AP GEOTECHNICS

Greggs Bakery / Twickenham

Phase II, Geoenvironmental Investigation

February 2019

CONTENTS

FORMER GREGGS BAKERY
GOULD ROAD
TWICKENHAM
TW2 6RT

Phase II
Geoenvironmental Investigation

Synopsis

An investigation has been carried out at the now defunct Greggs Bakery in Twickenham on the instructions of London Square. A Phase I Environmental Assessment[1] has been prepared for the site and should be read in conjunction with this report.

The purpose of the investigation was to determine the ground conditions and to provide recommendations in respect of foundation design and other geoenvironmental matters for the proposed mixed use development.

Five boreholes and 18 continuous open drive (windowless) samplers were carried out, supported by a programme of in situ and laboratory testing.

Conventional spread foundations are envisioned for the development and appropriate design data is provided. Chemical analysis revealed some slight contamination in the Made Ground and dissolved phase hydrocarbons in groundwater but insufficient to prejudice the development.

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[1] *Report No. 4609-1 Phase I Environmental Assessment. Former Greggs Bakery, Gould Road, Twickenham TW2 6RT. AP Geotechnics Ltd., 14 March 2017*

1
Site description

The area under investigation is an approximate 'L' shaped plot of land extending to some 1.12 hectares, as shown on Figure 1 at Appendix A. The site was, from 1953 until November 2016, a bakery and distribution depot for Greggs.

A full site description is available in the Phase 1 report to which the reader is referred.

2
Development proposals

It is intended to demolish the existing buildings and redevelop the site for both residential and commercial use. However, the exact configuration has yet to be finalised.

The latest iteration of the proposed ground floor general arrangement is given at Figure 2 of Appendix A.

3
Geology

Published records of the British Geological Survey (BGS) indicate the site to lie on Kempton Park Gravel over London Clay. No Made Ground or Worked Ground is mapped at the subject site.

4
Field work

The extent of the field work was agreed with London Square and comprised five boreholes drilled by light percussive techniques to a maximum depth of 20 m. The two external BHs were advanced with a conventional rig whilst the three internal ones were drilled with a demountable rig. In addition, 18 window samplers were carried out to give a more detailed description of the near surface soils and to gain greater spatial coverage of the site. The Phase 1 report includes an unexploded ordnance (UXO) threat assessment which concludes that there is a medium risk of UXOs at the site. The location of the boreholes and window samplers therefore had to be cleared of potential UXOs during drilling which was achieved with a UXO technician, magnetometer and use of stainless steel casing. The location of all exploratory points is shown on Figure 1 at Appendix A.

Representative soil samples were recovered from the boreholes for subsequent laboratory examination and testing; whilst Standard Penetration Tests (SPT) were carried out as appropriate. Details of the strata encountered are provided on the Borehole Records at Appendix B; together with particulars of the samples recovered, groundwater observations and SPT results. The profile of SPT with depth in the cable percussive boreholes is also presented at Figure 3 of Appendix A.

Standpipes were installed in boreholes 1, 2 & 5 and WS 13, 16 and 17 to allow monitoring of soil gas concentrations and groundwater levels. The results to date are presented at Appendix C.

Whilst positioning the exploratory locations a manhole cover was lifted in front of the offices which revealed a set of stairs descending into a basement. Greggs personnel confirmed there

was a basement under part of the northern portion of the offices but its extent is not known. No entry into the basement was made during the field work.

5
Laboratory testing

The following laboratory tests were conducted on soil samples recovered during the field work:-

- Natural moisture content: to assess the in situ condition of the soil.
- Liquid and Plastic Limits: to classify cohesive soil into behavioural groups.
- Particle size distribution: by sieve analysis to classify granular material.
- Unconsolidated undrained triaxial compression: to determine the shear strength of cohesive material and thus to assess its load bearing capacity.
- One-dimensional consolidation: to determine the deformation characteristics of clay under applied loading.
- Soluble sulphate and pH value: for the specification of buried concrete.
- Contamination: chemical analyses to detect the presence of contaminants as indicated by the Phase 1 Assessment, viz:-

Metals & metalloids:	Total arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc. Water soluble boron and hexavalent chromium.
Organic:	Petroleum hydrocarbons (TPH), polyaromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs) and phenols.
Others:	Asbestos screen and Waste Acceptance Criteria (WAC) full solid waste suite and 2 stage leachate suite.

Results of these tests are presented at Appendix D and the variation of shear strength with depth is shown at Figure 4 of Appendix A.

6
Ground conditions

6.1
Stratigraphy

The stratigraphy of the site as revealed by the investigation is described in detail at Appendix B and in general terms hereafter.

6.1.1
Made Ground

Made Ground was encountered in all exploratory locations under a surfacing of either asphalt, concrete or the former factory floor and was observed to a maximum depth of 1.7 m in WS2.

The Made Ground comprised both granular and cohesive material with the latter more prevalent. The granular material was represented by a black sand in BH2 and by fragments of brick and concrete in a matrix of silt and sand sized particles elsewhere.

The cohesive member was generally represented by a clay, sometimes sandy and with the addition of fragments of brick, concrete and flint. Relic topsoil was also encountered in WS1, 2, 10 and 18.

Window samplers 6 and 11 were terminated within Made Ground.

6.1.2
Superficial clay

Although not mapped at this location by the BGS, up to 1 m of mottled brown slightly sandy clay with occasional gravel was recorded. The superficial clay was encountered in 12 of the 23 exploratory locations and was observed to a maximum depth of 1.8 m in BH1.

6.1.3
Kempton Park Gravel

This stratum was encountered in all boreholes (save for WS6, 11 & 12) at depths ranging from 0.32 m in WS14 to 1.80 m in BH1. It was generally represented by a brown or orange brown sandy to very sandy flint gravel with occasional sand layers. The gravel was sometimes clayey in its upper reaches and was locally a sand and gravel.

The gravel was observed to a maximum depth of 9.15 m in BH3. The majority of WS holes were terminated within gravel at 4 m depth.

In situ testing indicates the gravels to be often in a very dense to dense state of compaction in the upper reaches, becoming medium dense with depth.

6.1.4
London Clay

London Clay was proved beneath the Kempton Park Gravel in the cable percussive boreholes and extended to the limit of investigation of 20 m depth.

The London Clay was represented by a dark grey clay which was locally fissured and is typical of the unweathered material.

Triaxial testing indicates the London Clay to be predominately stiff to very stiff. A firm result was recorded in the upper part of the London Clay in BH4. However, the other firm results are considered to be a result of premature failure due to fissures.

6.2
Groundwater

Groundwater was encountered at depths ranging from 2.4 m in WS13 to 4.2 m in BH2. However, the speed of drilling, the requirement to add water in granular material to aid the drilling process and the use of casing to support the bore may have masked any small inflows and impinged upon the accuracy of the observations.

Details of all groundwater observations during drilling are provided on the Borehole Records.

Standpipe readings taken during subsequent monitoring visits recorded the depth to groundwater at around the three metre mark in most standpipes. However, groundwater in BH2 has been consistently deeper, at some 6 m depth or so.

7
Discussion

7.1
General

The site has evidently already carried development and the investigation has revealed Made Ground to be present. It is likely that other pockets of Made Ground may also be present; perhaps deeper, of different character or associated with the remains of construction; even though not detected by this investigation.

All remnants of previous construction should be removed prior to redevelopment to enable the proposals to be constructed without hindrance and to perform satisfactorily.

A 375 mm diameter sewer lies under the site and discussions should start at an early stage with Thames Water regarding any potential impact on the proposed site layout. Thames Water may require exclusion zones over or adjacent to their sewer which could potentially affect the foundation design required.

7.2
Spread foundations

Made Ground is inherently variable in both composition and compaction and is therefore prone to large and unpredictable settlement. It does not form a reliable bearing stratum. The thin and laterally inconsistent superficial clay layers are also not considered suitable.

Foundations should therefore bear on the underlying Kempton Park Gravel throughout. Some disturbance may have occurred at the contact of the gravel with the overlying material and foundations should be constructed in undisturbed material. An allowance of 200 to 300 mm is often sufficient in this respect, foundations thus bearing at the minimum recommended depth of 0.9 m in the vicinity of WS14 & 15, increasing to around 2 m depth adjacent to BH1 and WS2.

Based upon the data provided by in situ testing, a net allowable bearing capacity of 200 kPa is available for conventional strip or pad foundations. Pad foundations should not be less than 750 mm side and a minimum width of 0.45m be employed for strip foundations to minimise the risk of overstress of locally weaker material. Deeper trench fill foundations should satisfy the minimum aspect ratio of 3/1 (depth/breadth) for the concrete to reduce the effect of any unintentional eccentricity of loading.

Total settlement of these foundations is not expected to exceed some 25 mm over a 25 year period, with approximately two thirds occurring immediately load is applied and the remainder at gradually decreasing rate over the ensuing years, although actual settlement is likely to be in the order of 15 mm or less.

7.3
Ground floor slabs

As stated in Section 7.2, Made Ground will not form a reliable bearing stratum, therefore suspended ground floor construction should be adopted unless natural gravel is present at shallow depth.

7.4
Excavations

All material likely to be encountered in general construction excavations should be regarded as unstable. Some apparent stability may be present immediately on excavation, especially where there is a high clay content, but this must not be relied upon. All excavations should therefore be supported at all times unless battered to a safe angle of repose. In any event, excavations to greater than 1.2 m depth should be supported at all times.

Provision of adequate support is especially important for the safety of personnel when required to work in or close to excavations. Particular care should be exercised where excavations are close to existing structures to ensure they do not experience any loss of support. Temporary and permanent works should be designed to resist the additional lateral earth pressures arising from any superimposed loads in addition to those generated by the soil itself, without significant deformation.

Observations during the intrusive works and the subsequent monitoring visits suggests that significant groundwater inflows are unlikely within general construction excavations. However, a perched water table may be established in the Made Ground, especially after periods of high rainfall but this is expected to drain into the underlying gravels where excavations are of sufficient depth.

7.5
Contaminant analysis

7.5.1
Solid phase

Contaminant testing was undertaken on selected soil samples and the results compared with the limited number of CLEA[2] Soil Guideline Values (SGVs) for residential land use that have been published to date. Where not available from that source, reference has also been made to the LQM/CIEH S4ULs for Human Health Risk Assessment[3]. Appropriate trigger levels are given with the results at Appendix D and individual values exceeding the triggers have been highlighted. Although some portions of the site may be developed for commercial use, the more conservative residential triggers have been used as an initial site wide screen to highlight any potential issues.

Analysis for metals and metalloids revealed all determinands to be below the triggers for residential land use with plant uptake.

No SGV exists for lead (the old SGV of 450 mg/kg having been withdrawn) and LQM have not calculated one. However, provisional Category 4 Screening Levels (C4SLs) have been

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[2] *The Contaminated Land Exposure Assessment Model, Department for Environment, Food and Rural Affairs, The Environment Agency, R & D Publications SGV 1 et al., March 2002*

[3] *The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, 2015*

published by Defra which suggest a maximum concentration of 210 mg/kg lead for residential land use with plant uptake (a number of different concentrations have been published, dependant on differing exposure scenarios). Samples from WS4, 5, 8 & 10 recorded lead in excess of this value with concentrations of 1350, 217, 333 and 230 mg/kg respectfully.

No phenols were recorded above the limit of detection for the test of 5 mg/kg

No polychlorinated biphenyls were recorded above the limit of detection for the test of 0.03 mg/kg in the two samples analysed. The samples were recovered from WS9, the closest location to the existing substation.

Analysis for speciated TPH recorded a maximum concentration of 5910 mg/kg in WS17 at 3.0 m depth. This was also the only sample to record concentrations above the S4UL triggers. Aromatic carbon bands $>C_{12}$ - C_{16} and $>C_{16}$ - C_{21} recorded concentrations of 1020 and 1360 mg/kg respectfully; the S4UL of these carbon bands is 660 & 930 mg/kg respectively. Contrastingly, the samples immediately above and below (from 2.5 m & 4.0 m depth) recorded very little or no TPH. In addition to the foregoing, the sample from WS2 at 2.9 m depth recorded 1190 and 1040 mg/kg TPH in carbon bands $>C_{12}$ - C_{16} and $>C_{16}$ - C_{21} respectfully. Such concentrations would be above the aromatic S4ULs, if the TPH were wholly aromatic.

Fourteen samples were analysed for speciated PAH. A maximum total PAH concentration of 90.4 mg/kg was recorded in WS4 whilst six samples recorded concentrations at or below the limit of detection for the test of 0.1 mg/kg. The sample from WS4 and one from WS2 were the only samples to record individual PAHs above the relevant S4UL and were recovered from Made Ground.

