 ▼						
		4.00		60.86								
Soft brown slightly sandy CLAY. (LONDON CLAY)							4.00	D	2			
							4.00 - 4.50	B	6			
			(0.70)							4.50	SPT(C)N=9 (3,2/2,2,3,2)	
		4.70		60.16								
Soft brown CLAY. (LONDON CLAY)							4.70	D	7			
			(0.50)									
		5.20		59.66			5.20	D	8			
Firm grey CLAY with rare selenite crystals. (LONDON CLAY)					150					5.50	SPT(S)N=10 (1,2/2,2,3,3)	

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Groundwater encountered at 3.50 m bgl.
4. Installed with a 63 mm HDPE standpipe to 5.00 m bgl.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
06/03/2018		3.50 m	20 min 15 min 10 min 5 min	2.40 m 2.70 m 3.00 m 3.20 m		

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513465.30 N173661.80	64.86	SI Drilling	TR2000	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: **18-0170.01**

Hole ID: **CP103**

Project: **Turing House, Hounslow**

Cable Percussive Borehole Log

Date: **06/03/2018 - 07/03/2018**

Client: **Bowmer and Kirkland**

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details			Test Details		Backfill
							Depth (m)	Type	Ref	Depth (m)	Results	
Firm grey CLAY with rare selenite crystals. (LONDON CLAY)			(4.80)				6.00	D	9			
							7.00	D	10	7.00	SPT(S)N=16 (1,2/3,4,4,5)	
		10.00		54.86								
Borehole complete at 10.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Groundwater encountered at 3.50 m bgl.
4. Installed with a 63 mm HDPE standpipe to 5.00 m bgl.

Water Stike			Water Level		Chiselling	
Date	Time	Strike	Duration	Standing	Depth (m)	Time (h:m)
06/03/2018		3.50 m	20 min 15 min 10 min 5 min	2.40 m 2.70 m 3.00 m 3.20 m		

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale (m):
E513465.30 N173661.80	**64.86**	**SI Drilling**	**TR2000**	**DP**	**RS**	**PH**	**1:30**

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

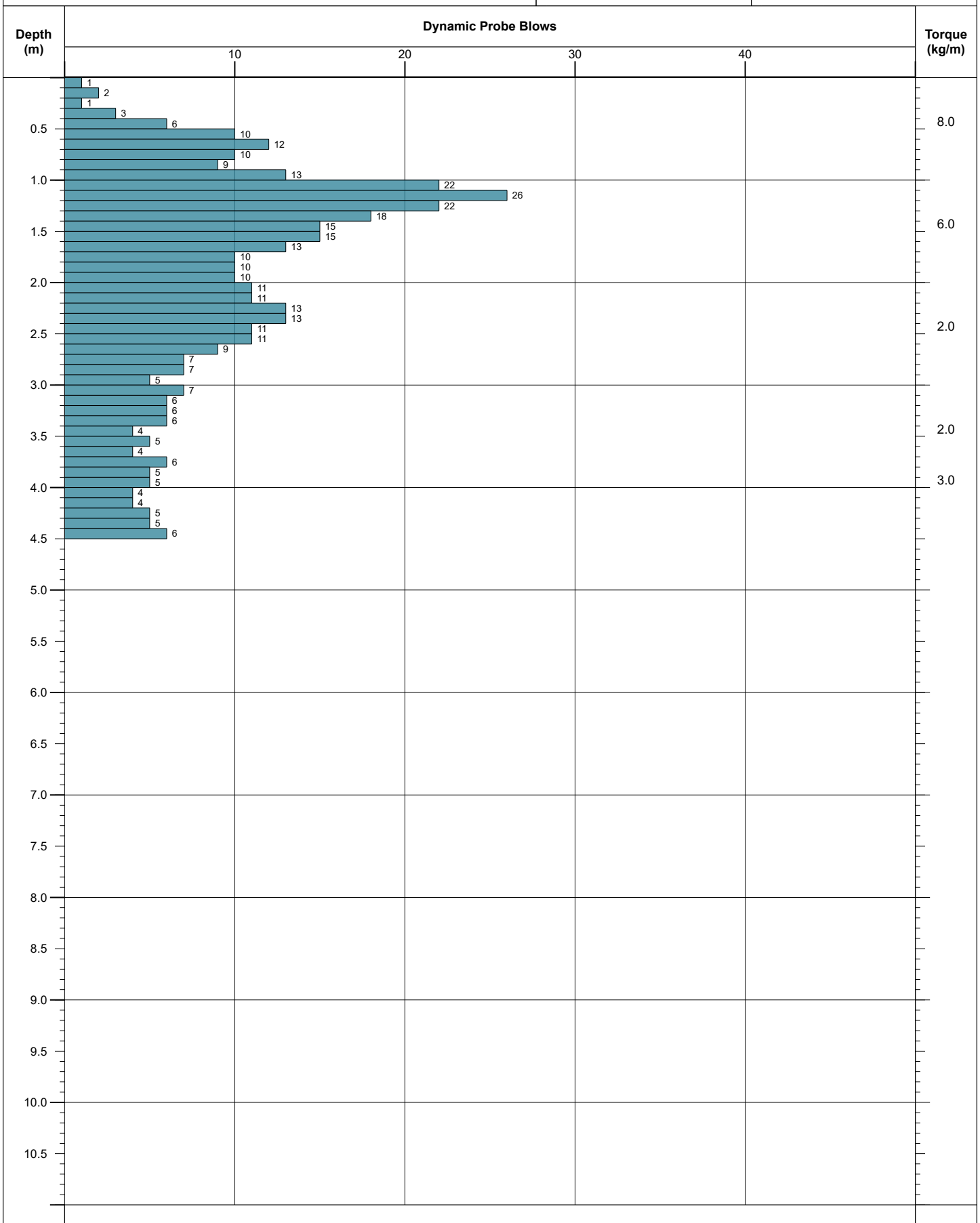
Project No:	Hole ID:	Page:
18-0170.01	DPT101	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **06/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513382.60 N173633.95	64.96	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

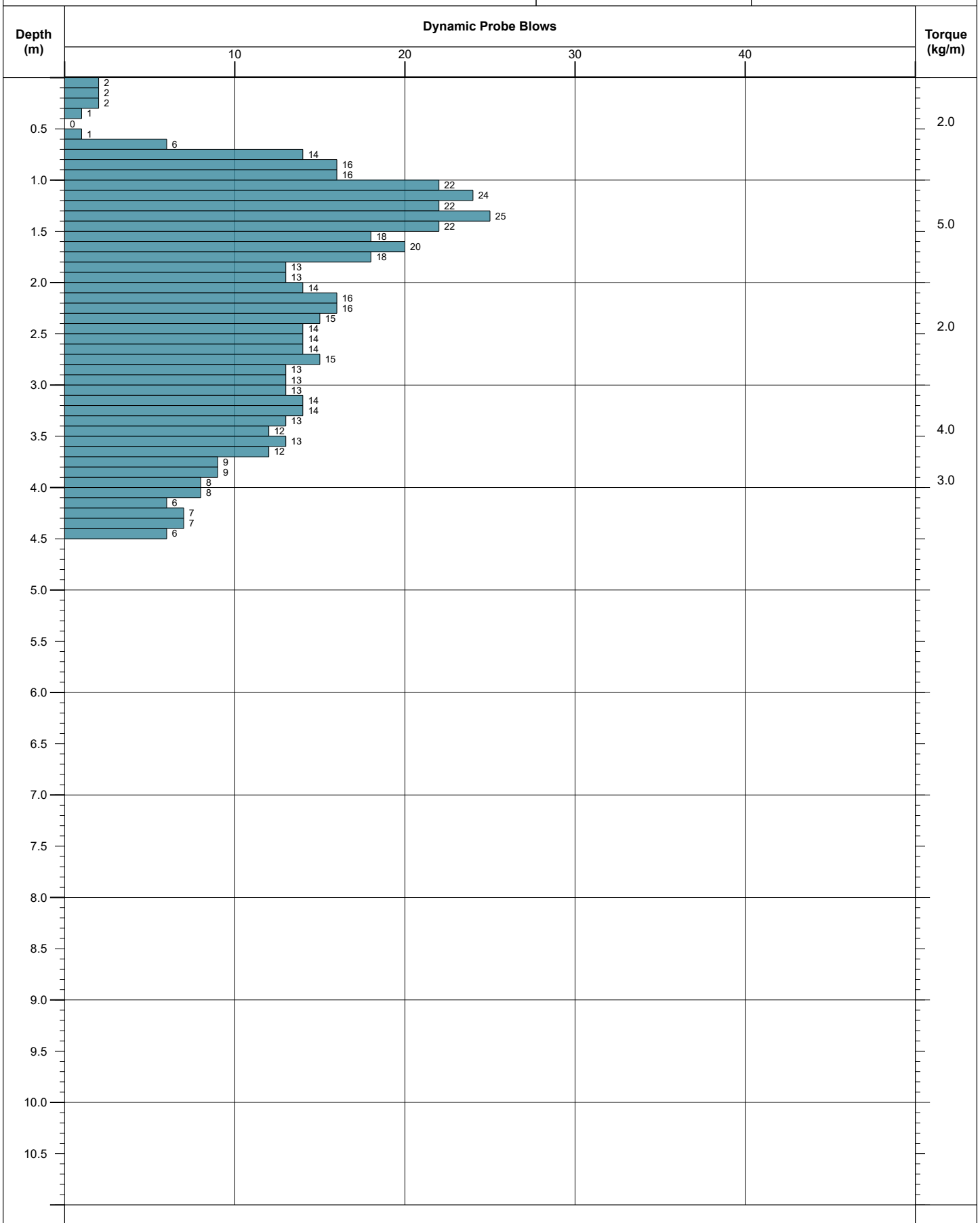
Project No:	Hole ID:	Page:
18-0170.01	DPT102	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **06/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513398.40 N173635.12	65.04	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

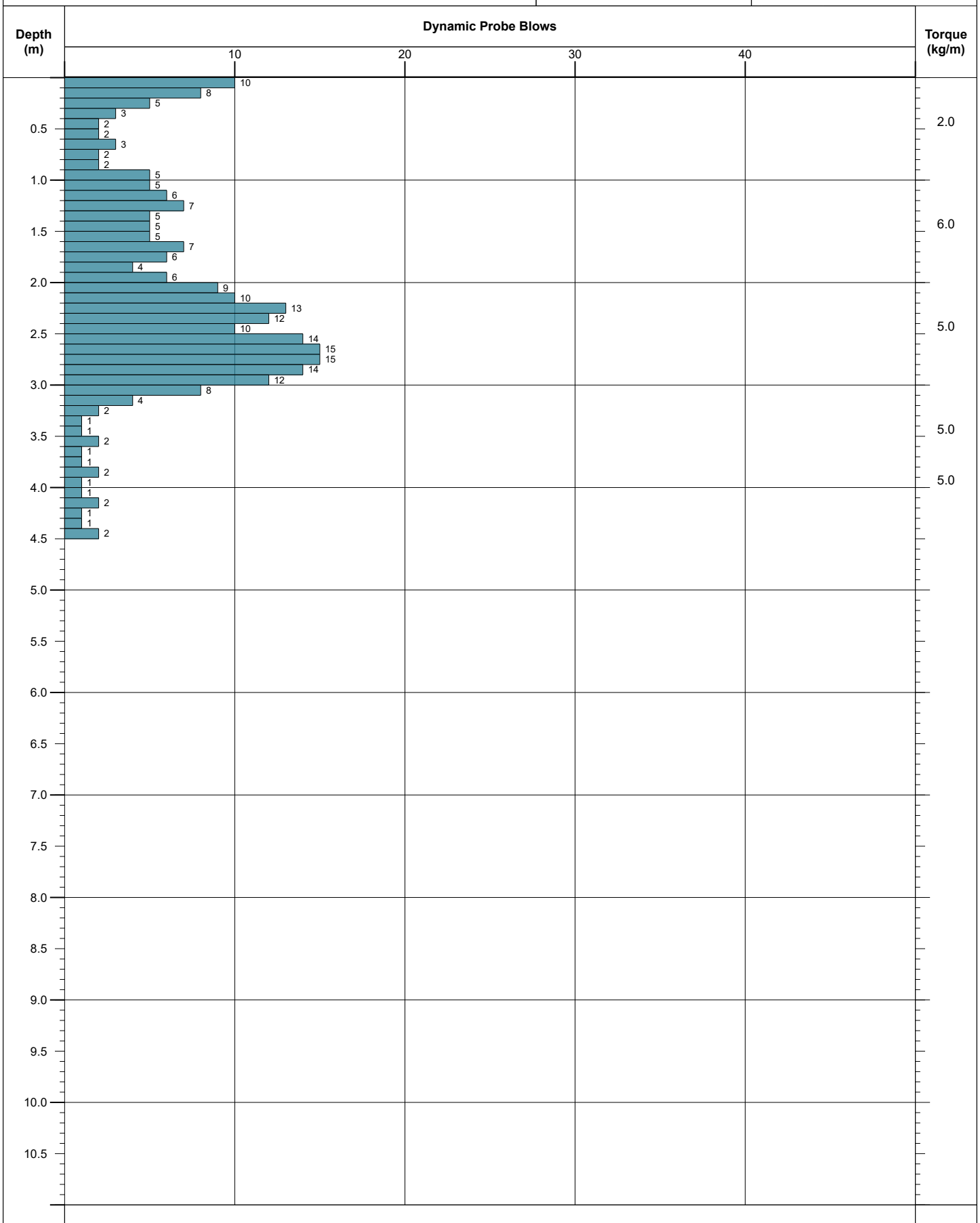
Project No:	Hole ID:	Page:
18-0170.01	DPT103	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **06/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513400.04 N173557.17	65.64	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

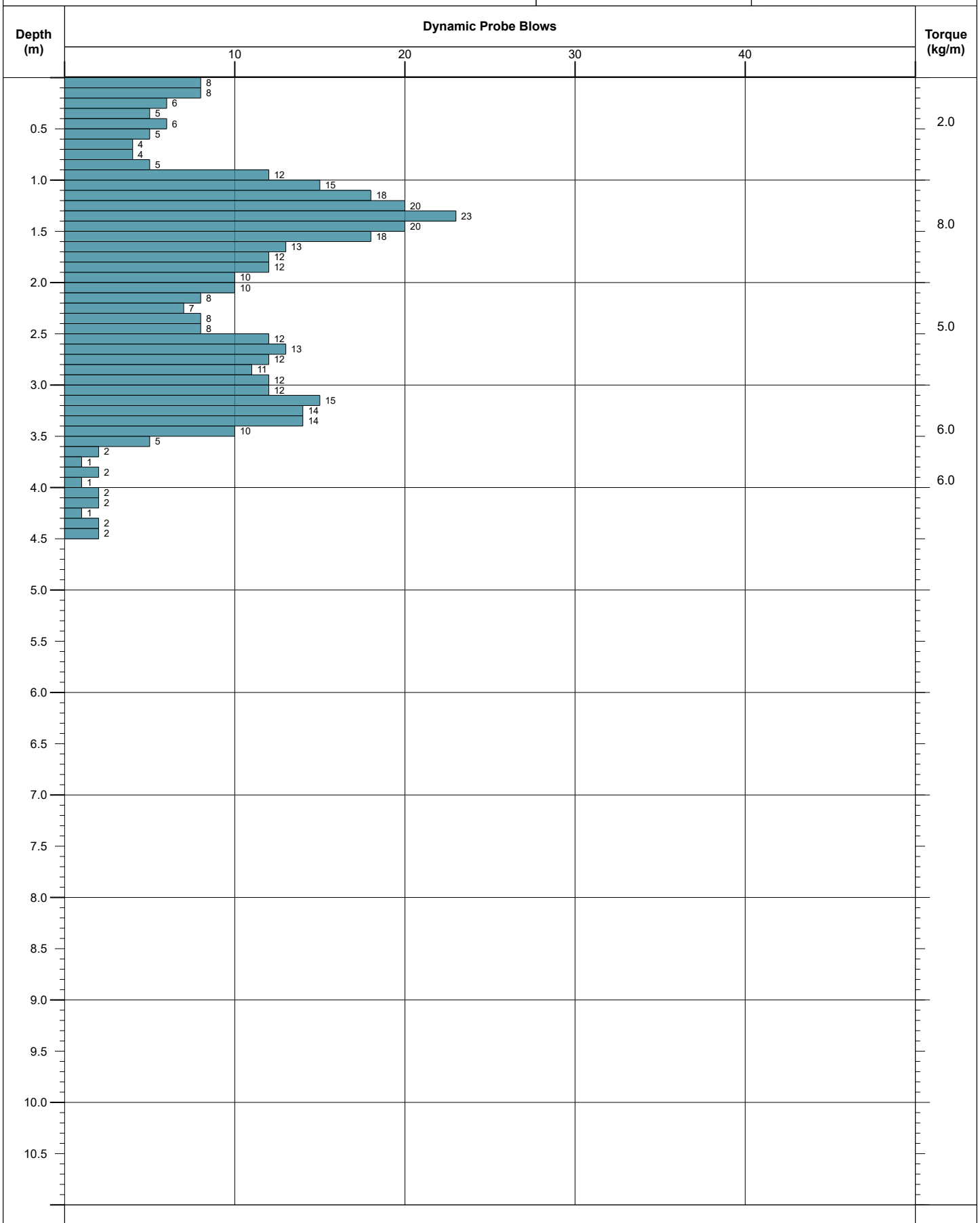
Project No:	Hole ID:	Page:
18-0170.01	DPT104	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **06/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513409.09 N173559.96	65.66	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