Analysis for asbestos was carried out on 15 samples. No asbestos fibres were detected.

7.5.2
Dissolved phase

Contaminant testing was carried out on purged groundwater samples recovered with a submersible pump from the boreholes on 5 September 2017. The results are presented at Appendix D. There was insufficient groundwater in the window samplers to allow sampling. No UK standards exist for groundwater quality and the results have therefore been compared to the UK Drinking Water Standards (UKDWS) and the Environmental Quality Standard (EQS) where available as an initial screen.

Analysis for metals and metalloids revealed the vast majority of determinands to be below the limit of detection or below the relevant triggers. However, a concentration of 19 µg/l arsenic and 84 µg/l nickel was recorded in BH2 versus the UKDWS of 10 µg/l and 20 µg/l respectfully. No phenols were detected above the limit ofd detection for the test of 1 µg/l.

Analysis for dissolved phase TPH with aromatic/aliphatic split and carbon banding recorded a maximum concentration of 84.9 µg/l in BH2. All of the TPH was found to be in the $>C_{21}$ - C_{35} carbon band range (both aromatic and aliphatic). Borehole 1 recorded 34.7 µg/l total TPH, predominately within the same carbon band range.

No MTBE or BTEX was recorded in any of the samples.

Analysis for speciated PAH recorded total concentrations of 41.2, 2.64 & 0.93 µg/l in BHs 1, 2 & 5 respectively. Benzo(a)pyrene was recorded above the UKDWS of 0.1 µg/l in all three boreholes; concentrations of 3.94, 0.22 and 0.06 µg/l were recorded in BHs 1, 2 and 5 respectively. No other PAH was recorded above the UKDWS or EQS.

7.5.3
Gas phase

The standpipes installed in the boreholes are being monitored for gas flow rate and concentrations of oxygen, methane, carbon dioxide, carbon monoxide and hydrogen sulphide. A note is also being made of the weather conditions at the time of reading. Data obtained thus far is presented at Appendix C and the complete set of six will be issued once monitoring is complete.

7.5.4
Waste Acceptance Criteria (WAC)

Five samples were subject to the WAC full solid waste suite and the WAC 2 stage leachate suite. The results have been compared to the criteria contained in the Landfill Regulations 2002 as amended and are presented at Appendix D.

Within the solid waste suite, the vast majority of results were within the Inert Waste Landfill criteria limits save for Total Organic Carbon in WS1 between 0.5-0.8 m depth and in WS9 between 0.5-0.7 m depth which recorded 4.4 and 3.3 % respectfully. This value is above the Inert criteria limit of 3 % but below the Stable Non-reactive Hazardous waste in non-hazardous Landfill criteria limit of 5 %.
Parameters determined on the compliance leaching test were also predominately within the Inert Waste Landfill criteria limits save for antimony in WS9 between 0.5-0.7 m depth. The leachate concentration of 0.08 mg/kg (equivalent) is above the Inert criteria limit of 0.06 mg/kg but below the Stable Non-reactive Hazardous waste in non-hazardous Landfill criteria limit of 0.7 mg/kg.

The results are only marginally above the Inert Waste Landfill criteria limits and any arisings or spoil may be able to go as Inert, when dilution is taken into account. However, this should be confirmed with the disposal facility.

The contamination test results and the WAC results should be forwarded to the contractor appointed to undertake any spoil removal to confirm disposal requirements. Transfer notes and chain of custody sheets should be retained for all arisings removed from site.

7.6
Conclusions and recommendations

The investigation carried out to date has revealed elevated concentrations of lead in the Made Ground at shallow depth in WS4, 5, 8 & 10. In addition, TPH was recorded above the relevant S4UL in WS2[4] & WS17 and some individual PAHs were above the relevant S4UL in WS2 & WS4, also in Made Ground.

Groundwater samples have revealed low concentrations of dissolved phase hydrocarbons (TPH & PAH) in all BHs and arsenic and nickel above the UKDWS in BH2.

Three underground fuel storage tanks (USTs) are located between the Enessa Works and the building to its north. Surplus diesel was removed from tank No. 3 and the USTs were foam filled between 27 and 29 September 2006. Full details are presented at Appendix B of the Phase I report. The tanks and any remaining pipework will need to be removed and the resultant excavation validated prior to backfill. Window sampler 17 was drilled adjacent to the USTs and was one of only two locations to record TPH bands above the relevant S4UL. There is therefore likely to be some impacted soils around the USTs due to past spillages/leakage.

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[4] *Assuming all TPH aromatic species*

An interceptor is located adjacent to the former stores building in the south of the site. As for the USTs, this will need to be removed and the resultant excavation validated prior to backfilling.

In addition to the foregoing, a former Greggs employee indicated that two underground cavities or partial voids were present in the northern part of the site; one under the boiler house and one close to the public sewer manhole, as shown on Figure 1 at Appendix A. The former was apparently caused by hot water/steam 'blow-down' from the boiler and the latter by the force of water coming from a damaged downpipe. The likelihood of actual voids being present within the Kempton Park Gravel is considered unlikely due to its granular nature. However, the subsoil may have been weakened locally and this may account for the anomalous depth to groundwater consistently recorded in BH2. In addition, the construction of the sewer would have disturbed the adjacent ground.

During one of the monitoring visits, a falling head test was attempted in BH2. The aim was to raise the water level within the standpipe and make a note of the time taken for it to drop back to water table level. However, 50 litres of water was added and the water level only rose 70 mm, dropping back to the pre-fill level within six minutes. The reason for the more than 3 m difference is unclear and unusual as it is assumed that the gravels are in hydraulic continuity across the site. A high rate of pumping would cause such a depression in the water table but this does not appear to be happening at the site as no water abstraction licences are held within 1000 m. Therefore at present the reason for the difference remains unknown.

The proposals include private gardens which may be used for the cultivation and consumption of home grown produce. The current subsoil is considered unsuitable as a garden material due to its visual appearance, chemical composition and as a suitable growing medium. Imported subsoil and topsoil will therefore undoubtedly be required. The soil(s) should be

delivered certified clean although the Local Authority Pollution Control Officer (or similar) may also require additional validation of the soil, depending on its source(s).

The shallow lead and PAH contamination in the Made Ground is likely to be removed or diluted by the demolition process. Indeed, the soils tested are unlikely to remain in situ over the course of the redevelopment due to tracking by heavy plant etc. In any event, an appropriate thickness of clean soil will be provided in garden and soft landscaping areas.

The deeper TPH contamination is not considered significant in terms of human health due to its depth. However, the Kempton Park Gravel is a Principle Aquifer and a receptor in its own right. The dissolved phase contaminants recorded at the site are not considered significant enough to warrent modelling or to require remediation. There is likely to be attenuation of the species within the natural environment before any pore water eventually reaches either groundwater or surface waters that may feed potable water supplies. The site lies on a Principle Aquifer underlain by Unproductive strata. There is no groundwater abstracted within 1000 m of the subject site.

At this stage no remediation is considered necessary. However, additional investigations are recommended in the vicinity of WS2 and when the tanks and interceptor are removed.

7.7
Buried concrete

Laboratory tests on soil samples within the anticipated depth of construction yielded a maximum soluble sulphate concentration of 0.39 g/l which results in a Design Sulphate Class[5] of DS-1.

[5] *Concrete in aggressive ground. BRE Special Digest 1. Building Research Establishment, 2005*

The groundwater is considered to be mobile and all pH determinations were in excess of 6.5.

Therefore the Aggressive Chemical Environment for Concrete, ACEC, is classed as AC-1.

R G Chapman
AP GEOTECHNICS LTD.
26th September 2017

PROCEDURAL NOTES for GROUND INVESTIGATIONS

General

This report is based upon data obtained from field descriptions of the strata and examination of the samples by an engineer, together with the results of in situ and laboratory tests as appropriate. Responsibility cannot be accepted for variations in ground conditions between and around any of the exploratory points that is not revealed by the data. Whilst the report may offer an opinion on the ground conditions between exploratory points and below the depth of investigation, this is for guidance only and no liability is accepted for its accuracy. Unless specifically included in the report, it should be assumed that no testing has been carried out in respect of asbestos or Japanese Knotweed and no liability is inferred or will be accepted.

Drilling procedure

Boring by light cable percussion drilling allows the ground conditions to be reasonably well established. However, a certain amount of disturbance is inevitable and some mixing of soils can occur.

Sampling procedure

"Undisturbed" samples of predominantly cohesive soils are taken with a 100mm diameter open tube sampler, generally in accordance with BS 5930: 1999.

Where appropriate, or where an undisturbed sample is unsuccessful, disturbed samples are recovered and sealed into polythene bags.

Groundwater samples are taken when water is encountered in sufficient quantity.

Standard penetration tests

The test is conducted generally in accordance with BS 1377: Part 9: 1990. The sampler tube is subject to a seating drive of 150mm into the soil at the base of the borehole. Results are given on the Borehole Records as the number of blows required to drive the sampler tube a further 300mm and this is known as the "N" value. Where the driving resistance is such that full penetration is not achieved, the test is generally terminated after 50 blows and the actual distance penetrated is recorded.

Groundwater

Groundwater observations necessarily reflect the conditions encountered at the time of the exploratory work. Long term monitoring of standpipes is usually required to establish an equilibrium water level since the normal rate of boring is too fast to permit steady state conditions to be achieved.

Groundwater levels are subject to variations caused by changes in drainage conditions and seasonal climatic changes.

Water may necessarily be added to advance the bore whilst casing may be required to maintain an open hole. These can both mask subsequent groundwater observations and are therefore noted on the individual Borehole Record.

APPENDICES

A Figures

B Borehole Records

C Standpipe Records

D Laboratory Test Results

APPENDIX A

FIGURES

Former Greggs Bakery,
Gould Road, Twickenham,
TW2 6RT

Site Plan

Scale: as shown

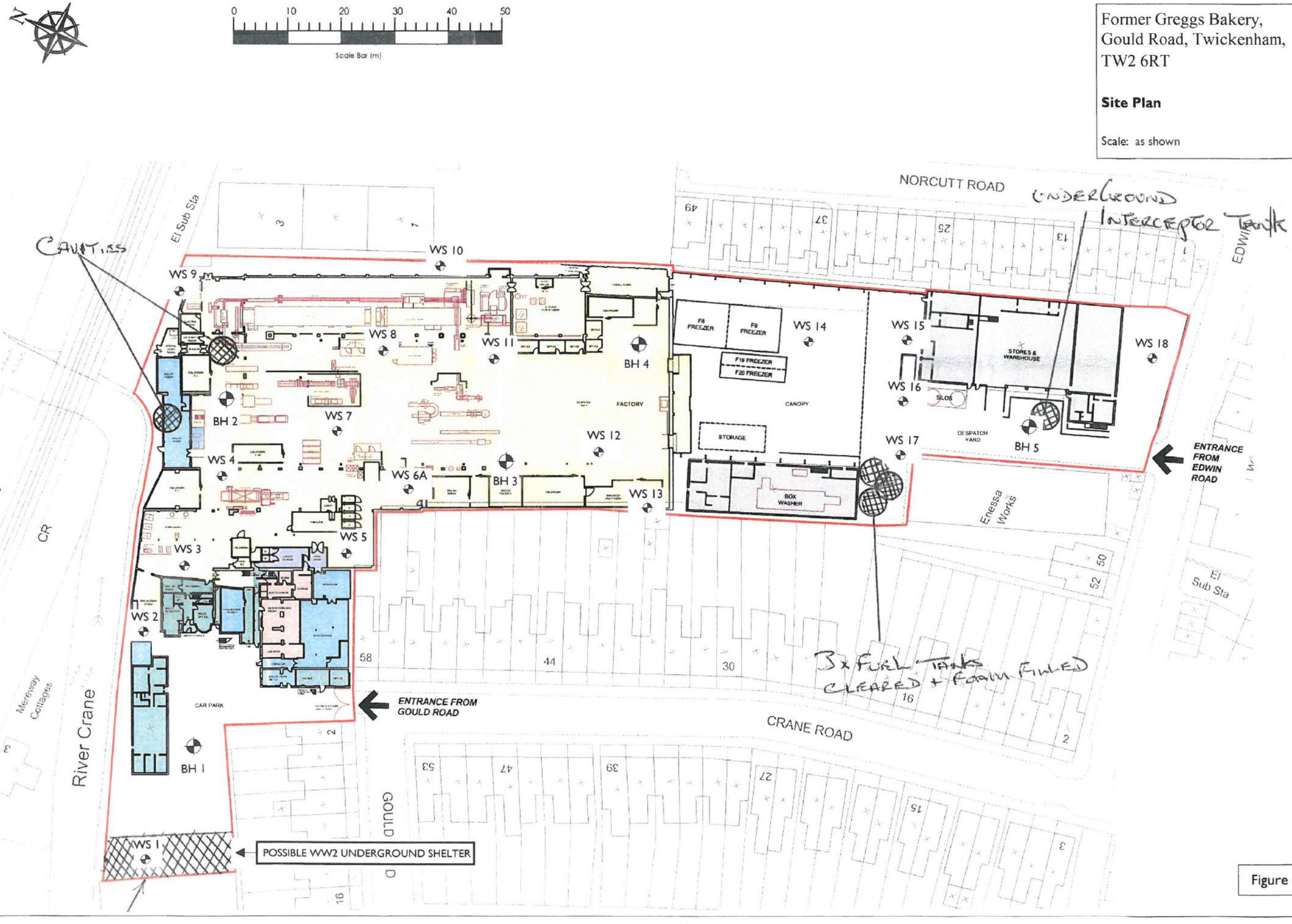


Figure 1

Former Greggs Bakery,
Gould Road, Twickenham,
TW2 6RT

Site arrangement

Scale: as shown

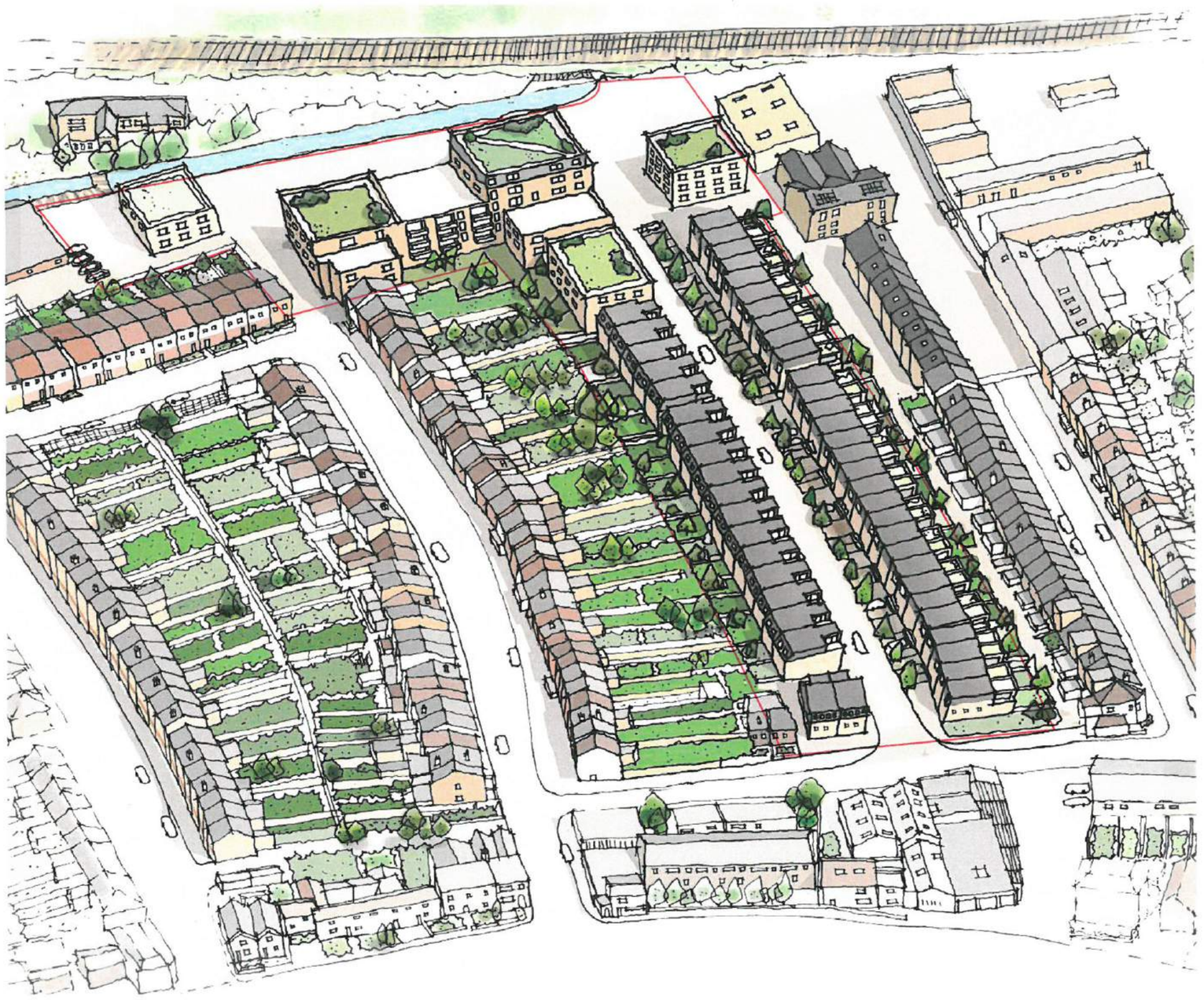


Figure 2

SPT PROFILE
Former Greggs Bakery, Twickenham

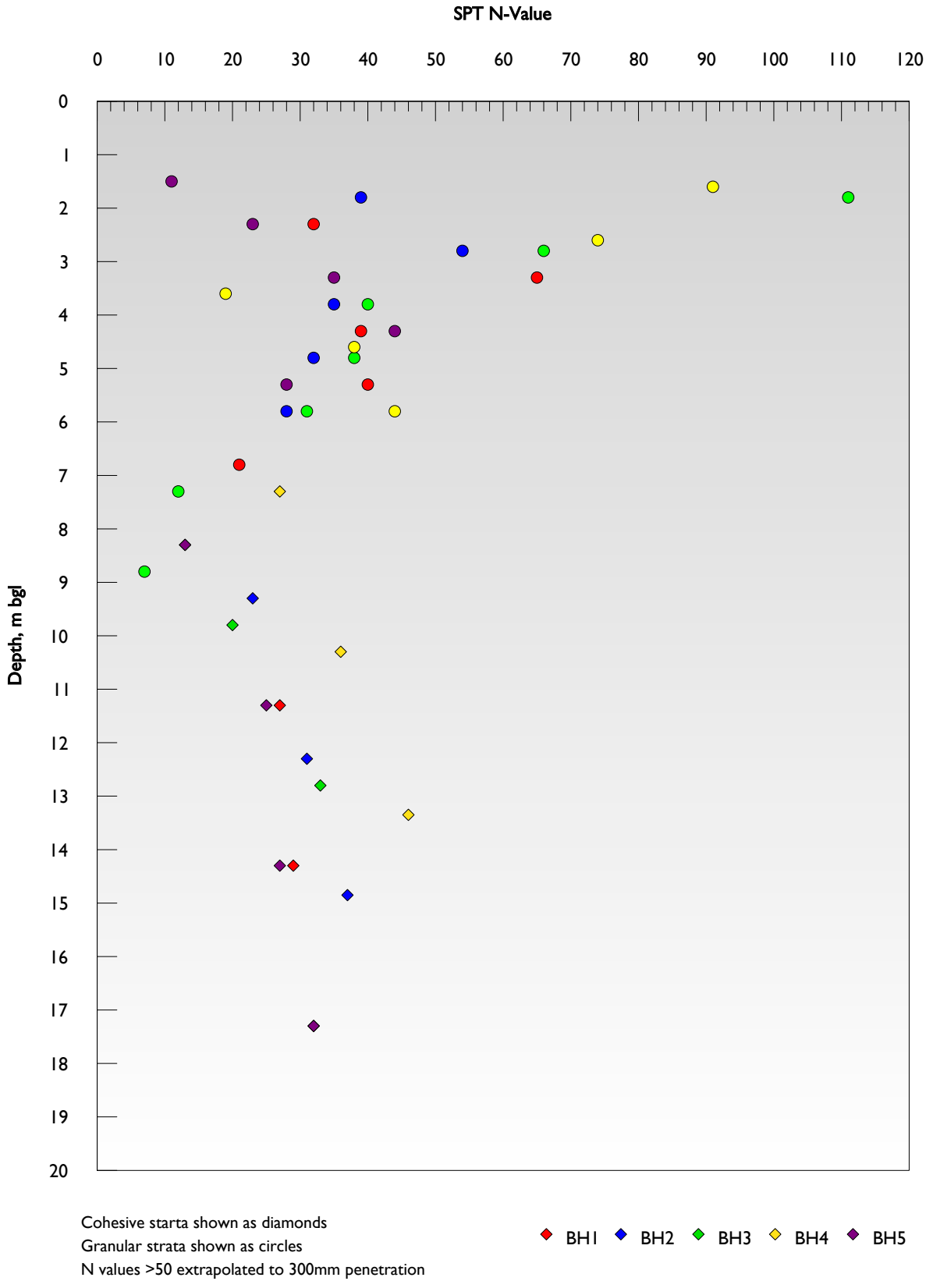


Figure 3

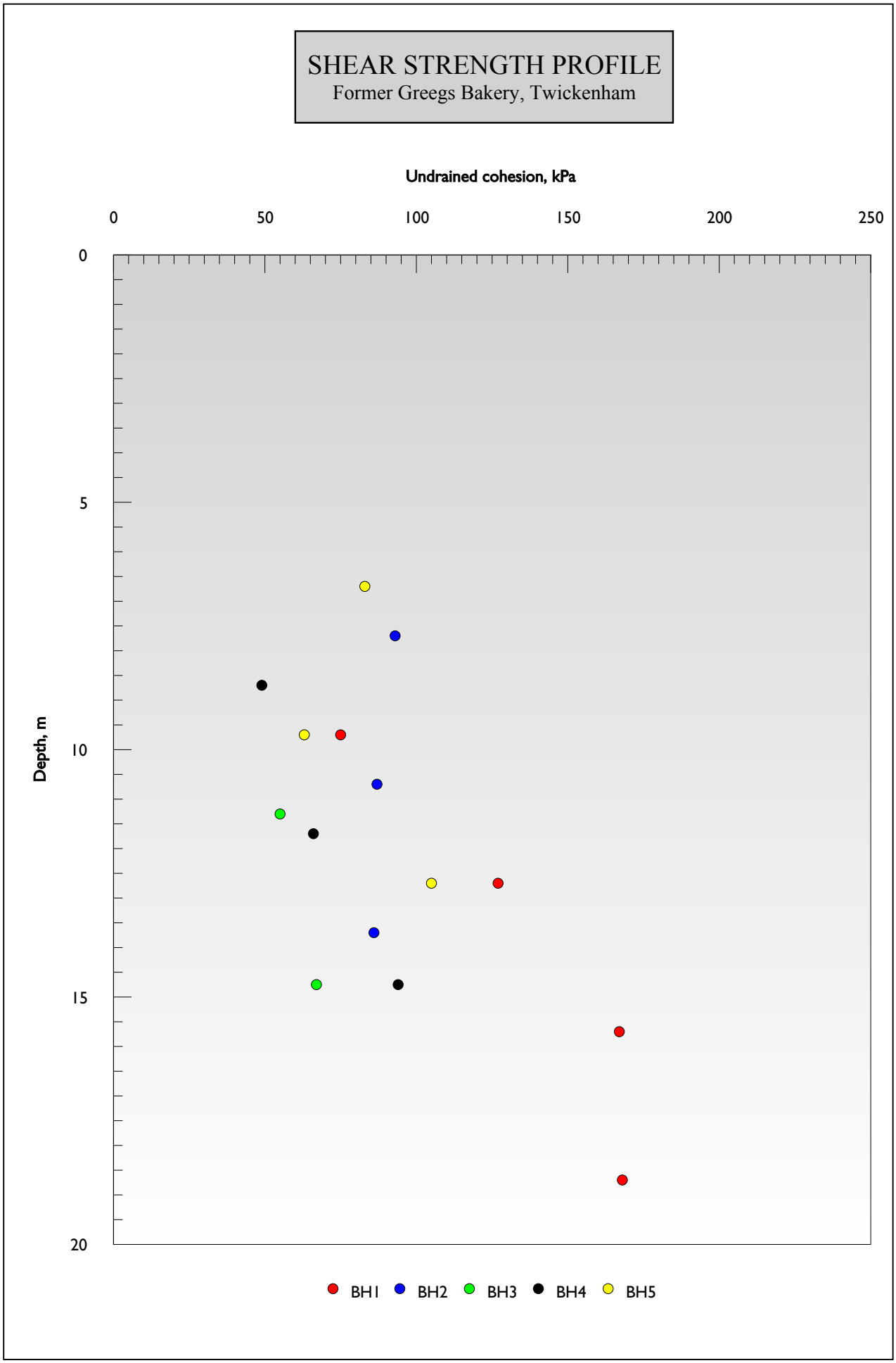


Figure 4

APPENDIX B

BOREHOLE RECORDS

SYMBOLS and ABBREVIATIONS

Samples

Undisturbed

U	Standard open drive "undisturbed" 102mm dia. in boreholes 38mm dia. in trial pits, window sampler and hand auger
T	Thin wall open drive
P	Piston
CBR	CBR mould
L	Windowless sampler liner