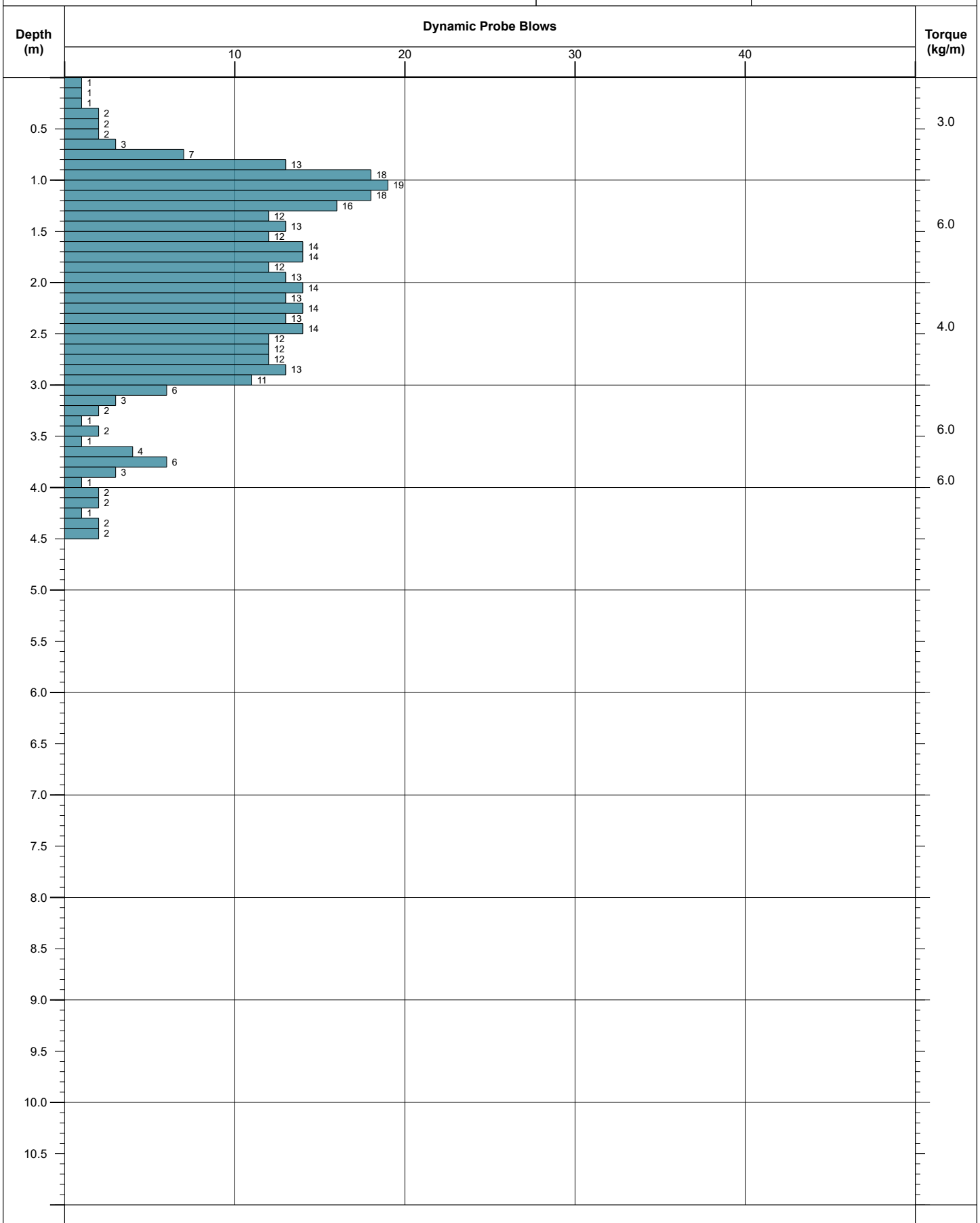
Project No:	Hole ID:	Page:
18-0170.01	DPT105	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **07/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513369.48 N173669.05	64.82	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

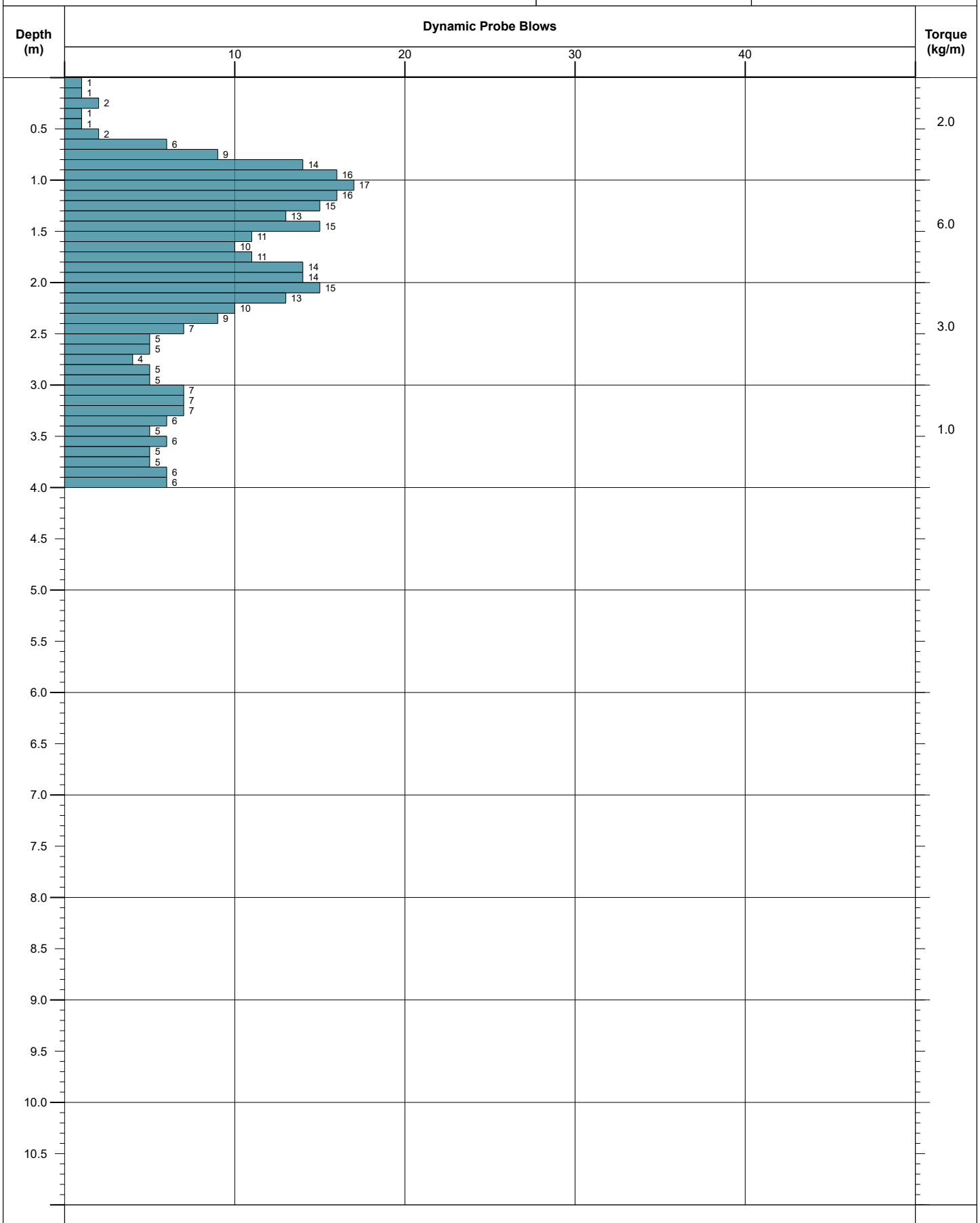
Project No:	Hole ID:	Page:
18-0170.01	DPT106	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **07/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513527.06 N173666.97	64.71	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

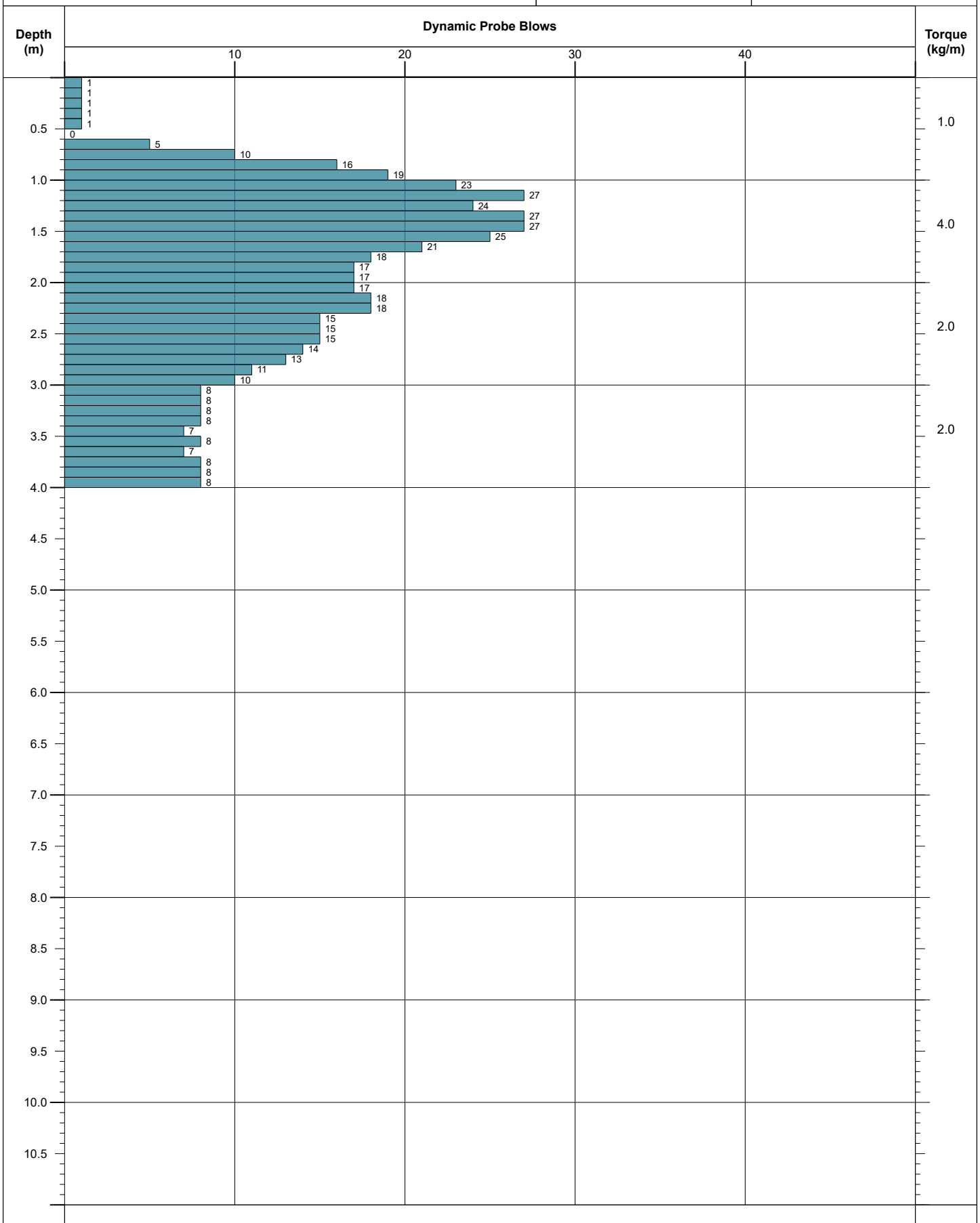
Project No:	Hole ID:	Page:
18-0170.01	DPT107	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **07/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513554.33 N173641.73	64.80	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

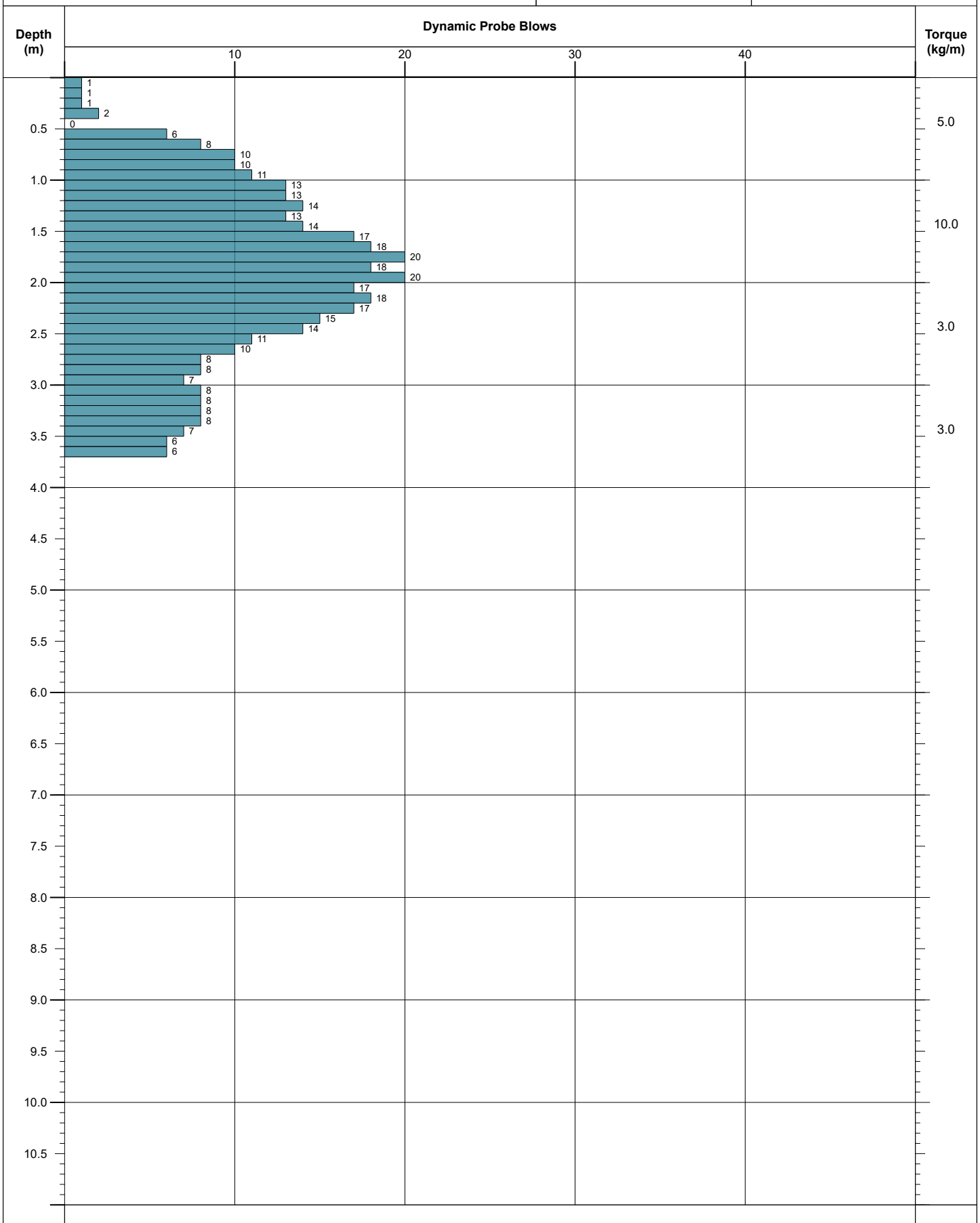
Project No:	Hole ID:	Page:
18-0170.01	DPT108	1 of 1

Project: **Turing House, Hounslow**

Dynamic Probe Log

Date: **07/03/2018**

Client: **Bowmer and Kirkland**



BS EN ISO 22476-2:2005	63.5 kg Hammer Mass	750 mm Standard Drop	40 mm Cone Base Diameter	38 mm Rod Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged By:	Checked By:	Approved By:	Scale:
E513489.10 N173672.29	64.67	Delta-Drilling	Premier 110	GC	DP	PH	1:50

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: **18-0170.01**

Hole ID: **DS101**

Page: **1 of 1**

Project: **Turing House, Hounslow**

Dynamic Sampler Log

Date: **06/03/2018**

Client: **Bowmer and Kirkland**

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Dark brown black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TOPSOIL)		0.40	(0.40)	64.56			0.40 - 0.60	B	1			
Brown clayey sandy fine to medium subrounded to subangular GRAVEL. of flint. (TAPLOW GROUND MEMBER)		0.60	(0.20)	64.36			0.50	ES	1			
Soft brown sandy gravelly CLAY. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		0.70	(0.10)	64.26			0.70	ES	2			
Brown medium SAND. (TAPLOW GROUND MEMBER)		1.10	(0.40)	63.86								
Brown sandy fine to medium subrounded to subangular flint GRAVEL. (TAPLOW GROUND MEMBER)		1.70	(0.60)	63.26								
Brown medium SAND. (TAPLOW GROUND MEMBER)		2.00	(0.30)	62.96			2.00	D	1			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		4.00	(2.00)	60.96			3.00	D	2			
Borehole complete at 4.00 m bgl.							4.00	D	3			

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513382.60 N173633.95	64.96	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS102 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 06/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Dark brown black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TOPSOIL)		0.30	(0.30)	64.74								
Soft brown orangish brown slightly gravelly silty CLAY. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		0.50	(0.20)	64.54			0.40	ES	1			
Brown clayey sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		0.80	(0.30)	64.24			0.60	ES	2			
Light brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.80	(1.00)	63.24								
Brown medium SAND. (TAPLOW GROUND MEMBER)		2.00	(0.20)	63.04			2.00	D	1			
Light brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		4.00	(2.00)	61.04			3.00	D	2			
Borehole complete at 4.00 m bgl.							4.00	D	3			

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513398.40 N173635.12	65.04	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS103 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 06/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Black sandy fine to coarse subrounded to subangular GRAVEL of flint, brick and ceramic.		0.20	(0.20)	65.44			0.10	ES	1			
Black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		0.90	(0.70)	64.74			0.30 - 0.60 0.50	B ES	1 2			
Grey gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		1.00	(0.10)	64.64								
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.20	(0.20)	64.44								
Soft brown grey silty gravelly CLAY. (TAPLOW GROUND MEMBER)		1.80	(0.60)	63.84								
Brown grey medium SAND. (TAPLOW GROUND MEMBER)		2.00	(0.20)	63.64			2.00	D	1			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		3.10	(1.10)	62.54			3.00	D	2			
Firm brown grey CLAY. (LONDON CLAY)		4.00	(0.90)	61.64			4.00	D	3			
Borehole complete at 4.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513400.04 N173557.17	65.64	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS104 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 06/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Brown sandy fine to medium subrounded to subangular flint GRAVEL.		0.20	(0.20)	65.46			0.15	ES	1			
Dark brown black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		0.80	(0.60)	64.86			0.50	ES	2			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.90	(1.10)	63.76								
Brown medium SAND. (TAPLOW GROUND MEMBER)		2.40	(0.50)	63.26			2.00	D	1			
Brown sandy fine to medium subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		3.40	(1.00)	62.26			3.00	D	2			
Soft to firm brown grey CLAY. (LONDON CLAY)		4.00	(0.60)	61.66								
Borehole complete at 4.00 m bgl.							4.00	D	3			

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Installed with a 63 mm HDPE standpipe to 3.30 m bgl.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513409.09 N173559.96	65.66	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS105 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 06/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Dark brown black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TOPSOIL)		0.50	(0.50)	64.32			0.40	ES	1			
Grey sandy fine to coarse subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.00	(0.50)	63.82			0.70	ES	2			
Brown grey clayey sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.20	(0.20)	63.62								
Brown grey medium SAND. (TAPLOW GROUND MEMBER)		1.50	(0.30)	63.32								
Brown sandy fine to medium subrounded to subangular flint GRAVEL. (TAPLOW GROUND MEMBER)		1.60	(0.10)	63.22								
Brown medium SAND. (TAPLOW GROUND MEMBER)		2.00	(0.40)	62.82			2.00	D	1			
Brown sandy fine to medium subrounded to subangular GRAVEL. of flint (TAPLOW GROUND MEMBER)		3.60	(1.60)	61.22			3.00	D	2			
Soft to firm brown CLAY. (LONDON CLAY)		4.00	(0.40)	60.82			4.00	D	3			
Borehole complete at 4.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Installed with a 63 mm HDPE standpipe to 2.50 m bgl.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513369.48 N173669.05	64.82	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS106 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 07/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Black slightly gravelly sandy SILT. Gravel is fine to coarse subrounded to subangular flint. (TOPSOIL)		0.50	(0.50)	64.21			0.20	ES	1			
Soft orangish bown sandy silty CLAY.		0.60	(0.10)	64.11			0.50	ES	2			
Orangish brown clayey sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		2.00	(1.40)	62.71			2.00	D	1			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		2.70	(0.70)	62.01			3.00	D	2			
Light brown gravelly fine to medium SAND. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		3.20	(0.50)	61.51			4.00	D	3			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		4.00	(0.80)	60.71								
Borehole complete at 4.00 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513527.06 N173666.97	64.71	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: 18-0170.01 | Hole ID: DS107 | Page: 1 of 1

Project: Turing House, Hounslow

Dynamic Sampler Log

Date: 07/03/2018 | Client: Bowmer and Kirkland

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TOPSOIL)			(0.60)				0.20	ES	1			
		0.60		64.20								
Soft orangish brown sandy silty CLAY.		0.70	(0.10)	64.10			0.60	ES	2			
Orangish brown clayey sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)			(0.90)									
		1.60		63.20								
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.80	(0.20)	63.00								
Light brown gravelly fine to medium SAND. Gravel is fine to medium subrounded to subangular flint. (TAPLOW GROUND MEMBER)		2.00	(0.20)	62.80			2.00 2.00	B D	1 1			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. Sand is medium to coarse. (TAPLOW GROUND MEMBER)			(1.50)				3.00	D	2			
		3.50		61.30			3.50	D	3			
Borehole complete at 3.50 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513554.33 N173641.73	64.80	Delta-Simons	Premier 110	DP	RS	PH	1:30

deltasimons
Environment - Health & Safety - Sustainability

Head Office
3 Henley Way, Doddington Road
Lincoln, LN6 3QR
Tel: +44 (0) 1522 882555
Email: info@deltasimons.com

Project No: **18-0170.01**

Hole ID: **DS108**

Page: **1 of 1**

Project: **Turing House, Hounslow**

Dynamic Sampler Log

Date: **07/03/2018**

Client: **Bowmer and Kirkland**

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
Black slightly gravelly sandy SILT. Gravel is fine to medium subrounded to subangular flint. (TOPSOIL)		0.50	(0.50)	64.17			0.20	ES	1			
Soft orangish brown sandy silty CLAY. (TAPLOW GROUND MEMBER)		0.70	(0.20)	63.97			0.60	ES	2			
Light brown clayey sandy fine to medium subrounded to subangular GRAVEL of flint. (TAPLOW GROUND MEMBER)		1.80	(1.10)	62.87			1.00	D	1			
Brown sandy fine to medium subrounded to subangular GRAVEL of flint. Sand is medium to coarse. (TAPLOW GROUND MEMBER)		3.50	(1.70)	61.17			2.00	D	2			
							3.00	D	3			
Borehole complete at 3.50 m bgl.												

Remarks:
1. Engineer verified logged in general accordance to BS 5930:2015.
2. Area CAT scanned prior to excavation.
3. Borehole remained dry upon completion.
4. Backfilled with arisings.

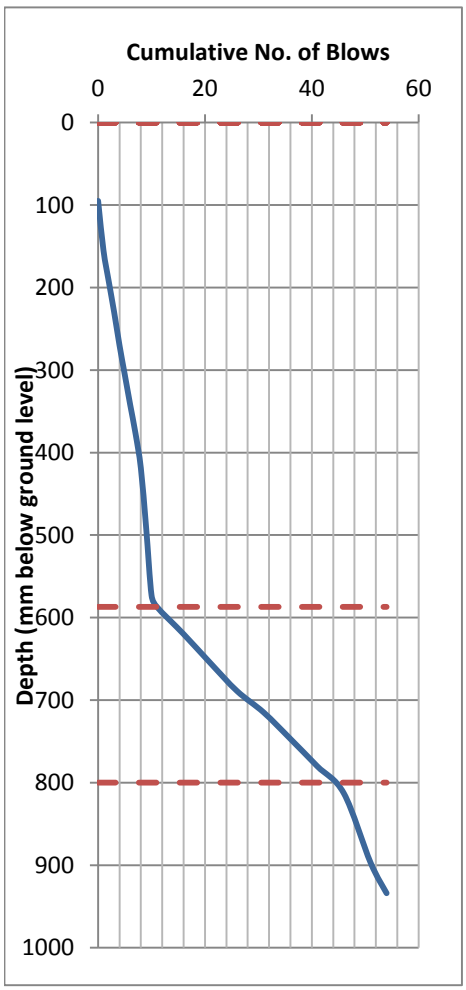
Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration	Depth Water	Depth Base	Diameter

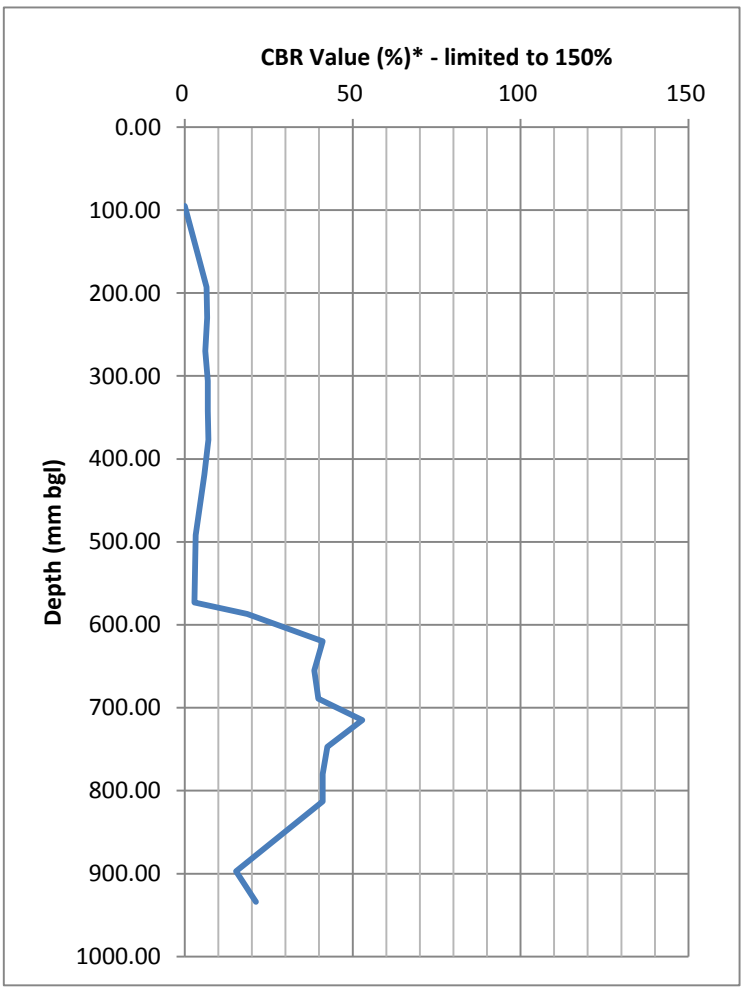
Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E513489.10 N173672.29	**64.67**	**Delta-Simons**	**Premier 110**	**DP**	**RS**	**PH**	**1:30**

TRL Dynamic Cone Penetrometer - Determination of CBR Value (%)*

Site Name	Hounslow	**Starting Depth (mm bgl)**	95.00
Job Number	18-0170.01	**Surface Level (m AOD)**	
Test No.	DCP101	**Easting**	
Date of Test	14-Mar-18	**Northing**	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)*
1	11	11	492	587	**5.4**
2	30	41	213	800	**38.0**
3	13	54	134	934	**25.7**