Disturbed

D	Small
B	Bulk
W	Water
C	Contaminants: plastic tub
J	Contaminants: brown glass jar

In situ tests

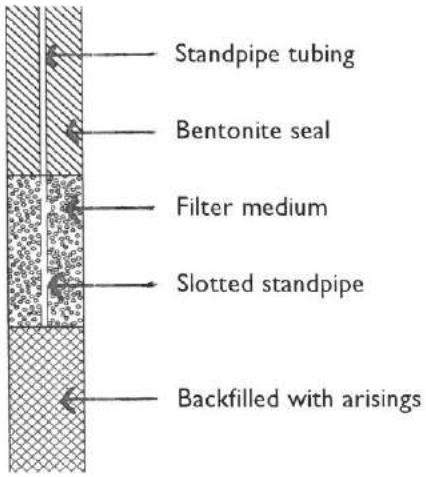
SPT CPT	Standard Penetration Test, open shoe solid cone N value is number of blows for 300mm penetration. Blow count also given as seating drive followed by four increments of 75mm.
V ( )	Vane test (c_u kPa)
P ( )	Hand penetrometer (c_u kg/cm^2)
M ( )	Mexe probe (CBR %)

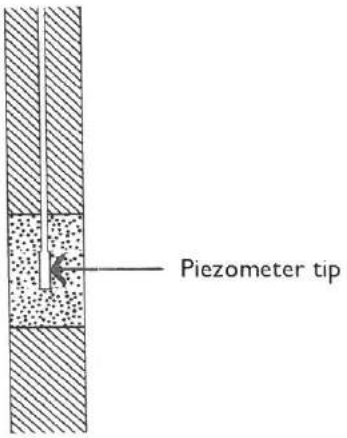
Water records

$\blacktriangledown_2$	Standing level
$\triangledown_2$	Depth encountered

suffix identifies separate strikes

Standpipes





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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 8.60m		London Square	4609-2

Location	Dates	Engineer	Sheet
See site plan	08/08/2017- 09/08/2017		1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.15) 0.15	Asphalt			
						(0.27) 0.42	MADE GROUND: Black relic topsoil with brick and flint			
						(0.78) 1.20	MADE GROUND: Soft to firm dark brown very sandy clay with flint and brick			
1.20-1.65 1.20-1.70	SPT(C) N=10 B1		DRY	1,1/1,1,3,5			Firm brown sandy CLAY with flint gravel			
1.70	D1					(0.60) 1.80				
2.00-2.45 2.00-2.50	SPT(C) N=32 B2	2.00	DRY	3,5/7,8,8,9			Dense to very dense brown very sandy GRAVEL. Gravel is fine to coarse subangular to rounded flint			
2.50	D2									
3.00-3.50	B3			Water strike(1) at 3.00m, rose to 2.80m in 20 mins, sealed at 6.90m.					▼1	
3.00-3.27 3.50	SPT(C) 50/115 D3	3.00	2.80	5,7/9,10,14,17					▽1	
4.00-4.45 4.00-4.50	SPT(C) N=39 B4	4.00	3.00	4,7/7,9,10,13		(4.40)				
4.50	D4									
5.00-5.45 5.00-5.50	SPT(C) N=40 B5	5.00	3.00	6,8/8,10,10,12			...becoming SAND and GRAVEL			
6.00	D5									
6.50-6.95 6.50-7.00	SPT(C) N=21 B6	6.50	3.50	4,6/5,6,5,5		6.20 (0.70) 6.90	Medium dnse grey green SAND with black flint gravel and cobbles			
7.50	D6						Stiff to very stiff dark grey CLAY			
8.00-8.45	SPT N=13	7.00	WET	2,2/3,3,3,4						
9.00	D7									
9.50-9.95	U1	8.60	DRY	50 blows						

Remarks
Chiselling from 10.00m to 10.10m for 0.15 hours. Water added from 1.80m to 3.50m.

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH1

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 8.60m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017- 09/08/2017	**Engineer**	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00	D8						Stiff to very stiff dark grey CLAY			
							...claystone from 10.00m to 10.10m			
10.50	D9									
11.00-11.45 11.00	SPT N=27 D10	8.60	DRY	3,4/5,7,7,8						
12.00	D11									
12.50-12.95	U2	8.60	DRY	70 blows						
13.00	D12									
13.50	D13									
14.00-14.45 14.00	SPT N=29 D14	8.60	DRY	4,6/7,7,7,8						
15.00	D15					(13.10)				
15.50-15.95	U3	8.60	DRY	75 blows						
16.00	D16									
							...claystone from 16.20 to 16.30m			
16.50	D17									
17.00-17.45 17.00	SPT N=32 D18	8.60	DRY	4,7/7,8,8,9						
18.00	D19									
18.50-18.95	U4	8.60	DRY	75 blows						
19.00	D20									
19.50	D21									
20.00-20.45	SPT N=34	8.60	DRY	5,7/8,8,9,9		20.00				

Remarks
Chiselling from 10.00m to 10.10m for 0.15 hours. Chiselling from 16.20m to 16.30m for 0.15 hours.

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH1

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 8.60m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	08/08/2017- 09/08/2017		3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
19.95	D22									

Remarks

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH1

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.60m		London Square	4609-2
	Location See site plan	**Dates** 14/08/2017-15/08/2017	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.20) 0.20	CONCRETE (cored floor)			
0.50-1.00	B1					(1.20)	MADE GROUND: Black sand			
1.50-1.95	SPT(C) N=39			7/7,9,11,12		1.40	Very dense becoming medium dense brown slightly sandy to very sandy GRAVEL. Dense to very dense brown very sandy GRAVEL. Gravel is fine to coarse subangular to rounded flint			
1.50-1.95	B2									
2.50-2.95	SPT(C) N=54			11/11,14,14,15						
2.50-2.95	B3									
3.50-3.95	SPT(C) N=35			6/7,9,9,10					▽1	
3.50-3.95	B4									
				Fast(1) at 4.20m, sealed at 7.60m.		(5.75)				
4.50-4.95	SPT(C) N=32			7/7,8,8,9						
4.50-4.95	B5									
5.50-5.95	SPT(C) N=28			4/5,7,7,9						
5.50-5.95	B6									
						7.15				
7.20	`D7						Stiff dark grey CLAY			
7.50-7.95	U8									
8.50	D9									
9.00-9.45	SPT N=23			5/4,5,7,7						
9.00-9.45	D10									

Remarks
Excavating from 0.20m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.BH2

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.60m		London Square	4609-2

Location	Dates	Engineer	Sheet
See site plan	14/08/2017-15/08/2017		2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00	D11						Stiff dark grey CLAY			
10.50-10.95	U12									
11.50	D13						...claystone from 11.7 - 11.85 m depth			
12.00-12.45	SPT N=31			8/6,8,8,9						
12.00-12.45	D14									
						(7.85)				
13.00	D15									
13.50-13.95	U16									
14.30	D17									
14.55-15.00	SPT N=37			8/7,9,10,11						
14.55-15.00	D18									
				14/08/2017:DRY		15.00				
							Complete at 15.00m			

Remarks
Chiselling from 11.70m to 11.85m for 0.5 hours.

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.BH2

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH3

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 9.50m		London Square	4609-2
	Location See site plan	**Dates** 10/08/2017-11/08/2017	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.20)	CONCRETE (cored floor)		
						0.20	MADE GROUND: Brown grey clay with brick and flint		
0.50-1.00	B1					(1.20)			
				10/08/2017:DRY		1.40	Very dense becoming dense brown sandy to very sandy GRAVEL, locally a SAND & GRAVEL		
1.50-1.95	B2			11/08/2017:					
1.50-1.95	SPT(C) N=111			19/25,26,30,30					
2.50-2.95	SPT(C) N=66			13/11,17,19,19					
2.50-2.95	B3								
3.50-3.95	SPT(C) N=40			5/7,9,12,12		(4.60)			▽1
3.50-3.95	B4			Fast(1) at 4.00m, sealed at 9.50m.					
4.50-4.95	SPT(C) N=38			5/7,9,11,11					
4.50-4.95	B5								
5.50-5.95	SPT(C) N=31			10/10,7,7,7					
5.50-5.95	B6								
				11/08/2017:4.70m		6.00	Medium dense becoming loose dark grey slightly gravelly silty SAND		
				11/08/2017:					
7.00-7.45	SPT(C) N=12			3/2,3,3,4					
7.00-7.45	B7					(3.15)			
8.50-8.95	SPT(C) N=7			2/2,2,1,2					
8.50-8.95	B8								
						9.15			
9.20	D9						Stiff dark grey CLAY		
9.50-9.95	SPT N=20			5/3,4,6,7					
9.50-9.95	D10								

Remarks
Surface reinstated in concrete
Borehole backfilled with arisings
Excavating from 0.20m to 1.20m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.BH3

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH3

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 9.50m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	10/08/2017-11/08/2017		2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Stiff dark grey CLAY		
10.50	D11								
11.00-11.45	U12								
12.00	D13								
12.50-12.95	SPT N=33			6/7,8,8,10		(5.85)			
12.50-12.95	D14								
13.80	D15								
14.55-15.00	U16								
				11/08/2017:DRY		15.00	Complete at 15.00m		

Remarks	Scale (approx)	Logged By
	1:50	
	Figure No. 4609-2.BH3	

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH4

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.00m		London Square	4609-2

Location	Dates	Engineer	Sheet
See site plan	09/08/2017-10/08/2017		1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.20) 0.20	CONCRETE (cored floor)		
							MADE GROUND: Cobbles of flint, brick and concrete		
						(1.10)			
1.30-1.75	SPT(C) N=91			13/17,24,24,26		1.30	Very dense brown sandy GRAVEL.		
1.30-1.75	B1								
						(1.70)			
2.30-2.75	SPT(C) N=74			19/15,17,21,21					
2.30-2.75	B2					3.00			
							Medium dense to dense brown silty gravelly SAND		▽1
3.30-3.75	B3			Fast(1) at 3.20m, sealed at 7.00m.					
3.30-3.75	SPT(C) N=19			5/3,4,5,7					
4.30-4.75	SPT(C) N=38			8/7,9,11,11					
4.30-4.75	B4								
						(3.50)			
5.50-5.95	SPT(C) N=44			5/7,11,12,14					
5.50-6.00	B5								
6.50	D6					6.50	Firm to stiff dark grey CLAY		
7.00-7.45	SPT N=27			5/5,7,7,8					
7.00-7.45	D7								
8.00	D8								
8.50-8.95	U9								
9.50	D10								
10.00-10.45	SPT N=36			5/7,9,9,11					

Remarks
Borehole backfilled with arisings
Surface reinstated in concrete
Chiselling from 0.20m to 1.30m for 2 hours.

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.BH4

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH4

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.00m		London Square	4609-2
	Location See site plan	**Dates** 09/08/2017-10/08/2017	**Engineer**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45	D11						Stiff dark grey CLAY		
11.00	D12								
11.50-11.95	U13								
12.50	D14					(8.50)			
13.05-13.50	SPT N=46			7/9,12,12,13					
13.05-13.50	D15								
14.00	D16								
14.55-15.00	U17								
				10/08/2017:DRY		15.00			
				10/08/2017:			Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.BH4

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH5

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.00m		London Square	4609-2
	Location See site plan	**Dates** 10/08/2017	**Engineer**	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.36)	CONCRETE			
						0.36				
						(0.36)	MADE GROUND: Brick and concrete fragments in a matrix of silt and sand sized particles			
						0.72				
							Medium dense brown slightly sandy clayey GRAVEL			
1.20-1.65 1.20-1.70	SPT(C) N=11 B1		DRY	1,2/2,3,3,3		(0.98)				
1.70	D1					1.70				
							Medium dense to dense brown very sandy GRAVEL becoming a very gravelly sand with depth			
2.00-2.45 2.00-2.50	SPT(C) N=23 B2	2.00	DRY	2,4/4,5,6,8						
2.50	D2									
3.00-3.50	B3			Water strike(1) at 3.00m, rose to 2.73m in 20 mins, sealed at 6.20m.					▼1	
3.00-3.45 3.50	SPT(C) N=35 D3	3.00	2.73	4,6/6,8,9,12					▽1	
4.00-4.45 4.00-4.50	SPT(C) N=44 B4	4.00	3.00	6,6/6,9,11,18		(4.50)				
4.50	D4									
5.00-5.45 5.00-5.50	SPT(C) N=28 B5	5.00	3.50	3,3/6,7,7,8						
6.00	D5									
						6.20	Stiff dark grey CLAY			
6.50-6.95	U1	6.50	WET	50 blows						
7.00	D6									
7.50	D7									
8.00-8.45 8.00	SPT N=13 D8	7.00	DRY	1,2/2,3,3,5						
9.00	D9									
9.50 9.50-9.95	D10 U2	7.00	DRY	55 blows						

Remarks
Water added from 1.80m to 3.50m.