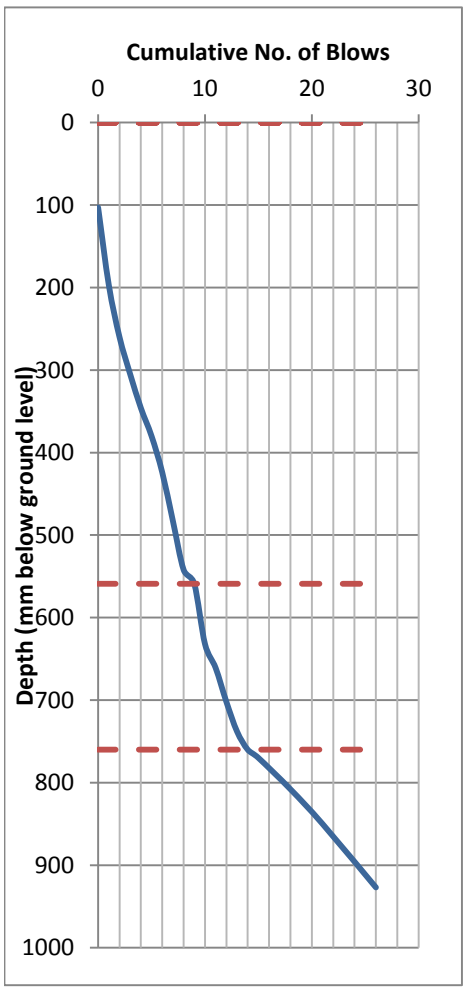


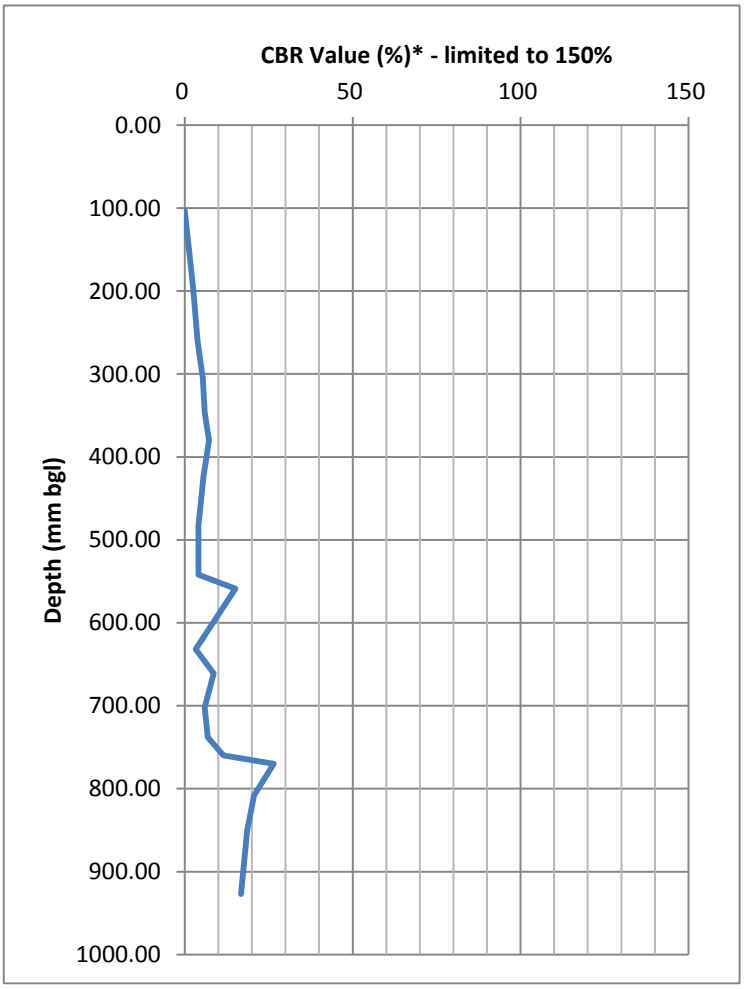
* CBR Interpretation based on the TRRL Road Note 8 equation: $Log_{10}(CBR) = 2.48 - [1.057 \times Log_{10}(mm/blow)]$

TRL Dynamic Cone Penetrometer - Determination of CBR Value (%)*

Site Name	Hounslow	**Starting Depth (mm bgl)**	103.00
Job Number	18-0170.01	**Surface Level (m AOD)**	
Test No.	DCP102	**Easting**	
Date of Test	14-Mar-18	**Northing**	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)*
1	9	9	456	559	**4.8**
2	5	14	201	760	**6.1**
3	12	26	167	927	**18.7**



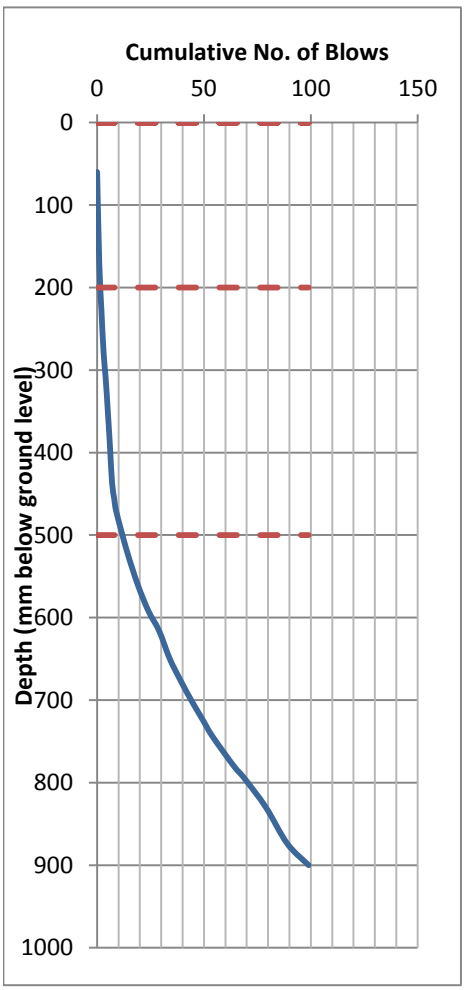


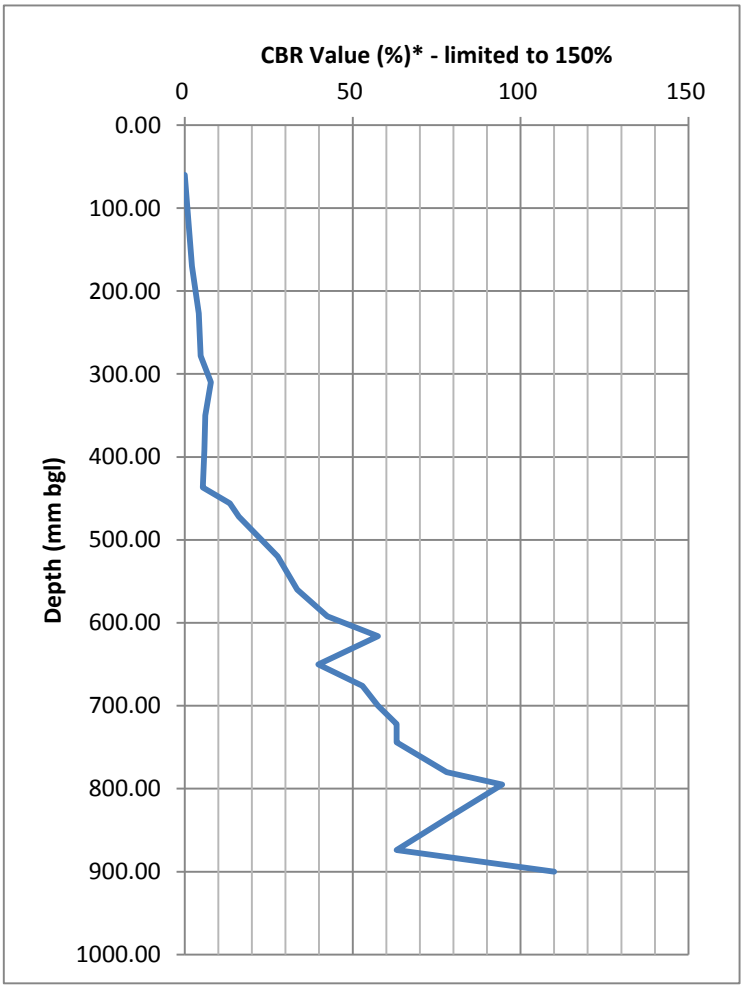
* CBR Interpretation based on the TRRL Road Note 8 equation: $Log_{10}(CBR) = 2.48 - [1.057 \times Log_{10}(mm/blow)]$

TRL Dynamic Cone Penetrometer - Determination of CBR Value (%)*

Site Name	Hounslow	**Starting Depth (mm bgl)**	60.00
Job Number	18-0170.01	**Surface Level (m AOD)**	60
Test No.	DCP103	**Easting**	
Date of Test	14-Mar-18	**Northing**	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)*
1	1	1	140	200	**1.6**
2	8	9	300	500	**6.6**
3	90	99	400	900	**62.4**



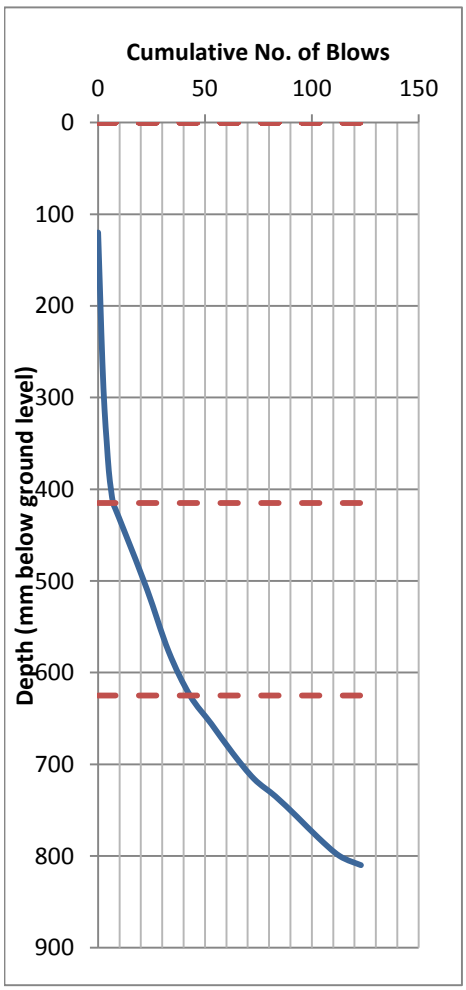


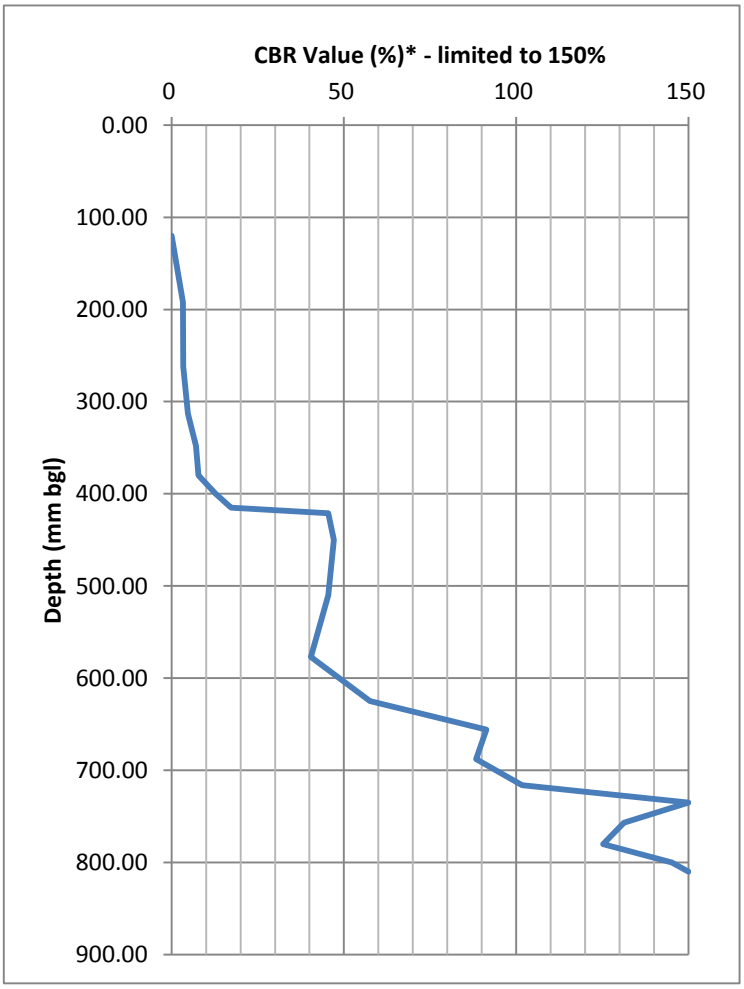
* CBR Interpretation based on the TRRL Road Note 8 equation: $Log_{10}(CBR) = 2.48 - [1.057 \times Log_{10}(mm/blow)]$

TRL Dynamic Cone Penetrometer - Determination of CBR Value (%)*

Site Name	Hounslow	**Starting Depth (mm bgl)**	120.00
Job Number	18-0170.01	**Surface Level (m AOD)**	120
Test No.	DCP104	**Easting**	
Date of Test	14-Mar-18	**Northing**	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)*
1	7	7	295	415	**5.8**
2	36	43	210	625	**46.8**
3	80	123	185	810	**>100**



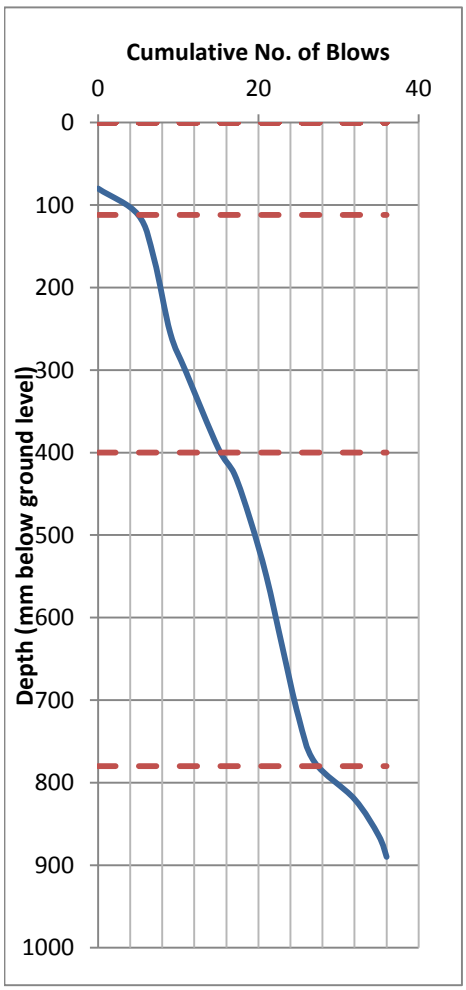


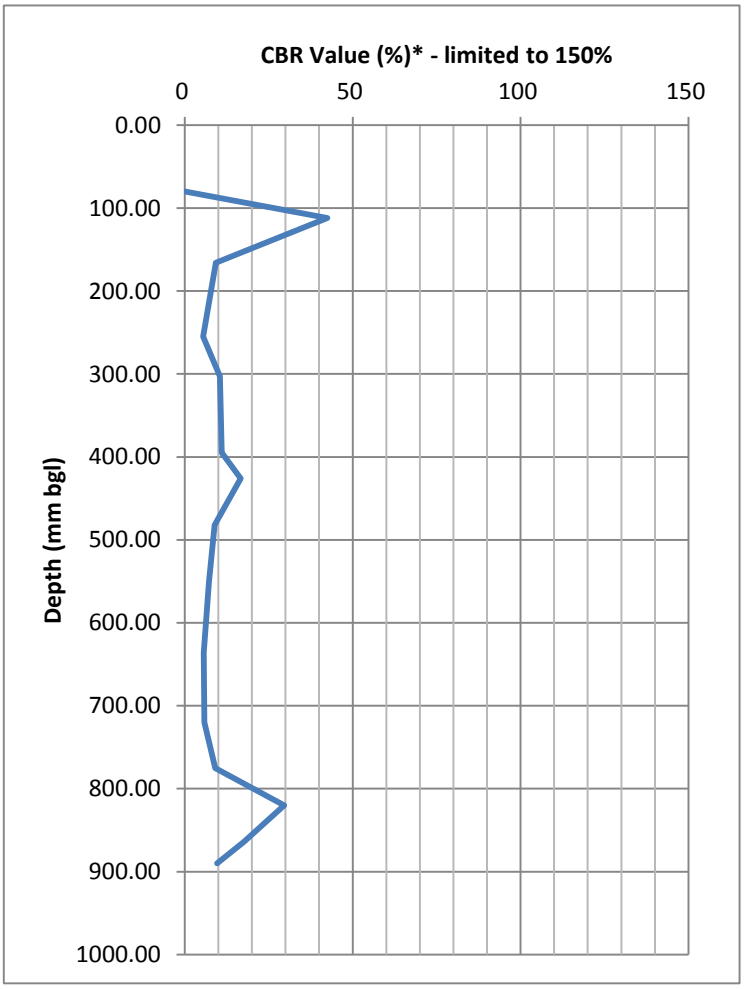
* CBR Interpretation based on the TRRL Road Note 8 equation: $Log_{10}(CBR) = 2.48 - [1.057 \times Log_{10}(mm/blow)]$