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH5

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH5

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.00m		London Square	4609-2
	Location See site plan	**Dates** 10/08/2017	**Engineer**	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00	D11						Stiff dark grey CLAY			
10.50	D12									
11.00-11.45	SPT N=25	7.00	DRY	2,4/5,6,6,8						
11.00	D13						...claystone from 11.30m to 11/40m			
12.00	D14									
12.50-12.95	U3	7.00	DRY	65 blows						
13.00	D15									
13.50	D16									
14.00-14.45	SPT N=27	7.00	DRY	3,5/6,6,7,8						
14.00	D17									
15.00	D18					(13.80)				
15.50-15.95	U4	7.00	DRY	80 blows						
16.00	D19									
16.50	D20									
17.00-17.45	SPT N=32	7.00	DRY	4,6/7,8,8,9						
17.00	D21									
18.00	D22									
18.50-18.55	U5 refusal	7.00	WET	100 blows			...claystone from 18.55m to 18.65m			
18.60	D23									
19.50	D24									
20.00-20.45	SPT N=31	7.00	WET	2,6/6,7,8,10		20.00				

Remarks
Chiselling from 11.30m to 11.40m for 0.25 hours. Chiselling from 18.55m to 18.65m for 0.25 hours.

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH5

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Site	Borehole Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	BH5

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 7.00m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	10/08/2017		3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
19.95	D25									

Remarks

Scale (approx)	Logged By
1:50	ljs

Figure No. 4609-2.BH5

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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	07/08/2017		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.13) 0.13	Asphalt		
					(0.10) 0.23	MADE GROUND: Brick and concrete fragments in sandy matrix		
0.50-0.80	C1				(1.37)	MADE GROUND: Relic topsoil with brick, flint and pockets of sand		
1.00-1.45 1.00-2.00	SPT(C) N=4 L2		0,0/1,0,1,2		1.60	Very dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=64 L3		23/12,14,17,21		(2.40)			
3.00-3.45 3.00-4.00	SPT(C) N=46 L4		16/10,11,12,13					
			Water strike(1) at 3.40m.					▽1
			07/08/2017:3.30m					
			07/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS1

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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 07/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.23)	Asphalt over reinforced CONCRETE		
					0.23	MADE GROUND: Brown relic topsoil with pockets of clay and fragments of brick and flint		
0.40	C1							
1.00-1.45 1.00-2.00	SPT(C) N=5 L2		2/1,1,1,2		(1.47)			
					1.70	Very dense orange brown sandy to very sandy GRAVEL with occasional sand layers. Stained and odorous from 1.9 to 4 m		
2.00-2.45 2.00 2.00-3.00	SPT(C) N=52 C2 L3		17/11,13,13,13,15					
2.90	C3				(2.30)			
3.00-3.45 3.00-4.00	SPT(C) N=52 L4		16/11,13,13,13,15					▽1
			Water strike(1) at 3.20m.					
			07/08/2017:3.12m					
4.00	C4		07/08/2017:		4.00			

Remarks
Gravels stained and slightly odorous from 1.9 m to base of hole at 4 m
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS2

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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 09/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.20) 0.20	CONCRETE floor		
					(0.60)	MADE GROUND: Firm brown clay with flint and brick		
					0.80	Soft to firm brown mottled slightly sandy CLAY		
1.00-1.45 1.00-2.00	SPT(C) N=39 L2		4/11,9,9,10		(0.40) 1.20	Very dense to dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.30 2.00-3.00	SPT(C) 50/150 L3		29/31,19		(2.80)			
3.00-3.45 3.00-4.00	SPT(C) N=41 L4		27/9,12,9,11		4.00			

Remarks
Strata depths approximate where recovery is less than 100 %
Borehole dry
UXO Engineer in attendence

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS3

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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 09/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.20) 0.20	CONCRETE floor		
						MADE GROUND: Brown clay with brick and flint		
					(0.80) 1.00			
1.00-1.45 1.00-2.00	SPT N=35 L2		6/7,8,9,11		(0.30) 1.30	Soft to firm brown mottled slightly sandy CLAY		
						Dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=37 L3		14/10,9,10,8		(2.70)			
3.00-3.45 3.00-4.00	SPT(C) N=33 L4		15/8,9,9,7					▽1
			Water strike(1) at 3.70m. 09/08/2017:3.70m					
4.00-4.45	SPT(C) N=28		09/08/2017: 11/7,8,6,7		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS4

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS5

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.25)	CONCRETE floor		
					0.25	MADE GROUND: Brown clay with brick, concrete and flint		
1.00-1.45 1.00-2.00	SPT(C) N=5 L2		1/1,1,1,2		(1.35)			
					1.60	Dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=37 L3		12/8,9,10,10		(2.40)			
			Water strike(1) at 2.90m.					▽1
3.00-3.45 3.00-4.00	SPT(C) N=25 L4	2.90	8/6,5,7,7					
			08/08/2017:2.92m					
			08/08/2017:		4.00			

Remarks
Strata depths approximate where recovery is less than 100 %
UXO Engineer in attendance

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS5

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS6

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			London Square	4609-2
Location		**Dates**	**Engineer**	**Sheet**
See site plan		08/08/2017		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.24)	CONCRETE floor		
					0.24	MADE GROUND: Brown clay with pockets of soil and fragments of brick and flint		
					(0.56)			
					0.80	Abandoned at 0.80m		

Remarks
No further progress - borehole abandoned and relocated to WS6A

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS6

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS6A

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.23) 0.23	CONCRETE floor		
					(0.77)	MADE GROUND: Brown clay with pockets of relic topsoil and fragments of brick and flint		
1.00-1.45 1.00-2.00	SPT(C) N=6 L2		2/1,2,1,2		1.00	Soft to firm brown mottled slightly sandy CLAY with a little gravel		
					(0.40) 1.40			
						Dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=48 L3		15/10,13,13,13,12		(2.60)			
3.00-3.45 3.00-4.00	SPT(C) N=34 L4		10/7,8,10,9 Water strike(1) at 3.15m.					▽1
			08/08/2017:2.91m 08/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS6A

AP GEOTECHNICS
T 01932 848460
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS7

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 07/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.23) 0.23	CONCRETE floor		
					(0.67) 0.90	MADE GROUND: Brown clay with brick and flint		
1.00-1.45 1.00-2.00	SPT(C) N=18 L2		3/1,3,6,8		(0.60) 1.50	Firm brown slightly sandy CLAY with rare gravel		
2.00-2.45 2.00-3.00	SPT(C) N=39 L3		13/8,10,10,11			Dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
			Water strike(1) at 2.70m.		(2.50)			▽1
3.00-3.45 3.00-4.00	SPT(C) N=25 L4	2.75	7/5,5,7,8					
			07/08/2017:2.77m					
			07/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS7

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS8

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	07/08/2017		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.20) 0.20	CONCRETE floor		
					(0.50) 0.70	MADE GROUND: Brown clay with brick and flint		
1.00-1.45 1.00-2.00	SPT N=16 L2		4/3,4,5,4		(1.00) 1.70	Firm brown mottled slightly sandy CLAY		
2.00-2.45 2.00-3.00	SPT(C) N=31 L3		13/8,8,7,8		(2.30) 4.00	Dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
3.00-3.45 3.00-4.00	SPT(C) N=31 L4		11/9,8,7,7					

Remarks
Borehole dry
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS8

AP GEOTECHNICS
T 01932 848460
F 01932 851255
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS9

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	09/08/2017		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.30) 0.30	ASPHALT over brick fragments		
					(0.50) 0.80	MADE GROUND: Brown clay with brick and flint		
1.00-1.45 1.00-2.00	SPT(C) N=29 L2		4/3,6,9,11		(0.40) 1.20	Soft to firm orange brown slightly sandy CLAY with rare gravel		
2.00-2.45 2.00-3.00	SPT(C) N=52 L3		16/12,12,13,15		(2.80)	Very dense medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
			Water strike(1) at 2.90m.					▽1
3.00-3.45 3.00-4.00	SPT(C) N=29 L4	2.90	11/7,7,7,8					
			09/08/2017:2.84m					
			09/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS9

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS10

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 09/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.10) 0.10	CONCRETE		
						MADE GROUND: Brown relic topsoil with brick and flint		
					(0.60)			
					0.70	Soft orange brown slightly sandy CLAY		
					(0.40)			
1.00-1.45 1.00-2.00	SPT(C) N=60 L2		7/10,13,17,20		1.10	Very dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=35 L3		11/7,9,9,10					
					(2.90)			
			Water strike(1) at 2.90m.					▽1
3.00-3.45 3.00-4.00	SPT(C) N=31 L4		10/7,7,8,9					
			09/08/2017:2.80m					
			09/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS10

AP GEOTECHNICS
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS11

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			London Square	4609-2
	Location See site plan	**Dates** 09/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25) 0.25	CONCRETE floor		
					(0.08) 0.33	MADE GROUND: Brown clay with brick and flint		
						Abandoned at 0.33m		

Remarks
No further progress - obstruction at 0.33 m depth

Scale (approx)	Logged By
1:50	

Figure No. 4609-2.WS11

AP GEOTECHNICS
T 01932 848460
F 01932 851255
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS12

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	09/08/2017		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.25)	CONCRETE floor		
					0.25			
					(0.15)	MADE GROUND: Firm grey and black slightly sandy clay with brick and flint		
					0.40			
					(0.60)	Soft to firm brown mottled slightly sandy CLAY with occasional gravel		
1.00-1.25	SPT(C) 50/100		21/26,24		1.00			
						Abandoned at 1.00m		

Remarks
Could not progress past 1 m depth - shoe and liner stuck down hole and could not recover

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS12

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS13

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 09/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	L1				(0.20) 0.20	CONCRETE			
					(0.60) 0.80	MADE GROUND: Brown clay with brick and flint			
1.00-1.45 1.00-2.00	SPT(C) N=38 L2		8/10,10,9,9		(0.40) 1.20	Soft to firm orange brown sandy CLAY with ocasional gravel			
2.00-2.45 2.00-3.00	SPT(C) N=77 L3		26/19,18,19,21			Very dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		▽1	
			Water strike(1) at 2.40m.		(2.80)				
3.00-3.45 3.00-4.00	SPT(C) N=26 L4	2.35	6/4,5,8,9						
			09/08/2017:2.00m						
			09/08/2017:		4.00				

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS13

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS14

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 07/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.22)	CONCRETE		
					0.22			
					(0.10)	MADE GROUND: Compact flint cobbles in a matrix of silt and sand sized particles		
					0.32			
						Very dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
1.00-1.45 1.00-2.00	SPT(C) N=67 L2		16/15,17,17,18					
2.00-2.45 2.00-3.00	SPT(C) N=48 L3		16/11,12,12,13		(3.68)			
			Water strike(1) at 2.70m.					▽1
3.00-3.45 3.00-4.00	SPT(C) N=25 L4	2.70	6/6,6,6,7					
			07/08/2017:2.70m		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS14

AP GEOTECHNICS
T 01932 848460
F 01932 851255
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS15

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 07/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.25) 0.25	CONCRETE		
					(0.35) 0.60	MADE GROUND: Dark brown and grey sandy clay with brick and flint		
1.00-1.30 1.00-2.00	SPT(C) 49/150 L2		25/23,26			Very dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=43 L3		16/10,11,10,12		(3.40)			
			Water strike(1) at 2.70m.					▽1
3.00-3.45 3.00-4.00	SPT(C) N=22 L4	2.75	5/4,6,6,6					
			07/08/2017:2.70m					
			07/08/2017:		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS15

AP GEOTECHNICS
T 01932 848460
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS16

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	L1				(0.27) 0.27	CONCRETE			
					(0.63) 0.90	MADE GROUND: Fragments of brick and concrete in a matrix of silt and sand sized particles			
1.00-1.45 1.00-2.00	SPT(C) N=39 L2		8/9,9,10,11		(1.10) 2.00	Dense grey clayey sandy GRAVEL (stained)			
2.00-2.45 2.00-3.00	SPT(C) N=42 L3		16/10,10,10,12			Dense orange brown sandy to very sandy GRAVEL with occasional sand layers			
			Water strike(1) at 2.80m.					▽1	
3.00-3.45 3.00-4.00	SPT(C) N=32 L4	2.80	12/8,7,8,9		(2.00) 4.00				
			08/08/2017:2.82m						
			08/08/2017:						

Remarks
Gravel stained from 0.9 to 2.0 m depth
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS16

AP GEOTECHNICS
T 01932 848460
F 01932 851255
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS17

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	L1				(0.25) 0.25	CONCRETE			
					(0.35) 0.60	MADE GROUND: Brick and concrete fragments in matrix of silt and sand sized particles			
					(0.20) 0.80	MADE GROUND: Dark grey and brown slightly sandy clay with brick and flint			
1.00-1.45 1.00-2.00	SPT(C) N=27 L2		4/5,6,7,9		(0.40) 1.20	Soft to firm brown mottled slightly sandy CLAY			
2.00-2.45 2.00-3.00	SPT(C) N=27 L3		13/7,7,6,7		(2.80)	Medium dense to dense orange brown sandy to very sandy GRAVEL with occasional sand layers - stained and odorous from 3 - 4 m depth			
3.00-3.45 3.00-4.00	SPT(C) N=34 L4		17/8,9,8,9 Water strike(1) at 3.10m.					▽1	
			08/08/2017:3.13m						
			08/08/2017:		4.00				

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS17

AP GEOTECHNICS
T 01932 848460
F 01932 851255
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Site	Number
FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM	WS18

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler	115mm to 1.00m		London Square	4609-2
	Location See site plan	**Dates** 08/08/2017	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	L1				(0.20)	CONCRETE		
					0.20	MADE GROUND: Relic topsoil with brick		
					(0.50)			
					0.70	Brown very clayey slightly sandy GRAVEL		
1.00-1.45 1.00-2.00	SPT(C) N=54 L2		4/9,13,15,17		(0.50)			
					1.20	Dense to medium dense orange brown sandy to very sandy GRAVEL with occasional sand layers		
2.00-2.45 2.00-3.00	SPT(C) N=41 L3		14/10,10,10,11		(2.80)			
3.00-3.45 3.00-4.00	SPT(C) N=29 L4		12/7,6,8,8					
			Water strike(1) at 3.20m.					▽1
			08/08/2017:3.13m		4.00			

Remarks
UXO Engineer in attendance
Strata depths approximate where recovery is less than 100 %

Scale (approx)	Logged By
1:20	

Figure No. 4609-2.WS18

APPENDIX C

STANDPIPE RECORDS

STANDPIPE RECORDS

GAS EMISSIONS AND WATER LEVELS

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM
Client: London Square

Project No: 4609-2
Sheet No: 1/2

Date		Measurement	Units	Location							
24/08/2017				BH1		BH2		BH5		WS13	
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	24	Flow rate	l/hr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atmos. mb	1020	Methane	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Carbon dioxide	%	4.4	4.7	1.8	0.3	0.3	0.3	0.7	0.7
Cloud	25 %	Carbon monoxide	ppm	0	0	0	0	0	0	0	0
Sun	bright	Hydrogen sulphide	ppm	0	0	0	0	0	0	0	0
Rainfall	nil	Oxygen	%	21.8	11.4	17.0	20.4	20.0	20.4	20.1	20.1
		PID reading	ppm	0	0	0	0	0	0	0	0
		Water level	m bgl	2.98		6.24		2.89		2.32	

Date		Measurement	Units	Location							
24/08/2017				WS16		WS17					
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	24	Flow rate	l/hr	0.0	0.0	0.2	0.0				
Atmos. mb	1020	Methane	%	0.0	0.0	0.0	0.0				
		Carbon dioxide	%	4.6	5.7	4.4	4.6				
Cloud	25 %	Carbon monoxide	ppm	0	0	0	0				
Sun	bright	Hydrogen sulphide	ppm	0	0	0	0				
Rainfall	nil	Oxygen	%	11.4	9.6	2.3	1.7				
		PID reading	ppm	0	0	0	0				
		Water level	m bgl	2.80		3.20					

Date		Measurement	Units	Location							
5/09/2017				BH1		BH2		BH5		WS13	
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	-0.2	0.0	0.6	0.0	0.0	0.0	-0.3	0.0
Atmos. mb	1017	Methane	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Carbon dioxide	%	5.2	5.2	1.8	1.9	0.3	0.4	1.2	1.2
Cloud	100 %	Carbon monoxide	ppm	0	0	0	0	0	0	0	0
Sun	nil	Hydrogen sulphide	ppm	0	0	0	0	0	0	0	0
Rainfall	nil	Oxygen	%	13.0	12.3	19.4	18.6	20.6	20.0	19.7	19.5
		PID reading	ppm	0	0	0	0	0	0	0	0
		Water level	m bgl	3.09		6.22		2.94		2.40	

Date		Measurement	Units	Location							
5/09/2017				WS16		WS17					
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	0.1	0.0	0.6	0.0				
Atmos. mb	1017	Methane	%	3.2	3.6	0.0	0.0				
		Carbon dioxide	%	8.1	8.5	3.3	3.4				
Cloud	100 %	Carbon monoxide	ppm	0	0	0	0				
Sun	nil	Hydrogen sulphide	ppm	0	0	0	0				
Rainfall	nil	Oxygen	%	1.3	0.2	4.1	3.1				
		PID reading	ppm	0	3.5	0	0				
		Water level	m bgl	2.82		3.08					

Readings taken with GFM435 manufactured by Gas Data Ltd.

STANDPIPE RECORDS

GAS EMISSIONS AND WATER LEVELS

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM
Client: London Square

Project No: 4609-2
Sheet No: 2/2

Date		Measurement	Units	Location							
19/09/2017				BH1		BH2		BH5		WS13	
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	0.6	0.0	0.3	0.0	0.1	0.0	0.0	0.0
Atmos. mb	1024	Methane	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Carbon dioxide	%	4.5	4.3	1.2	1.1	0.4	0.4	0.4	0.4
Cloud	10 %	Carbon monoxide	ppm	0	0	0	0	0	0	0	0
Sun	bright	Hydrogen sulphide	ppm	0	0	0	0	0	0	0	0
Rainfall	nil	Oxygen	%	14.1	14.2	19.3	19.4	20.3	20.1	20.4	20.5
		PID reading	ppm	0	0	0	0	0	0	0	0
		Water level	m bgl	3.15		6.24		2.95		Dry @ 2.42	

Date		Measurement	Units	Location							
19/09/2017				WS16		WS17					
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	0.1	0.0	0.1	0.0				
Atmos. mb	1024	Methane	%	1.7	2.1	0.0	0.0				
		Carbon dioxide	%	6.4	6.5	2.0	2.0				
Cloud	10 %	Carbon monoxide	ppm	0	0	0	0				
Sun	bright	Hydrogen sulphide	ppm	0	0	0	0				
Rainfall	nil	Oxygen	%	1.3	0.7	6.8	6.5				
		PID reading	ppm	2.0	2.1	0	0				
		Water level	m bgl	2.62		2.99					

Date		Measurement	Units	Location							
5/09/2017				BH1		BH2		BH5		WS13	
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	-0.2	0.0	0.6	0.0	0.0	0.0	-0.3	0.0
Atmos. mb	1017	Methane	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Carbon dioxide	%								1.2
Cloud	100 %	Carbon monoxide	ppm								0
Sun	nil	Hydrogen sulphide	ppm								0
Rainfall	nil	Oxygen	%	13.0	12.3	19.4	18.6	20.6	20.0	19.7	19.5
		PID reading	ppm	0	0	0	0	0	0	0	0
		Water level	m bgl	3.09		6.22		2.94		2.40	

Date		Measurement	Units	Location							
5/09/2017				WS16		WS17					
Weather conditions				Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady
Temp. °C	19	Flow rate	l/hr	0.1	0.0	0.6	0.0				
Atmos. mb	1017	Methane	%	3.2	3.6	0.0	0.0				
		Carbon dioxide	%	8.1	8.5	3.3	3.4				
Cloud	100 %	Carbon monoxide	ppm	0	0	0	0				
Sun	nil	Hydrogen sulphide	ppm	0	0	0	0				
Rainfall	nil	Oxygen	%	1.3	0.2	4.1	3.1				
		PID reading	ppm	0	3.5	0	0				
		Water level	m bgl	2.82		3.08					

Readings taken with GFM435 manufactured by Gas Data Ltd.

APPENDIX D

LABORATORY TEST RESULTS

SUMMARY OF GEOTECHNICAL TESTS

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/3

Location	Sample No	Depth m	Description	CLASSIFICATION							TRIAXIAL COMPRESSION - TOTAL STRESS							CHEMICAL		
				Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index %	Passing 425µm %	Mod. Plast. Index %	Class	Type	Moisture Content %	Bulk Density Mg/m³	Radial Stress kPa	Deviator Stress kPa	Cohesion cu, kPa assuming Øu = 0	Cohesion cu, kPa Øu, deg	Sulphate (SO4) Water g/l	Sulphate (SO4) Soil (Sol) g/l	pH
BH1	C1	0.40	MADE GROUND: Black relic topsoil with brick and flint																0.22	7.26
	C2	0.80	MADE GROUND: Soft to firm dark brown very sandy clay with flint and brick																0.19	7.12
	U1	9.50	Stiff dark grey CLAY								UU 102	29	1.98	190	151	75			0.53	7.88
	U2	12.50	Stiff dark grey CLAY								UU 102	25	2.06	250	253	127				
	U3	15.50	Very stiff dark grey CLAY								UU 102	27	2.05	310	334	167				
	U4	18.50	Very stiff dark grey CLAY								UU 102	25	2.09	370	336	168				
BH2	B1	0.50	MADE GROUND: Black sand																0.32	7.20
	B5	4.50	Brown very sandy GRAVEL																0.08	7.11

Note: Soil Classification based upon unmodified Plasticity Index

SUMMARY OF GEOTECHNICAL TESTS

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 2/3

Location	Sample No	Depth m	Description	CLASSIFICATION							TRIAXIAL COMPRESSION - TOTAL STRESS							CHEMICAL		
				Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index %	Passing 425µm %	Mod. Plast. Index %	Class	Type	Moisture Content %	Bulk Density Mg/m³	Radial Stress kPa	Deviator Stress kPa	Cohesion cu, kPa assuming Øu = 0	Cohesion cu, kPa Øu, deg	Sulphate (SO4) Water g/l	Sulphate (SO4) Soil (Sol) g/l	pH
BH2	U8	7.50	Stiff dark grey CLAY	29	77	31	46	100		CV	UU 102	26	2.03	150	186	93			0.51	7.49
	U12	10.50	Stiff dark grey CLAY								UU 102	30	2.04	210	174	87				
	U16	13.50	Stiff dark grey CLAY								UU 102	26	2.10	270	173	86				
BH3	B1	0.50	MADE GROUND: Brown grey clay with brick and flint																0.39	7.44
	B2	1.50	Brown SAND and GRAVEL																0.06	7.24
	U12	11.00	Stiff dark grey CLAY (premature failure)								UU 102	32	2.05	220	111	55				
	U16	14.55	Stiff dark grey CLAY (premature failure)								UU 102	27	2.05	291	135	67				
BH4	U9	8.50	Firm dark grey CLAY	29	74	30	44	100		CV	UU 102	29	2.04	170	98	49			0.36	7.85