TRL Dynamic Cone Penetrometer - Determination of CBR Value (%)*

Site Name	Hounslow	**Starting Depth (mm bgl)**	80.00
Job Number	18-0170.01	**Surface Level (m AOD)**	80
Test No.	DCP105	**Easting**	
Date of Test	14-Mar-18	**Northing**	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)*
1	5	5	32	112	**42.4**
2	10	15	288	400	**8.7**
3	12	27	380	780	**7.8**
4	9	36	150	930	**15.4**





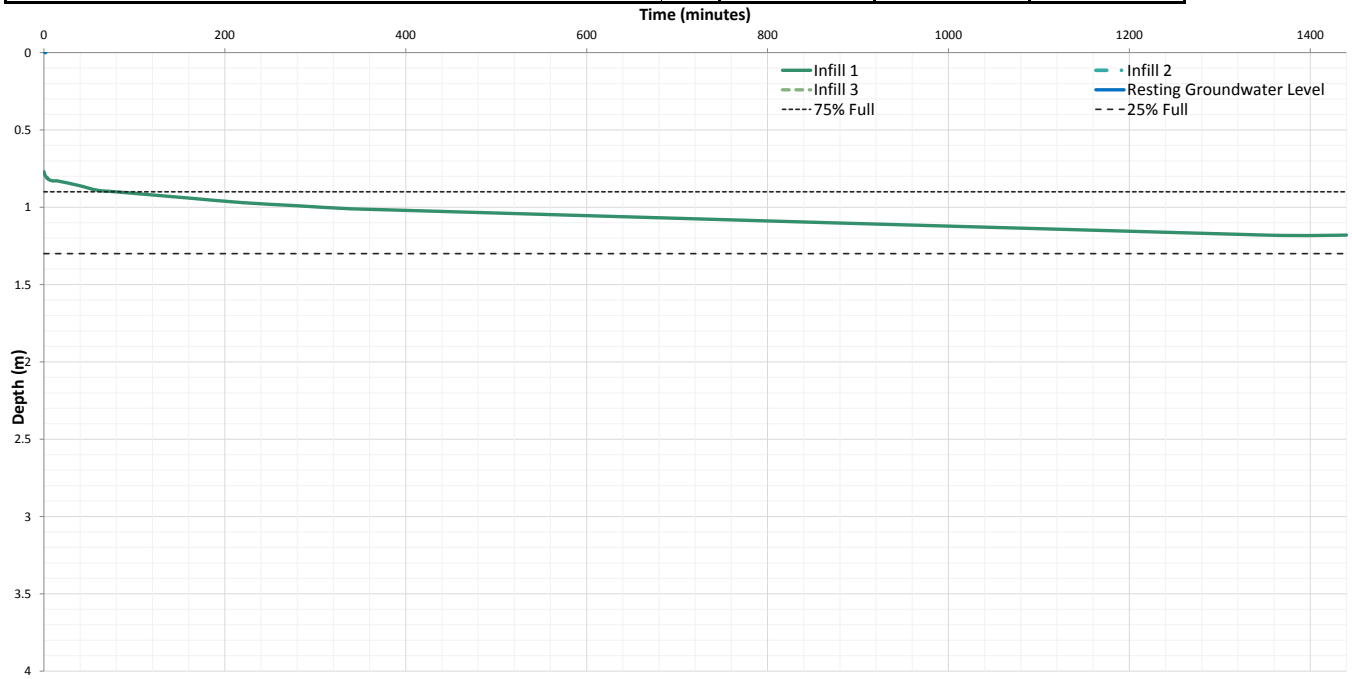
* CBR Interpretation based on the TRRL Road Note 8 equation: $Log_{10}(CBR) = 2.48 - [1.057 \times Log_{10}(mm/blow)]$

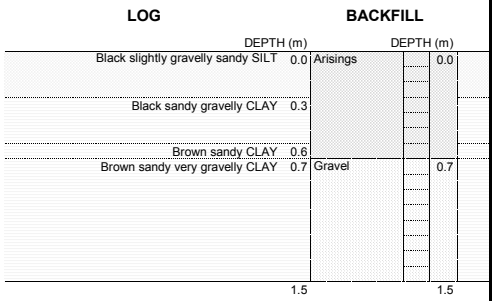
Appendix D – BRE365 Infiltration Report Sheets

	units	Infill 1	Infill 2	Infill 3
Length	m		2.00	
Width	m		0.60	
Depth	m		1.50	
Gravel type			20mm single size	
Voids ratio			0.40	
Resting groundwater level at time of testing	m		Dry	
Depth of first reading	m	0.77	0.00	0.00
Depth of final reading	m	1.18	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.87	0.00	0.00
Depth at 25% full/effective depth	m	1.08	0.00	0.00
Time at 75% full/effective depth	mins	47.33	#N/A	#N/A
Time at 25% full/effective depth	mins	740.77	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.10	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m^2	2.27	1.20	1.20
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	693.43	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





deltasimons

TITLE: Soakaway Test Results
Turing House
Bowmer and Kirkland

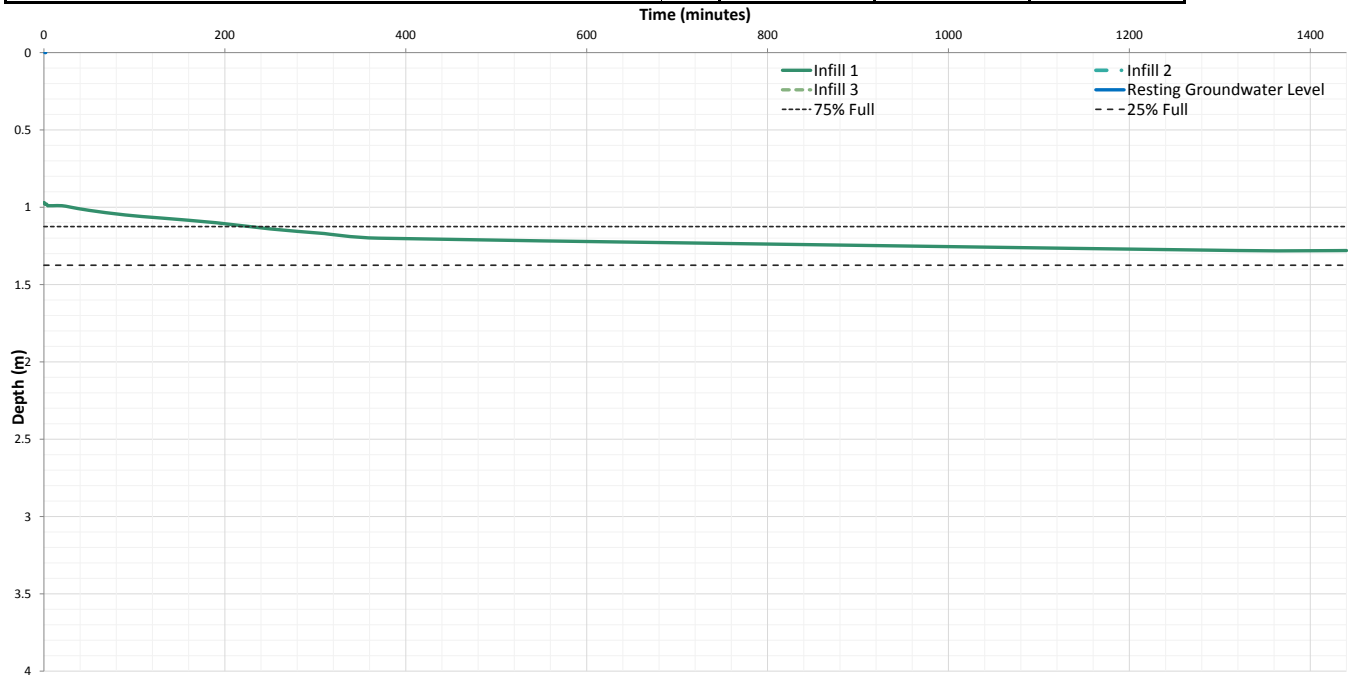
In accordance with BRE Digest 365 (2016)

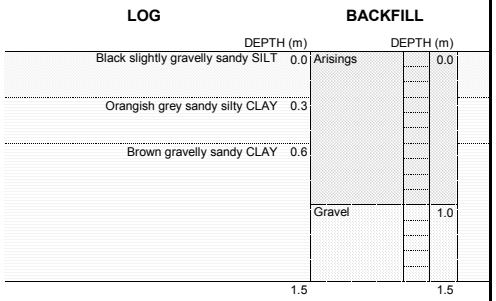
DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 18-0170.01	
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA103	
DATE: 20/03/2017			

	units	Infill 1	Infill 2	Infill 3
Length	m		2.00	
Width	m		0.60	
Depth	m		1.50	
Gravel type			20mm single size	
Voids ratio			0.40	
Resting groundwater level at time of testing	m		Dry	
Depth of first reading	m	0.97	0.00	0.00
Depth of final reading	m	1.28	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	1.05	0.00	0.00
Depth at 25% full/effective depth	m	1.20	0.00	0.00
Time at 75% full/effective depth	mins	86.67	#N/A	#N/A
Time at 25% full/effective depth	mins	399.69	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.07	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m^2	2.01	1.20	1.20
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	313.02	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





deltasimons

TITLE: Soakaway Test Results
Turing House
Bowmer and Kirkland

In accordance with BRE Digest 365 (2016)

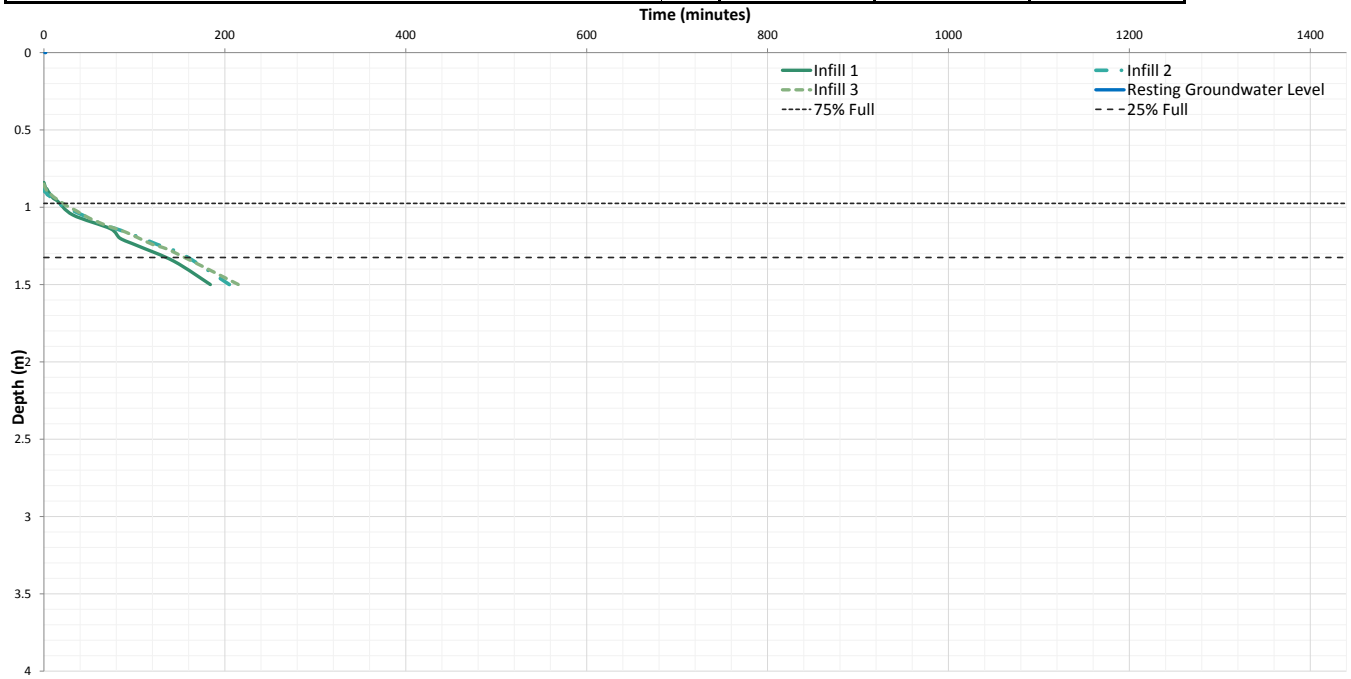
DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 18-0170.01	
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA102	
DATE: 20/03/2017			

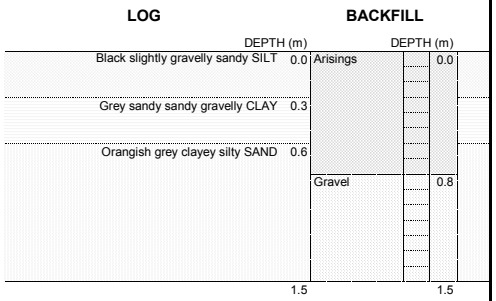
	units	Infill 1	Infill 2	Infill 3
Length	m		2.00	
Width	m		0.60	
Depth	m		1.50	
Gravel type			20mm single size	
Voids ratio			0.40	
Resting groundwater level at time of testing	m		Dry	
Depth of first reading	m	0.84	0.88	0.85
Depth of final reading	m	1.50	1.50	1.50
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		Yes	Yes	Yes
Depth at 75% full/effective depth	m	1.01	1.04	1.01
Depth at 25% full/effective depth	m	1.34	1.35	1.34
Time at 75% full/effective depth	mins	23.50	36.88	32.50
Time at 25% full/effective depth	mins	138.00	164.21	159.60
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.16	0.15	0.16
Mean surface area for outflow (50% full/effective depth)	m^2	2.92	2.81	2.89
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	114.50	127.34	127.10
Soil infiltration rate, f =	m/s	0.00000791	0.00000693	0.00000708
or	m/s	7.9E-06	6.9E-06	7.1E-06

Recommended soil infiltration rate

6.9E-06	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





deltasimons

TITLE: Soakaway Test Results
Turing House
Bowmer and Kirkland

In accordance with BRE Digest 365 (2016)

DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 18-0170.01	
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA101	
DATE: 20/03/2017			

Appendix E - Monitoring Records

Site Name	Turing House, Hounslow	Job number	18-0170.01	WEATHER	Start	End
				Time	9:25	11:45
Client	Bowmer and Kirkland	Recorded by	FH	Pressure (mb)	993	993
				Wind speed (m/s)	5.83	5.83
Date (DD/MM/YYYY)	04/04/2018			Wind Dir. (from)	S	S
Gas Analyser	GA2000 (LON) - GA10648	Visit Number	3	Temperature (°C)	9.00	12.00
Readings at start	CH_4 (% v/v) 0.0	CO_2 (% v/v) 0.1	O_2 (% v/v) 21.8	H_2S (ppm) 0		Dry/Rain/Snow/Ice	Intermittent rain	Dry
General comments						Rising/Falling Trend (for the three days before visit)		

Ref	GROUND GAS													GROUNDWATER			Notes
	Flow		CH_4		CO_2		O_2		H_2S	CO	VOC	Differential (Relative) Pressure	Atmos. Pressure	Depth to free product	Depth to water	Depth to base	(e.g. water colour, sheen, odour, damage to well or gas tap, flooded ground etc.)
	l/hr		% v/v		% v/v		% v/v		ppm								
	Max	Steady	Max	Steady	Max	Steady	Min	Steady	Max	Max	Max	mb	mb	m	m	m	
	The formulae require that only numbers, "<0.1" for ground gas and flow or "DRY" for groundwater are entered in the sheet																
CP102	0.2	<0.1	<0.1	<0.1	3.3	3.3	18.9	18.9	0.0			0.5	993.0		2.30	10.00	
CP103	-1.0	-1.0	<0.1	<0.1	3.9	3.8	16.4	16.4	0			0.5	993		1.85	4.78	
DS104	NR	NR	NR	NR	NR	NR	NR	NR	NR			NR	NR		NR	NR	Could not locate borehole
DS105	<0.1	<0.1	0.1	0.1	3.8	3.8	16.8	16.8	0			0.5	993		1.31	2.45	