Note: Soil Classification based upon unmodified Plasticity Index

SUMMARY OF GEOTECHNICAL TESTS

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 3/3

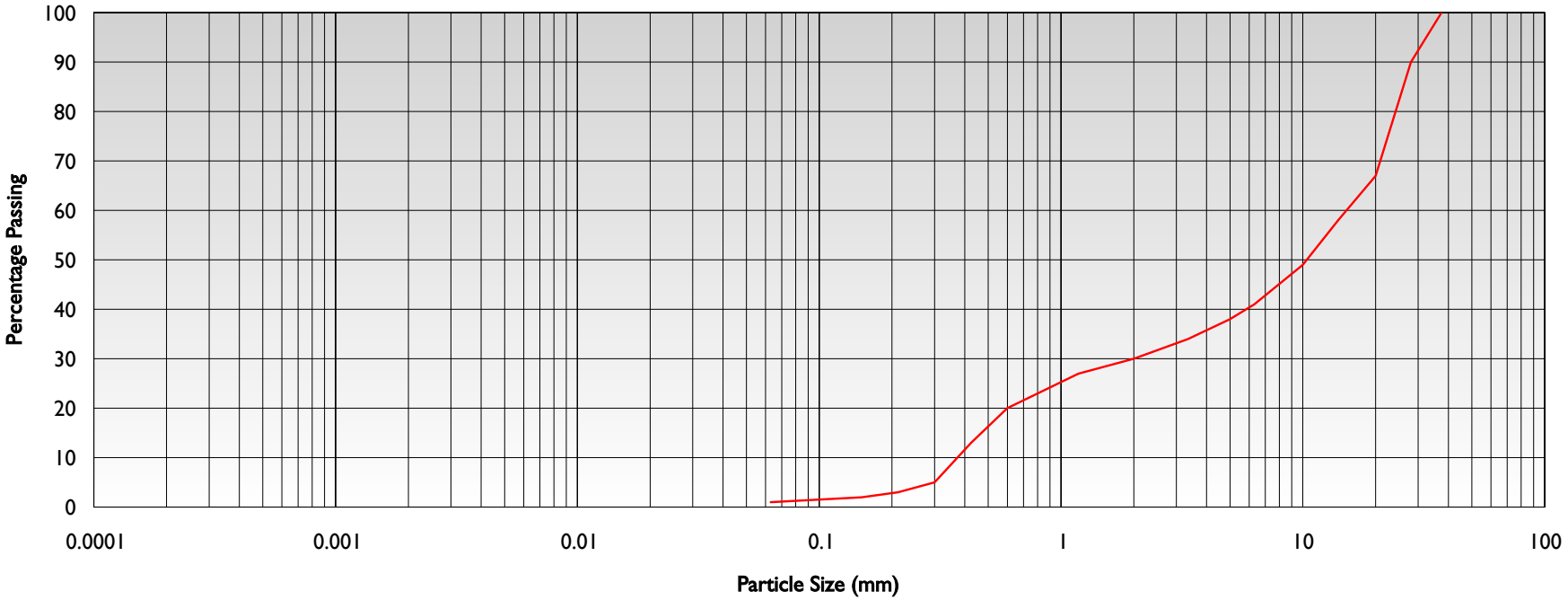
Location	Sample No	Depth m	Description	CLASSIFICATION							TRIAXIAL COMPRESSION - TOTAL STRESS							CHEMICAL		
				Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index %	Passing 425µm %	Mod. Plast. Index %	Class	Type	Moisture Content %	Bulk Density Mg/m³	Radial Stress kPa	Deviator Stress kPa	Cohesion cu, kPa assuming Øu = 0	Cohesion cu, kPa Øu, deg	Sulphate (SO4) Water g/l	Sulphate (SO4) Soil (Sol) g/l	pH
BH4	U13	11.50	Stiff dark grey CLAY								UU 102	29	1.91	230	133	66				
	U17	14.55	Stiff dark grey CLAY								UU 102	27	2.05	291	189	94				
BH5	C1	0.50	MADE GROUND: Brick and concrete fragments in matrix of silt and sand																0.17	7.02
	B2	2.00	Brown very sandy GRAVEL																0.04	7.09
	U1	6.50	Stiff dark grey CLAY	29	74	31	43	100		CV	UU 102	29	2.00	130	167	83			0.21	7.86
	U2	9.50	Stiff dark grey CLAY (premature failure)								UU 102	30	2.00	190	126	63				
	U3	12.50	Stiff dark grey CLAY								UU	28	2.02	250	211	105				
	U4	15.50	Stiff dark grey CLAY																0.61	7.59

Note: Soil Classification based upon unmodified Plasticity Index

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

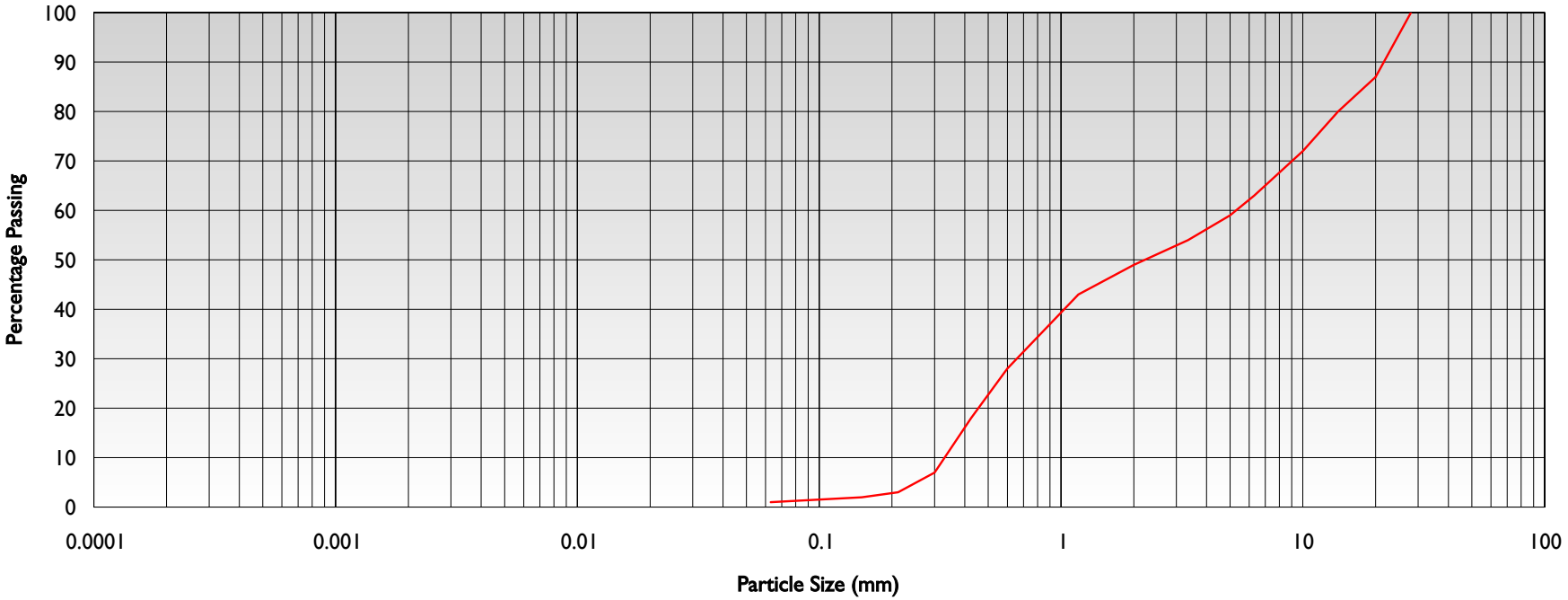
Location: **BH1**
Sample: **B3**
Depth, m: **3.00**

Description:-
Brown very sandy GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 2/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

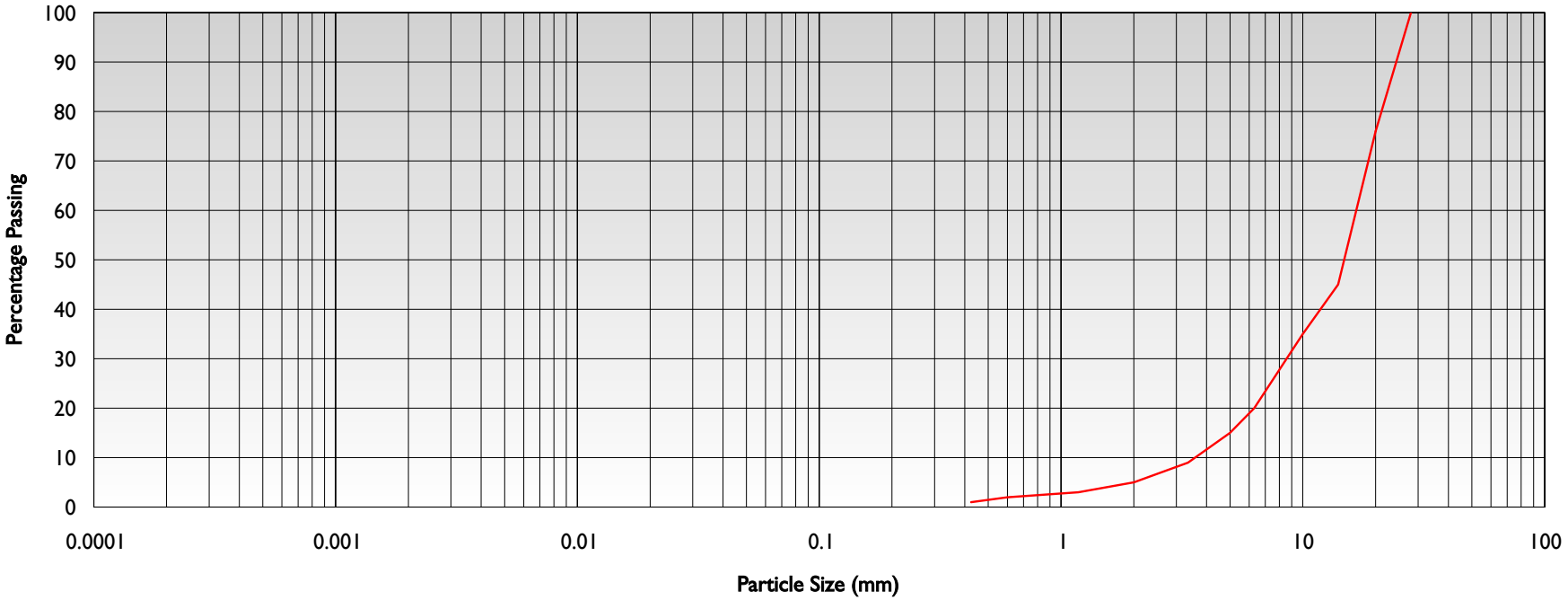
Location: **BH1**
Sample: **B5**
Depth, m: **5.00**

Description:-
Brown very sandy GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 3/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

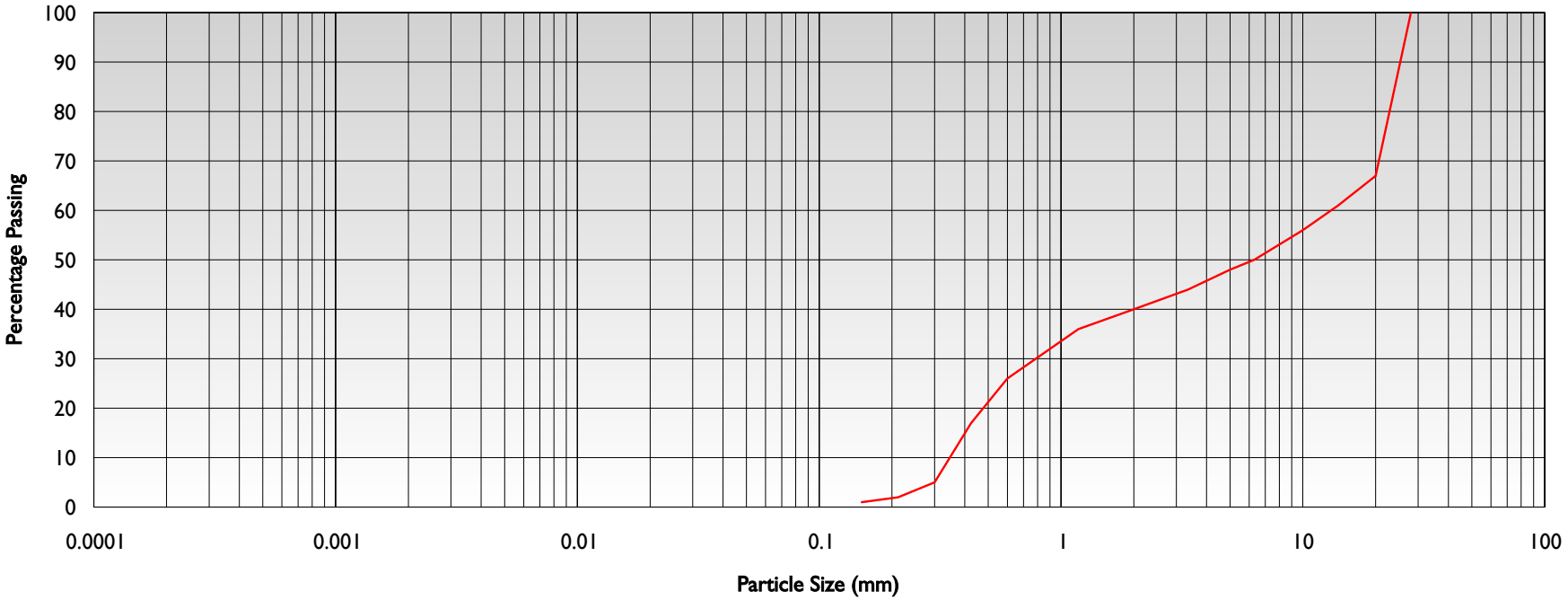
Location: **BH2**
Sample: **B3**
Depth, m: **2.50**

Description:-
Brown slightly sandy GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 4/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