Site Name	Turing House, Hounslow	Job number	18-0170.01	WEATHER	Start	End
				Time	12:00	15:00
Client	Bowmer and Kirkland	Recorded by	JM	Pressure (mb)	1029	1029
				Wind speed (m/s)	NR	NR
Date (DD/MM/YYYY)	21/03/2018			Wind Dir. (from)	NR	NR
Gas Analyser	GFM435 (Gas Kit 5) - 12233	Visit Number	2	Temperature (°C)	9.00	11.00
Readings at start	CH_4 (% v/v) 0.0	CO_2 (% v/v) 0.1	O_2 (% v/v) 20.5	H_2S (ppm) -60		Dry/Rain/Snow/Ice	Dry	Dry
General comments						Rising/Falling Trend (for the three days before visit)		

Ref	GROUND GAS													GROUNDWATER			Notes
	Flow		CH_4		CO_2		O_2		H_2S	CO	VOC	Differential (Relative) Pressure	Atmos. Pressure	Depth to free product	Depth to water	Depth to base	(e.g. water colour, sheen, odour, damage to well or gas tap, flooded ground etc.)
	l/hr		% v/v		% v/v		% v/v		ppm								
	Max	Steady	Max	Steady	Max	Steady	Min	Steady	Max	Max	Max	mb	mb	m	m	m	
	The formulae require that only numbers, "<0.1" for ground gas and flow or "DRY" for groundwater are entered in the sheet																
CP102	2.2	2.2	0.0	0.0	0.5	0.4	20.6	20.6		1			1029				Bung Unremoveable
CP103	0.0	0.0	0.0	0.0	3.3	3.3	12.1	12.0		1			1029		2.12	4.70	Brown gw
DS104	0.0	0.0	0.1	0.1	4.8	4.8	16.5	16.5		0			1029		2.41	3.26	Clear gw
DS105	0.0	0.0	0.0	0.0	2.2	2.2	18.3	18.3		1			1029		2.21	2.54	Clear gw

Site Name	Turing House, Hounslow	Job number	18-0170.01	WEATHER	Start	End
				Time	11:00	14:30
Client	Bowmer and Kirkland	Recorded by	JM	Pressure (mb)	1003	1002
				Wind speed (m/s)	NR	NR
Date (DD/MM/YYYY)	14/03/2018			Wind Dir. (from)	NR	NR
Gas Analyser	GA5000 (DUR)	Visit Number	1	Temperature (°C)	NR	NR
Readings at start	CH_4 (% v/v) NR; CO_2 (% v/v) NR; O_2 (% v/v) NR; H_2S (ppm) NR			Dry/Rain/Snow/Ice	Dry	Dry
General comments				Rising/Falling Trend (for the three days before visit)		

Ref	GROUND GAS													GROUNDWATER			Notes (e.g. water colour, sheen, odour, damage to well or gas tap, flooded ground etc.)
	Flow		CH_4		CO_2		O_2		H_2S	CO	VOC	Differential (Relative) Pressure	Atmos. Pressure	Depth to free product	Depth to water	Depth to base	
	l/hr		% v/v		% v/v		% v/v		ppm								
	Max	Steady	Max	Steady	Max	Steady	Min	Steady	Max	Max	Max	mb	mb	m	m	m	
	The formulae require that only numbers, "<0.1" for ground gas and flow or "DRY" for groundwater are entered in the sheet																
CP102	0.2	<0.1	<0.1	<0.1	3.3	3.3	18.9	18.9	0				1003		2.30	10.00	
CP103	0.1	0.1	<0.1	<0.1	2.5	2.5	14.8	14.8	0				1002		2.10	4.79	
DS104	<0.1	<0.1	0.2	0.2	4.0	4.0	17.8	17.8	0				1002		2.48	3.27	
DS105	0.1	<0.1	0.5	<0.1	1.9	1.7	17.4	18.0	0				1002		2.28	2.54	

Document No. C101	Version: 1.1	Issue Date: 11/07/17	Author: J Rhoades / S Steele	Authorised By:K Hughes

deltasimons

Appendix F - Chemical Analysis

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-07129-1
Initial Date of Issue:	16-Mar-2018
Client	Delta Simons
Client Address:	3 Henley Office Park Doddington Road Lincoln Lincolnshire LN6 3QR
Contact(s):	David Oreja Piris Paul Huteson
Project	18-0170.01 Hounslow

Quotation No.:		**Date Received:**	14-Mar-2018
Order No.:	DS37337	**Date Instructed:**	14-Mar-2018
No. of Samples:	5		
Turnaround (Wkdays):	3	**Results Due:**	16-Mar-2018
Date Approved:	16-Mar-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0170.01 Hounslow

Client: Delta Simons				**Chemtest Job No.:**	18-07129	18-07129	18-07129	18-07129	18-07129
Quotation No.:				**Chemtest Sample ID.:**	591812	591813	591814	591816	591818
Order No.: DS37337				Client Sample Ref.:	DS101	DS101	DS102	DS104	DS105
				Client Sample ID.:	ES1	ES2	ES1	ES1	ES1
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.70	0.40	0.15	0.40
				Date Sampled:	06-Mar-2018	06-Mar-2018	06-Mar-2018	06-Mar-2018	06-Mar-2018
				Asbestos Lab:				COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A				-	-
Asbestos Identification	U	2192	%	0.001				No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	9.0	7.7	13	7.1	11
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones, Roots	Stones	Stones, Roots	Stones	Stones, Roots
Soil Texture	N	2040		N/A	Loam	Sand	Clay	Sand	Sand
pH	M	2010		N/A		7.8			
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.47		< 0.40	1.3	0.50
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		< 0.010			
Arsenic	M	2450	mg/kg	1.0	12		17	19	14
Cadmium	M	2450	mg/kg	0.10	0.50		0.16	0.23	0.64
Chromium	M	2450	mg/kg	1.0	23		30	27	22
Copper	M	2450	mg/kg	0.50	17		13	23	18
Mercury	M	2450	mg/kg	0.10	0.36		0.13	0.14	0.45
Nickel	M	2450	mg/kg	0.50	14		16	21	13
Lead	M	2450	mg/kg	0.50	69		21	59	81
Selenium	M	2450	mg/kg	0.20	0.43		0.48	< 0.20	0.46
Zinc	M	2450	mg/kg	0.50	48		32	71	78
Total TPH >C6-C40	M	2670	mg/kg	10				51	22
Naphthalene	M	2700	mg/kg	0.10				< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10				0.34	< 0.10
Acenaphthene	M	2700	mg/kg	0.10				0.33	< 0.10
Fluorene	M	2700	mg/kg	0.10				0.12	< 0.10
Phenanthrene	M	2700	mg/kg	0.10				2.5	< 0.10
Anthracene	M	2700	mg/kg	0.10				1.1	< 0.10
Fluoranthene	M	2700	mg/kg	0.10				4.4	< 0.10
Pyrene	M	2700	mg/kg	0.10				4.0	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10				2.9	< 0.10
Chrysene	M	2700	mg/kg	0.10				1.7	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10				3.6	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10				1.4	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10				4.1	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10				1.1	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10				1.2	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10				2.2	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0				31	< 2.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

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 the indicated 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
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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

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.:	18-07134-1
Initial Date of Issue:	20-Mar-2018
Client	Delta Simons
Client Address:	3 Henley Office Park Doddington Road Lincoln Lincolnshire LN6 3QR
Contact(s):	David Oreja Piris Paul Huteson
Project	18-0170.01 Hounslow

Quotation No.:		**Date Received:**	14-Mar-2018
Order No.:	DS37337	**Date Instructed:**	14-Mar-2018
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	20-Mar-2018
Date Approved:	20-Mar-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Results - 2 Stage WAC

Project: 18-0170.01 Hounslow

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-07134						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	591827								
Sample Ref:	WAC 1								
Sample ID:									
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	08-Mar-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			2.6	3	5	6
Loss On Ignition	2610	U	%			5.3	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			12	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			5.5	100	--	--
pH	2010	U				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.022	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0077	0.0038	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.053	0.016	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0045	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0054	0.0019	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.026	0.0037	0.052	0.062	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	0.0027	0.0033	< 0.010	0.032	0.5	10	50
Antimony	1450	U	0.0093	0.0028	0.019	0.035	0.06	0.7	5
Selenium	1450	U	0.0017	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0096	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	56	8.3	110	140	800	15000	25000
Fluoride	1220	U	0.37	0.32	< 1.0	3.3	10	150	500
Sulphate	1220	U	220	38	440	580	1000	20000	50000
Total Dissolved Solids	1020	N	630	64	1300	1300	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	29	20	58	210	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	7.0

Leachate Test Information	
Leachant volume 1st extract/l	0.337
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.193

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 18-0170.01 Hounslow

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-07134						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	591828								
Sample Ref:	WAC 2								
Sample ID:									
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	08-Mar-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			3.9	3	5	6
Loss On Ignition	2610	U	%			7.3	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			120	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			27	100	--	--
pH	2010	U				8.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0090	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0046	0.0051	< 0.050	0.050	0.5	2	25
Barium	1450	U	0.016	0.010	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0047	0.0044	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.016	0.0052	< 0.050	0.068	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0087	< 0.010	0.074	0.5	10	50
Antimony	1450	U	0.0039	0.0023	< 0.010	0.025	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	0.0011	< 0.50	< 0.50	4	50	200
Chloride	1220	U	7.0	4.3	14	47	800	15000	25000
Fluoride	1220	U	0.26	0.26	< 1.0	2.6	10	150	500
Sulphate	1220	U	110	26	210	380	1000	20000	50000
Total Dissolved Solids	1020	N	240	56	480	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	26	18	52	190	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	9.4

Leachate Test Information	
Leachant volume 1st extract/l	0.332
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.265

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: 18-0170.01 Hounslow

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-07134						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	591829								
Sample Ref:	WAC 3								
Sample ID:									
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	08-Mar-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			3.5	3	5	6
Loss On Ignition	2610	U	%			8.2	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			46	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				6.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0050	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0025	0.0030	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.036	0.029	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00013	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0052	0.0040	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0051	0.0034	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0013	< 0.010	0.011	0.5	10	50
Antimony	1450	U	0.0021	0.0014	< 0.010	0.015	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0057	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	51	19	100	230	800	15000	25000
Fluoride	1220	U	0.15	0.30	< 1.0	2.8	10	150	500
Sulphate	1220	U	97	38	190	460	1000	20000	50000
Total Dissolved Solids	1020	N	660	69	1300	1500	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	72	56	140	580	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	11

Leachate Test Information	
Leachant volume 1st extract/l	0.328
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.226

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

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 the indicated 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
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-07139-1
Initial Date of Issue:	16-Mar-2018
Client	Delta Simons
Client Address:	3 Henley Office Park Doddington Road Lincoln Lincolnshire LN6 3QR
Contact(s):	Paul Huteson David Oreja Piris
Project	18-0170.01 Hounslow

Quotation No.:		**Date Received:**	14-Mar-2018
Order No.:	DS37337	**Date Instructed:**	14-Mar-2018
No. of Samples:	8		
Turnaround (Wkdays):	3	**Results Due:**	16-Mar-2018
Date Approved:	16-Mar-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Results - Soil

Project: 18-0170.01 Hounslow

Client: Delta Simons			**Chemtest Job No.:**		18-07139	18-07139	18-07139	18-07139	18-07139	18-07139	18-07139	18-07139
Quotation No.:			**Chemtest Sample ID.:**		591837	591838	591839	591840	591841	591842	591843	591844
Order No.: DS37337			Client Sample Ref.:		TP101	TP102	TP103	TP104	DS103	CP103	CP101	DS108
			Client Sample ID.:		ES1	ES1	ES1	ES1	D2	D10	D9	D1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	3.00	1.00	5.00	1.00
			Date Sampled:		08-Mar-2018	08-Mar-2018	08-Mar-2018	08-Mar-2018	08-Mar-2018	08-Mar-2018	08-Mar-2018	08-Mar-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY				
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-				
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected				
Moisture	N	2030	%	0.020					5.0	19	19	7.8
Soil Colour	N	2040		N/A					Brown	Brown	Brown	Brown
Other Material	N	2040		N/A					Stones	NONE	NONE	Stones
Soil Texture	N	2040		N/A					Sand	Clay	Clay	Clay
pH	U	2010		N/A					7.7	8.8	8.6	7.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010					0.013	0.13	0.10	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry

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 the indicated 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
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-07143-1
Initial Date of Issue:	19-Mar-2018
Client	Delta Simons
Client Address:	3 Henley Office Park Doddington Road Lincoln Lincolnshire LN6 3QR
Contact(s):	David Oreja Piris Paul Huteson
Project	18-0170.01 Hounslow

Quotation No.:		**Date Received:**	14-Mar-2018
Order No.:	DS37337	**Date Instructed:**	14-Mar-2018
No. of Samples:	6		
Turnaround (Wkdays):	4	**Results Due:**	19-Mar-2018
Date Approved:	19-Mar-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Results - Leachate

Project: 18-0170.01 Hounslow

Client: Delta Simons			**Chemtest Job No.:**		18-07143	18-07143	18-07143
Quotation No.:			**Chemtest Sample ID.:**		591873	591874	591875
Order No.: DS37337			Client Sample Ref.:		CORE 1	CORE 2	CORE 3
			Sample Type:		MISCSOLID	MISCSOLID	MISCSOLID
			Date Sampled:		07-Mar-2018	07-Mar-2018	07-Mar-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Chemtest
The right chemistry to deliver results

Results - Miscellaneous Solid

Project: 18-0170.01 Hounslow

Client: Delta Simons					**Chemtest Job No.:**	18-07143	18-07143	18-07143
Quotation No.:					**Chemtest Sample ID.:**	591873	591874	591875
Order No.: DS37337					Client Sample Ref.:	CORE 1	CORE 2	CORE 3
					Sample Type:	MISCSOLID	MISCSOLID	MISCSOLID
					Date Sampled:	07-Mar-2018	07-Mar-2018	07-Mar-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
TPH >C6-C10	N	2670	mg/kg	1.0		< 1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0		16	7.3	6.8
TPH >C21-C40	N	2670	mg/kg	1.0		390	110	130
Total TPH >C6-C40	N	2670	mg/kg	10.0		400	110	140
Naphthalene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Acenaphthene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Fluorene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Anthracene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Pyrene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Chrysene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Coronene	N	2700	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2700	mg/kg	2.0		< 2.0	< 2.0	< 2.0
Moisture	N		%	0.10		< 0.10	< 0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0170.01 Hounslow

Client: Delta Simons				**Chemtest Job No.:**	18-07143	18-07143	18-07143
Quotation No.:				**Chemtest Sample ID.:**	591867	591869	591871
Order No.: DS37337				Client Sample Ref.:	DS108	CP101	CP102
				Client Sample ID.:	ES1	ES1	ES1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.20	0.20	0.20
				Date Sampled:	07-Mar-2018	07-Mar-2018	07-Mar-2018
				Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A		-	-
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	12	17
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones, Roots1	Stones, Roots1	Stones, Roots 1
Soil Texture	N	2040		N/A	Sand	Loam	Loam
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.48	0.45	0.40
Arsenic	M	2450	mg/kg	1.0	17	20	18
Cadmium	M	2450	mg/kg	0.10	3.0	1.3	2.3
Chromium	M	2450	mg/kg	1.0	61	37	50
Copper	M	2450	mg/kg	0.50	60	33	47
Mercury	M	2450	mg/kg	0.10	1.1	0.99	0.92
Nickel	M	2450	mg/kg	0.50	20	18	18
Lead	M	2450	mg/kg	0.50	170	93	390
Selenium	M	2450	mg/kg	0.20	0.59	0.42	0.54
Zinc	M	2450	mg/kg	0.50	170	85	150
Total TPH >C6-C40	M	2670	mg/kg	10		< 10	< 10
Naphthalene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10		0.18	0.23
Anthracene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10		0.38	0.43
Pyrene	M	2700	mg/kg	0.10		0.30	0.57
Benzo[a]anthracene	M	2700	mg/kg	0.10		0.11	0.36
Chrysene	M	2700	mg/kg	0.10		0.24	0.27
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0		< 2.0	< 2.0

Test Methods

SOP	Title	Parameters included	Method summary
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

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 the indicated 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
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-07151-1
Initial Date of Issue:	16-Mar-2018
Client	Delta Simons
Client Address:	3 Henley Office Park Doddington Road Lincoln Lincolnshire LN6 3QR
Contact(s):	David Oreja Piris Paul Huteson
Project	18-0170.01 Hounslow

Quotation No.:		**Date Received:**	14-Mar-2018
Order No.:	DS37337	**Date Instructed:**	14-Mar-2018
No. of Samples:	4		
Turnaround (Wkdays):	3	**Results Due:**	16-Mar-2018
Date Approved:	16-Mar-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0170.01 Hounslow

Client: Delta Simons			**Chemtest Job No.:**		18-07151	18-07151	18-07151	18-07151
Quotation No.:			**Chemtest Sample ID.:**		591918	591920	591922	591924
Order No.: DS37337			Client Sample Ref.:		DS103	CP103	DS106	DS107
			Client Sample ID.:		ES1	ES1	ES1	ES1
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.20	0.20	0.20
			Date Sampled:		06-Mar-2018	06-Mar-2018	07-Mar-2018	07-Mar-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	7.2	13	15	17
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Roots5%	NONE
Soil Texture	N	2040		N/A	Sand	Sand,	Sand	Sand
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.74	0.72	0.58	1.2
Arsenic	U	2450	mg/kg	1.0	20	18	17	18
Cadmium	U	2450	mg/kg	0.10	0.24	2.9	3.2	3.7
Chromium	U	2450	mg/kg	1.0	29	53	57	66
Copper	U	2450	mg/kg	0.50	27	56	59	83
Mercury	U	2450	mg/kg	0.10	0.16	1.2	1.1	1.2
Nickel	U	2450	mg/kg	0.50	24	20	19	22
Lead	U	2450	mg/kg	0.50	320	170	190	400
Selenium	U	2450	mg/kg	0.20	< 0.20	0.97	0.77	0.92
Zinc	U	2450	mg/kg	0.50	78	170	170	230
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	0.90	< 0.10	< 0.10	0.73
Anthracene	U	2700	mg/kg	0.10	0.63	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	2.2	0.35	0.70	1.8
Pyrene	U	2700	mg/kg	0.10	2.4	0.53	0.55	1.3
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.6	< 0.10	< 0.10	0.85
Chrysene	U	2700	mg/kg	0.10	0.99	< 0.10	< 0.10	0.65
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	3.0	< 0.10	< 0.10	0.55
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.98	< 0.10	< 0.10	0.38
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.8	< 0.10	< 0.10	0.68
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	1.3	< 0.10	< 0.10	1.2
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	1.2	< 0.10	< 0.10	0.42
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	2.1	< 0.10	< 0.10	0.13
Total Of 16 PAH's	U	2700	mg/kg	2.0	19	< 2.0	< 2.0	8.7

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

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 the indicated 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
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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 G - Geotechnical Testing

LABORATORY REPORT

4043

Contract Number: PSL18/1219

Report Date: 10 April 2018

Client's Reference: 18-0170.01

Client Name: Delta Simons
3 Henley Office Park
Doddington Road
Lincoln
LN6 3QR

For the attention of: David Piris

Contract Title: Turing House, Hounslow/Bridge Farm

Date Received: 15/3/2018
Date Commenced: 15/3/2018
Date Completed: 10/4/2018

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

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	A Fry (Senior Technician)

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

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
CP101	D4		2.00		Brown sandy GRAVEL.
CP101	D6		3.50		Brown slightly gravelly slightly sandy CLAY.
CP101	D13		8.00		Greyish brown slightly sandy CLAY.
CP102	D6		4.00		Brown slightly sandy GRAVEL.
CP102	D9		5.50		Greyish brown slightly sandy CLAY.
CP102	D15		10.00		Greyish brown slightly sandy CLAY.
CP103	D5		3.00		Brown very gravelly SAND.
CP103	D7		4.70		Brown slightly gravelly slightly sandy CLAY.
CBR101			0.40	0.60	Brown very gravelly very sandy CLAY.
CBR107			0.20	0.50	Brown very gravelly very sandy CLAY.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
CP101	D4		2.00		4.2		2.69					
CP101	D6		3.50		28			62	27	35	94	High plasticity CH.
CP101	D13		8.00		30			69	29	40	100	High plasticity CH.
CP102	D6		4.00		2.7		2.70					
CP102	D9		5.50		30			70	29	41	100	Very high plasticity CV.
CP102	D15		10.00		28			72	30	42	100	Very high plasticity CV.
CP103	D5		3.00		8.3		2.67					
CP103	D7		4.70		30			65	28	37	93	High plasticity CH.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Turing House, Hounslow/Bridge Farm

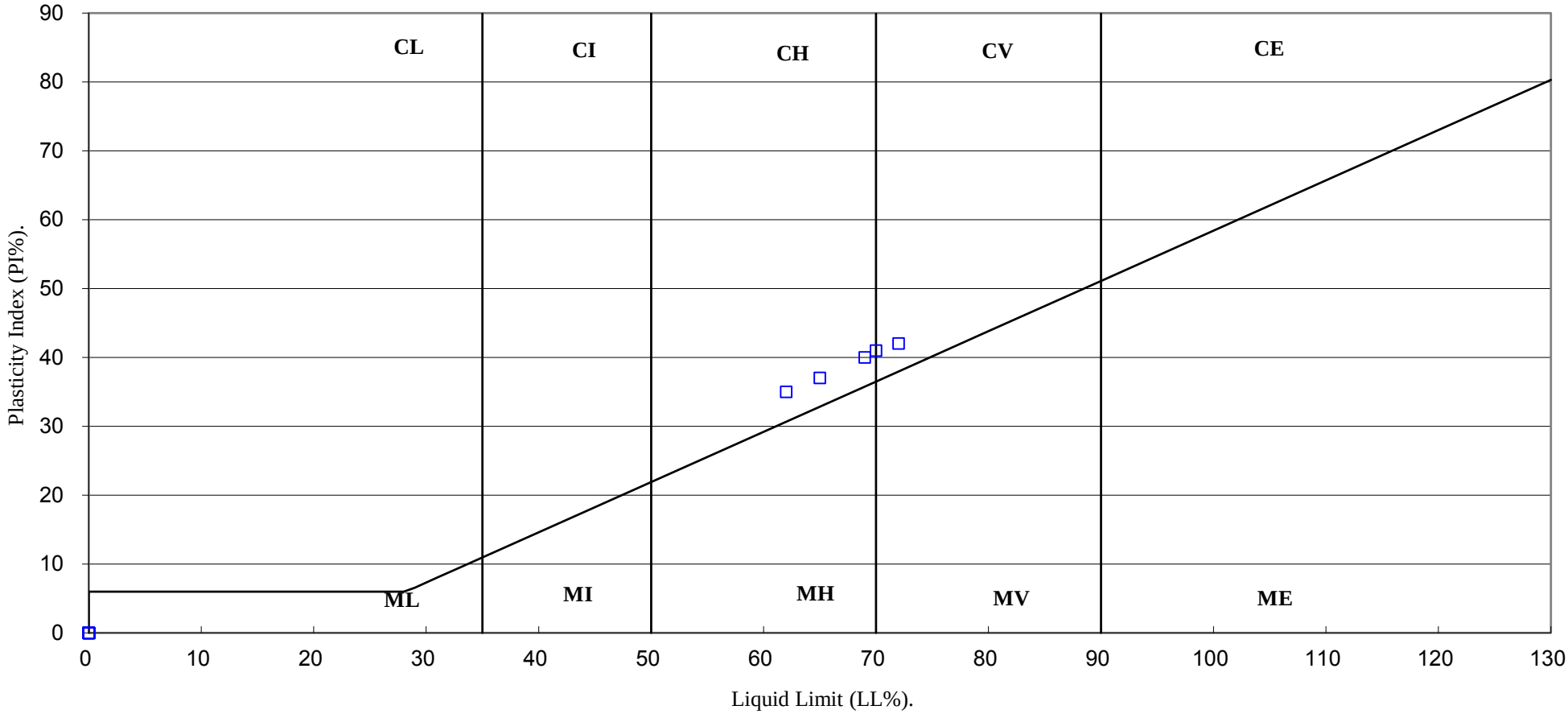
Contract No:

PSL18/1219

Client Ref:

18-0170.01

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Turing House, Hounslow/Bridge Farm	**Contract No:** PSL18/1219 **Client Ref:** 18-0170.01

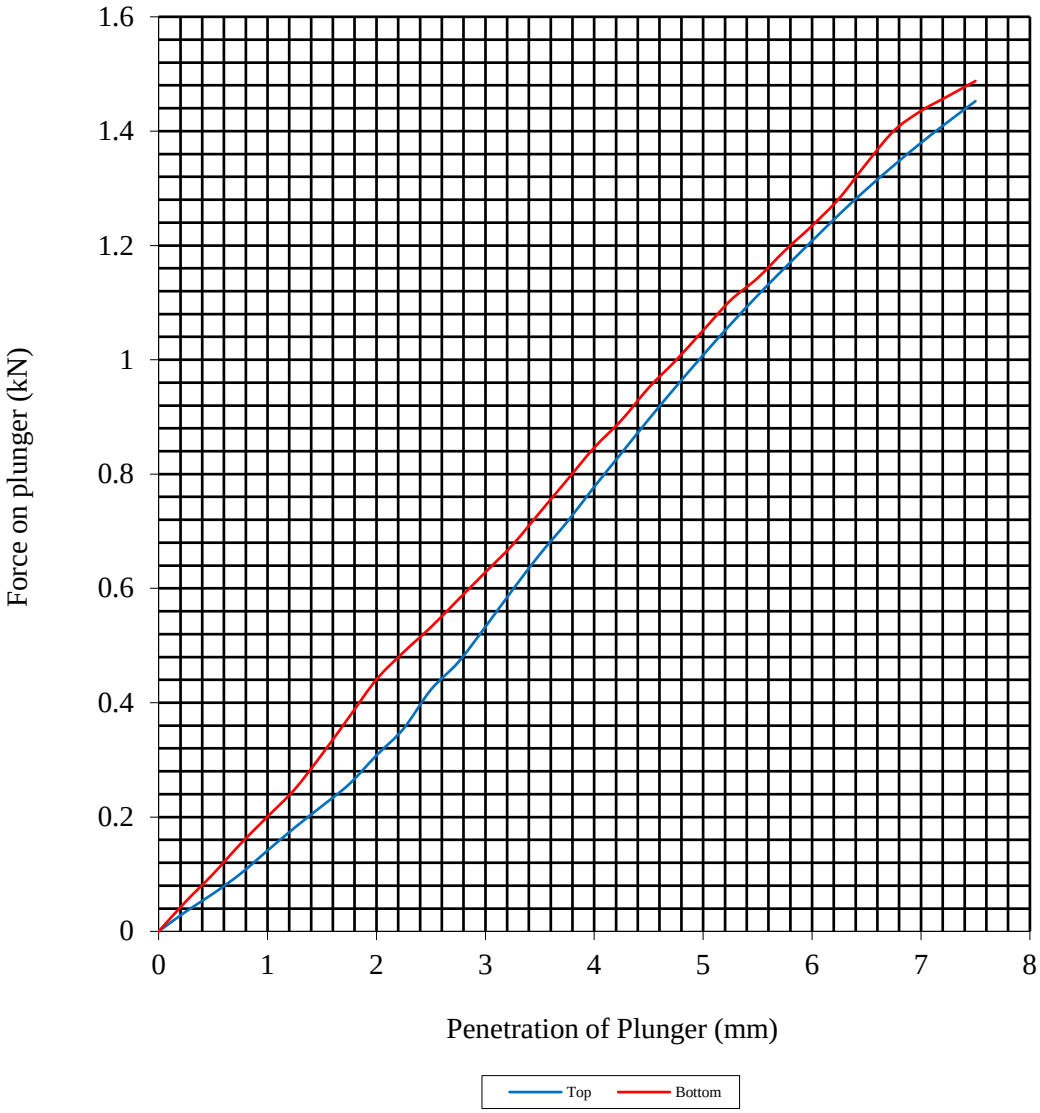
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: CBR101 **Top Depth (m):** 0.40

Sample Number: **Base Depth (m):** 0.60

Sample Type:



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	13	Sample Top	5.0
Bulk Density Mg/m3:	2.19	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	5.3
Dry Density Mg/m3:	1.95	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			24				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Turing House, Hounslow/Bridge Farm

Contract No: PSL18/1219

Client Ref: 18-0170.01

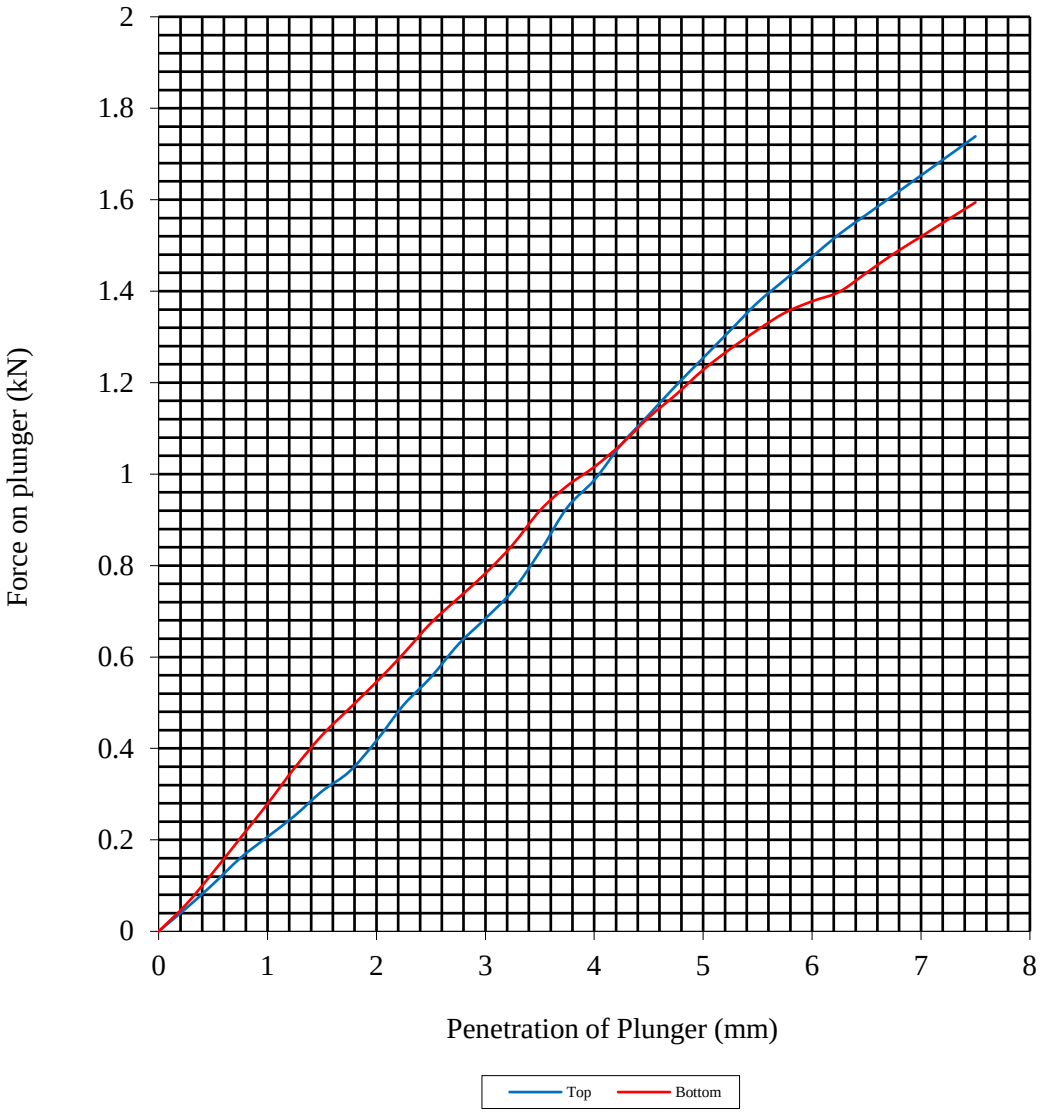
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: CBR107 **Top Depth (m):** 0.20

Sample Number: **Base Depth (m):** 0.50

Sample Type:



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	11	Surcharge Kg:	4.20	Sample Top	11	Sample Top	6.3
Bulk Density Mg/m3:	2.22	Soaking Time hrs	0	Sample Bottom	11	Sample Bottom	6.1
Dry Density Mg/m3:	2.01	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			10				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Turing House, Hounslow/Bridge Farm

Contract No: PSL18/1219

Client Ref: 18-0170.01

Appendix H - Generic Assessment Criteria

Residential Without Plant Uptake – CAT 1 Limited Investigation

A tiered risk assessment approach is used for the assessment of soil analysis results considering the 'pollutant linkages' on the basis of a 'source-pathway-receptor' relationship.

The following tables presents conservative Generic Assessment Criteria (GAC) used by Delta-Simons to provide an initial assessment of risk to Human Health in the context of the proposed redevelopment of the Site.

GACs are intended to assess:

- Chronic (long-term) on-site exposure risk to contaminants in the soil to future users and occupiers of the Site.
- Concentrations below the GAC considered tolerable or to pose a minimal risk to human health, or low risk in relation to the Category 4 Screening Levels (C4SLs).

GACs are not relevant for assessing:

- Acute (short-term) exposure risks (e.g. construction workers during development);
- Non-human receptors such as controlled waters, ecosystems, buildings and services, animals, domestic pets or plants;
- Aesthetic issues which may render a soil unsuitable for use such as odour or colour;
- GACs do not take account of other non-soil based sources of contamination such as contamination in groundwater or surface waters; and
- GACs are not suitable for assessing whether a soil provides a suitable growing medium for crops or plants.

Exceedences of Generic Assessment Criteria

An exceedence of a GAC:

- Is not an indicator of a significant risk to human health;
- Is an indication that the contaminant may pose a possibility harm to human health and, therefore, further consideration is required.

In assessing the significance of an exceedence consideration should be given to:

- The nature of the contaminant (e.g. volatile or non-volatile contaminants)
- Site design and potential exposure pathways (e.g. hard cover, buildings, landscaping)
- The distribution of exceedences (widespread or localised, numerous or few exceedences – NB: Consider data limitations – site coverage and gaps in data.
- The margin of the exceedence(s);
- The duration and frequency of exposure; and
- Any other site specific factors.

Metals

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Antimony	*550*	*EIC*	*550*	*EIC*	550	EIC
Arsenic	*40*	*LQM*	*40*	*LQM*	40	LQM
Arsenic	*40*	*C4SL*	*40*	*C4SL*	40	C4SL
Barium	*1,300*	*EIC*	*1,300*	*EIC*	1,300	EIC
Beryllium	*1.7*	*LQM*	*1.7*	*LQM*	1.7	LQM
Boron	*11000*	*LQM*	*11000*	*LQM*	11000	LQM
Cadmium	*85*	*LQM*	*85*	*LQM*	85	LQM
Cadmium	*150*	*C4SL*	*150*	*C4SL*	150	C4SL
Chromium (III)	*910*	*LQM*	*910*	*LQM*	910	LQM
Chromium (VI)	*6*	*LQM*	*6*	*LQM*	6	LQM
Chromium (VI)	*21*	*C4SL*	*21*	*C4SL*	21	C4SL
Copper	*7100*	*LQM*	*7100*	*LQM*	7100	LQM
Lead	*310*	*C4SL*	*310*	*C4SL*	310	C4SL
Mercury (Elemental)	0.2	DS-GAC	0.5	DS-GAC	1.0	DS-GAC
Mercury (Elemental)	-	-	-	-	1.2	LQM
Mercury (Inorganic)	*56*	*LQM*	*56*	*LQM*	56	LQM
Mercury (Methyl)	8.4	DS-GAC	12	DS-GAC	14	DS-GAC
Mercury (Methyl)	-	-	-	-	15	LQM
Molybdenum	*670*	*EIC*	*670*	*EIC*	670	EIC
Nickel	*180*	*LQM*	*180*	*LQM*	180	LQM
Selenium	*430*	*LQM*	*430*	*LQM*	430	LQM
Vanadium	*1200*	*LQM*	*1200*	*LQM*	1200	LQM
Zinc	*40000*	*LQM*	*40000*	*LQM*	40000	LQM

Italics– These values were derived based on a 6% SOM, however, the supporting documentation indicates that SOM has a negligible influence for these metals.

Petroleum Hydrocarbons

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Aliphatic EC5-EC6	42	LQM	78	LQM	160	LQM
Aliphatic >EC6-EC8	100	LQM	230	LQM	530	LQM
Aliphatic >EC8-EC10	27	LQM	65	LQM	150	LQM
Aliphatic >EC10-EC12	130 (48)	LQM	330 (118)	LQM	770 (283)	LQM
Aliphatic >EC12-EC16	1100 (24)	LQM	2400 (59)	LQM	4400 (142)	LQM
Aliphatic >EC16-EC35	65000 (8.48)	LQM	92000 (21)	LQM	110000	LQM
Aliphatic >EC35-EC44	65000 (8.48)	LQM	92000 (21)	LQM	110000	LQM
Aromatic >EC5-EC7	370	LQM	690	LQM	1400	LQM
Aromatic >EC7-EC8	860	LQM	1800	LQM	3900	LQM
Aromatic >EC8-EC10	47	LQM	110	LQM	270	LQM
Aromatic >EC10-EC12	250	LQM	590	LQM	1200	LQM
Aromatic >EC12-EC16	1800	LQM	2300 (419)	LQM	2500	LQM
Aromatic >EC16-EC21	1900	LQM	1900	LQM	1900	LQM
Aromatic >EC21-EC35	1900	LQM	1900	LQM	1900	LQM
Aromatic >EC35-EC44	1900	LQM	1900	LQM	1900	LQM
Aromatic and Aliphatic >EC44-EC70	1900	LQM	1900	LQM	1900	LQM

Polycyclic Aromatic Hydrocarbons (PAH)

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Naphthalene	2.3	LQM	5.6	LQM	13	LQM
Acenaphthylene	2900 (86.1)	LQM	4600 (212)	LQM	6000 (506)	LQM
Acenaphthene	3000 (57)	LQM	4700 (141)	LQM	6000 (336)	LQM
Fluorene	2800 (30.9)	LQM	3800 (76.5)	LQM	4500 (183)	LQM
Phenanthrene	1300 (36)	LQM	1500	LQM	1500	LQM
Anthracene	31000 (1.17)	LQM	35000	LQM	37000	LQM
Fluoranthene	1500	LQM	1600	LQM	1600	LQM
Pyrene	3700	LQM	3800	LQM	3800	LQM
Benz[a]anthracene	11	LQM	14	LQM	15	LQM
Chrysene	30	LQM	31	LQM	32	LQM
Benzo[b]fluoranthene	3.9	LQM	4	LQM	4	LQM
Benzo[k]fluoranthene	110	LQM	110	LQM	110	LQM
Benzo[a]pyrene	3.2	LQM	3.2	LQM	3.2	LQM
Benzo[a]pyrene	*5.3*	*C4SL*	*5.3*	*C4SL*	5.3	C4SL
Indeno[123-cd]pyrene	45	LQM	46	LQM	46	LQM
Dibenz[ah]anthracene	0.31	LQM	0.32	LQM	0.32	LQM
Benzo[ghi]perylene	360	LQM	360	LQM	360	LQM

C4SL for benzo(a)pyrene is based on 6% SOM only, however, the published C4SL Final Project Report indicates that SOM has a negligible influence for this compound.

Volatile Organic Compounds (VOC)

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
BTEX/MTBE						
Benzene	0.38	LQM	0.7	LQM	1.4	LQM
Benzene	0.89	C4SL	-	-	3.3	C4SL
Toluene	880 (869)	LQM	1900	LQM	3900	LQM
Ethylbenzene	83	LQM	190	LQM	440	LQM
o-Xylene	88	LQM	210	LQM	480	LQM
m-Xylele	82	LQM	190	LQM	450	LQM
p-Xylene	79	LQM	180	LQM	430	LQM
Methyl *tert*-butyl ether	73	EIC	120	EIC	220	EIC
Chlorinated Solvents						
Vinyl Chloride (Chloroethene)	0.00077	LQM	0.001	LQM	0.0015	LQM
Trichloromethane (Chloroform)	1.2	LQM	2.1	LQM	4.2	LQM
1,2-Dichloroethane (1,2-DCA)	0.0092	LQM	0.013	LQM	0.023	LQM
Trichloroethene (TCE)	0.017	LQM	0.036	LQM	0.08	LQM
1,1,1-Trichloroethane	9	LQM	18	LQM	40	LQM
Tetrachloroethene (PCE)	0.18	LQM	0.4	LQM	0.92	LQM
1,1,1,2-Tetrachlroroethanes	1.5	LQM	3.5	LQM	8.2	LQM

1,1,2,2-Tetrachlroroethane	3.9	LQM	8	LQM	17	LQM
Tetrachloromethane	0.026	LQM	0.056	LQM	0.13	LQM
1,1,2 Trichloroethane	0.88	EIC	1.8	EIC	3.9	EIC
1,1-Dichloroethane	2.5	EIC	4.1	EIC	7.7	EIC
1,1-Dichloroethene	0.23	EIC	0.41	EIC	0.82	EIC
Cis 1,2-Dichloroethene	0.12	EIC	0.2	EIC	0.39	EIC
Trans 1,2-dichloroethene	0.19	EIC	0.35	EIC	0.71	EIC
Benzenes						
Chlorobenzene	0.46	LQM	1	LQM	2.4	LQM
1,2,4-Trimethylbenzene	0.41	EIC	0.99	EIC	2.3	EIC
Iso-propylbenzene	12	EIC	28	EIC	67	EIC
Propylbenzene	40	EIC	97	EIC	230	EIC
Other						
Bromobenzene	0.91	EIC	2.1	EIC	4.9	EIC
Bromodichloromethane	5.2	EIC	11	EIC	23	EIC
Carbon Disulphide	0.14	LQM	0.29	LQM	0.62	LQM
Chloroethane	8.4	EIC	11	EIC	18	EIC
Chloromethane	0.0085	EIC	0.0099	EIC	0.013	EIC
Dichloromethane	2.1	EIC	2.8	EIC	4.5	EIC
1,2-Dichloropropane	0.024	EIC	0.042	EIC	0.085	EIC
Hexachlorobutadiene	0.32	LQM	0.78	LQM	1.8	LQM
Styrene	35	EIC	78	EIC	170	EIC

Semi-Volatile Organic Compounds (SVOC) and Other Organic Compounds

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Chlorobenzenes		Δ	Δ			
1,2-Dichlorobenzene	24	LQM	57	LQM	130	LQM
1,3-Dichlorobenzene	0.44	LQM	1.1	LQM	2.5	LQM
1,4-Dichlorobenzene	61	LQM	150	LQM	350	LQM
1,2,3-Trichlorobenzene	1.5	LQM	3.7	LQM	8.8	LQM
1,2,4-Trichlorobenzene	2.6	LQM	6.4	LQM	15	LQM
1,3,5-Trichlorobenzene	0.33	LQM	0.81	LQM	1.9	LQM
1,2,3,4-Tetrachlorobenzene	24	LQM	56	LQM	120	LQM
1,2,3,5-Tetrachlorobenzene	0.75	LQM	1.9	LQM	4.3	LQM
1,2,4,5-Tetrachlorobenzene	0.73	LQM	1.7	LQM	3.5	LQM
Pentachlorobenzene	19	LQM	30	LQM	38	LQM
Hexachlorobenzene	4.1 (0.2)	LQM	5.7 (0.5)	LQM	6.7 (1.2)	LQM
Pthtalates						
Bis (2-ethylhexyl)phthalate	2,700 (8.68)	EIC	2,800 (21.6)	EIC	2,800 (51.7)	EIC
Diethyl phthalate	1,800 (13.7)	EIC	3,500 (29.1)	EIC	6,300 (65)	EIC
Di-*n*-butyl phthalate	450 (4.65)	EIC	450 (11.4)	EIC	450 (27.3)	EIC
Di-*n*-octyl phthalate	3,400 (32.6)	EIC	3,400 (81.5)	EIC	3,400 (196)	EIC

Butyl benzyl phthalate	42,000 (26.3)	EIC	44,000 (64.7)	EIC	44,000 (154)	EIC
Phenols						
Phenol	440	LQM	690	LQM	1200	LQM
2,4-Dimethylphenol	210	EIC	410	EIC	730	EIC
Total Cresols (2-, 3- and 4-methylphenol)	3,700	EIC	5,400	EIC	6,900	EIC
Chlorophenols						
Chlorophenols (except Pentachlorophenol)	94	LQM	150	LQM	210	LQM
Pentachlorophenol	27 (16.4)	LQM	29	LQM	31	LQM
Other						
Biphenyl	220 (34.4)	EIC	500 (84.3)	EIC	980 (201)	EIC
Bromoform	0.019	EIC	0.034	EIC	0.070	EIC
2-Chloronaphthalene	3.8	EIC	9.3	EIC	22	EIC
2,4-Dinitrotoluene	170 (141)	EIC	170	EIC	170	EIC
2,6-Dinitrotoluene	78	EIC	84	EIC	87	EIC
Hexachloroethane	0.22	EIC	0.54	EIC	1.3	EIC
Tributyl tin oxide	1.4	EIC	3.1	EIC	5.7	EIC

PCBs, Furans and Dioxins

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Sum of PCDDs, PCDFs and dioxin-like PCBs	-	-	-	-	0.008	SGV v.1.05

Pesticides and Herbicides

Compound	1% SOM	Δ Source	Δ 2.5 - 3% SOM	Source	6% SOM	Source
Aldrin	7.3	LQM	7.4	LQM	7.5	LQM
Dieldrin	7	LQM	7.3	LQM	7.4	LQM
Atrazine	610	LQM	620	LQM	620	LQM
Dichlorvos	6.4	LQM	6.5	LQM	6.6	LQM
Endosulfan (alpha)	160 (0.003)	LQM	280 (0.007)	LQM	410 (0.016)	LQM
Endosulfan (beta)	190 (0.00007)	LQM	320 (0.0002)	LQM	440 (0.0004)	LQM
alpha-Hexachlorocyclohexanes	6.9	LQM	9.2	LQM	11	LQM
beta-Hexachlorocyclohexanes	3.7	LQM	3.8	LQM	3.8	LQM
gamma-Hexachlorocyclohexanes (inc. Lindane)	2.9	LQM	3.3	LQM	3.5	LQM

The respective sources are:

- Soil Guidance Values (**SGV**) published by the EA;
- Category 4 Screening Levels (**C4SL**s) published by DEFRA;
- The 2014 Land Quality Management (**LQM**) / Chartered Institute of Environmental Health (CIEH) Suitable for Use Levels for Human Health Risk Assessment (S4ULs);

- The guidance values produced by the Environmental Industries Commission (**EIC**), the Association of Geotechnical and Geoenvironmental Specialists (AGS) and Contaminated Land: Application in Real Environments (CL:AIRE) in December 2009; and
- In house Generic Screening Values (**DS-GAC**s) derived by Delta-Simons.