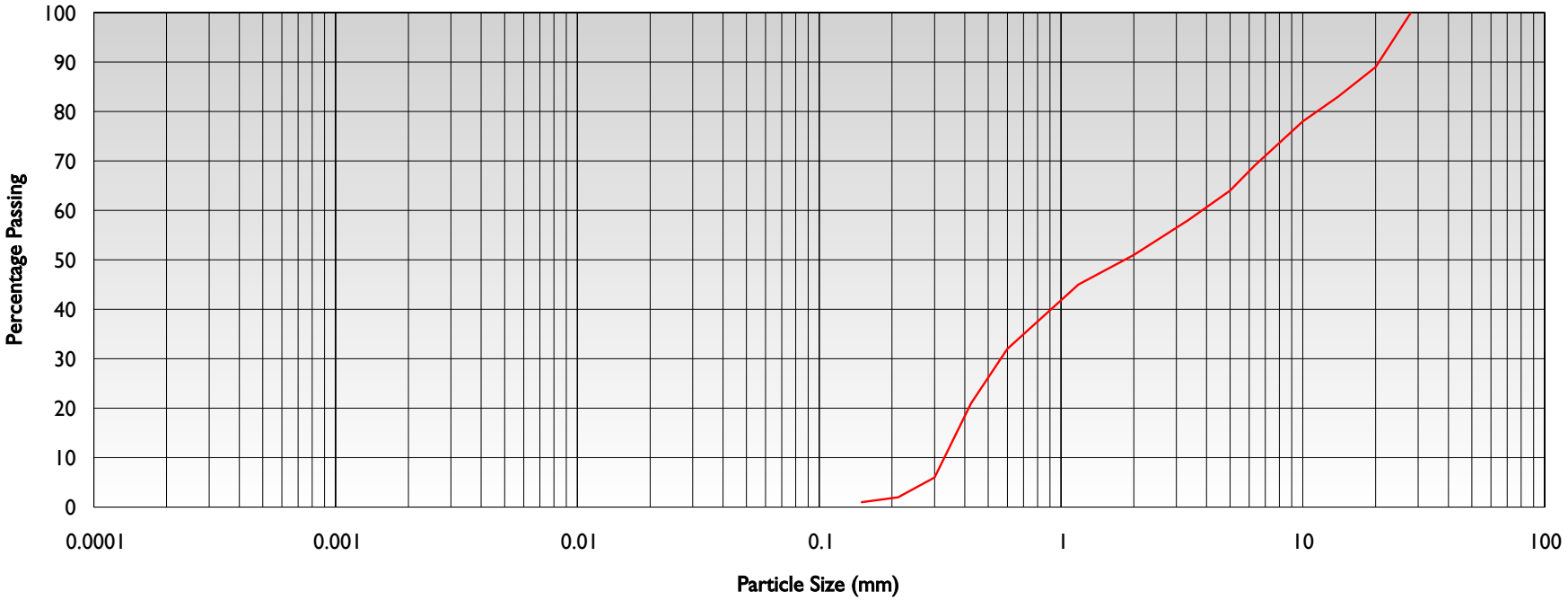
Location: **BH2**
Sample: **B5**
Depth, m: **4.50**

Description:-
Brown very sandy GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 5/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

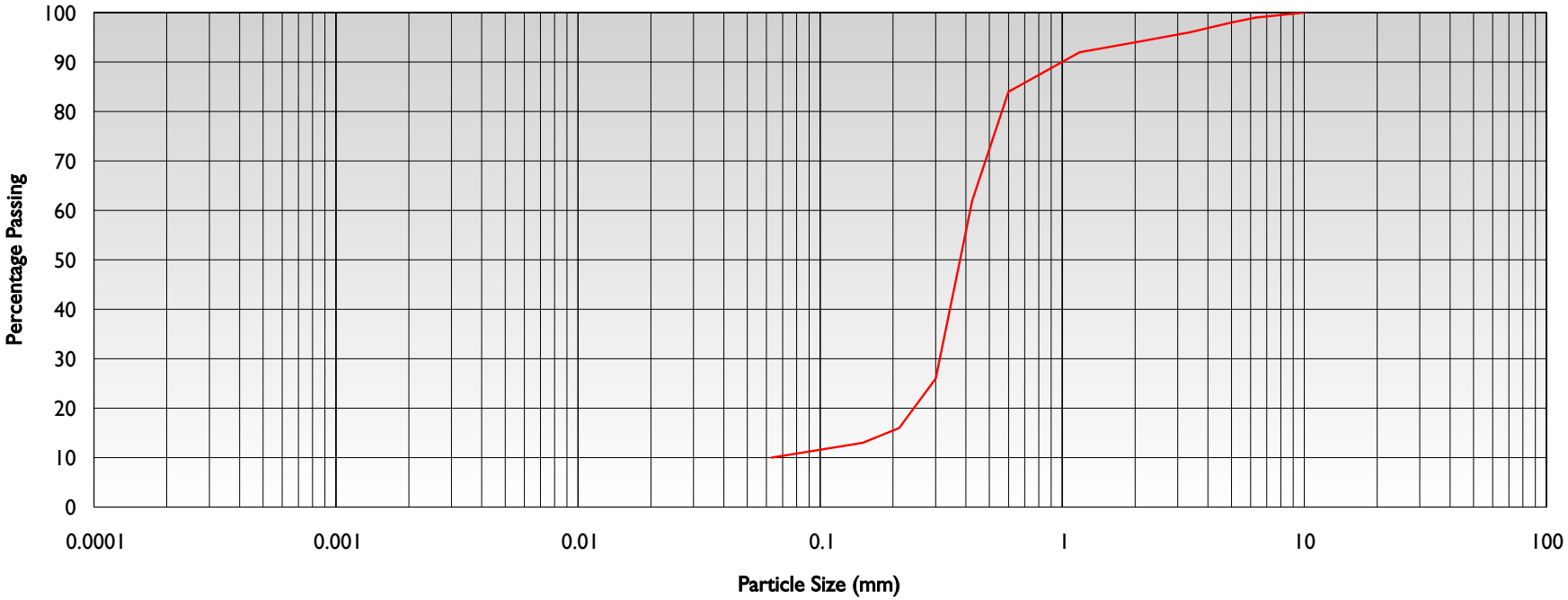
Location: **BH3**
Sample: **B2**
Depth, m: **1.50**

Description:-
Brown SAND & GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 6/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

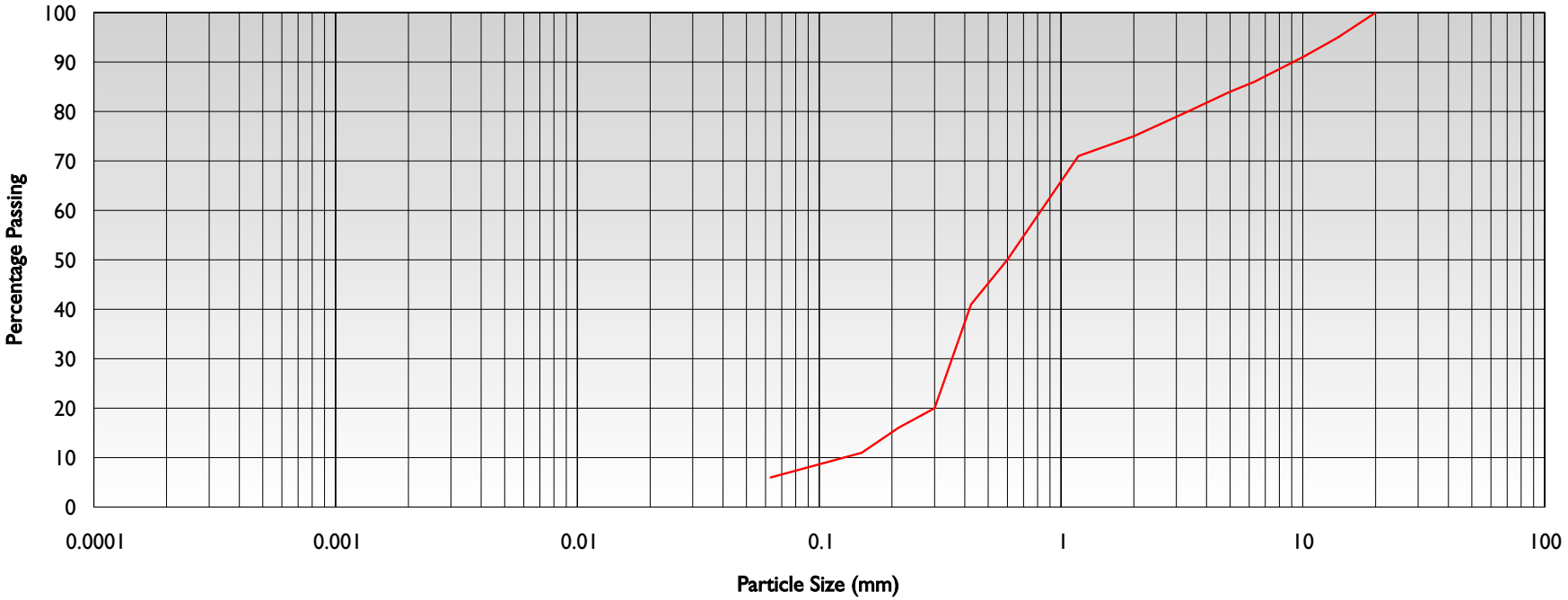
Location: **BH3**
Sample: **B7**
Depth, m: **7.00**

Description:-
Brown slightly gravelly silty SAND

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 7/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

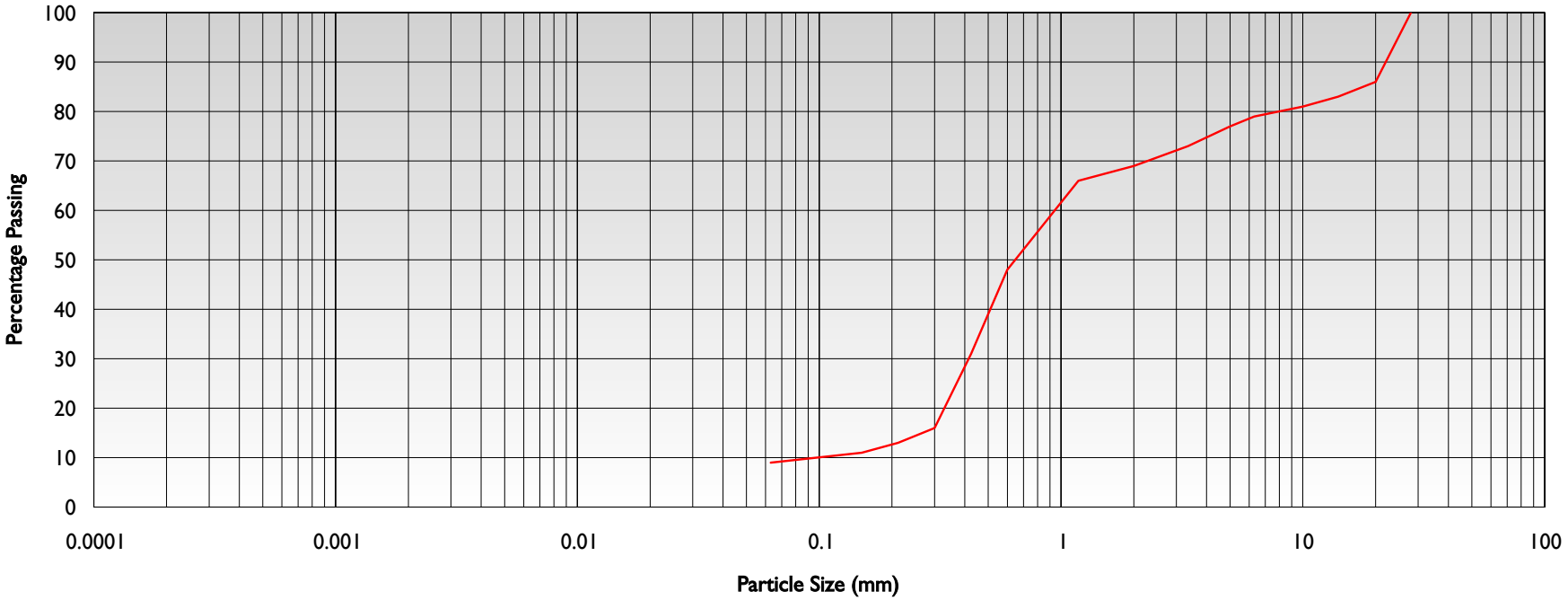
Location: **BH4**
Sample: **B3**
Depth, m: **3.30**

Description:-
Brown silty gravelly SAND

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 8/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

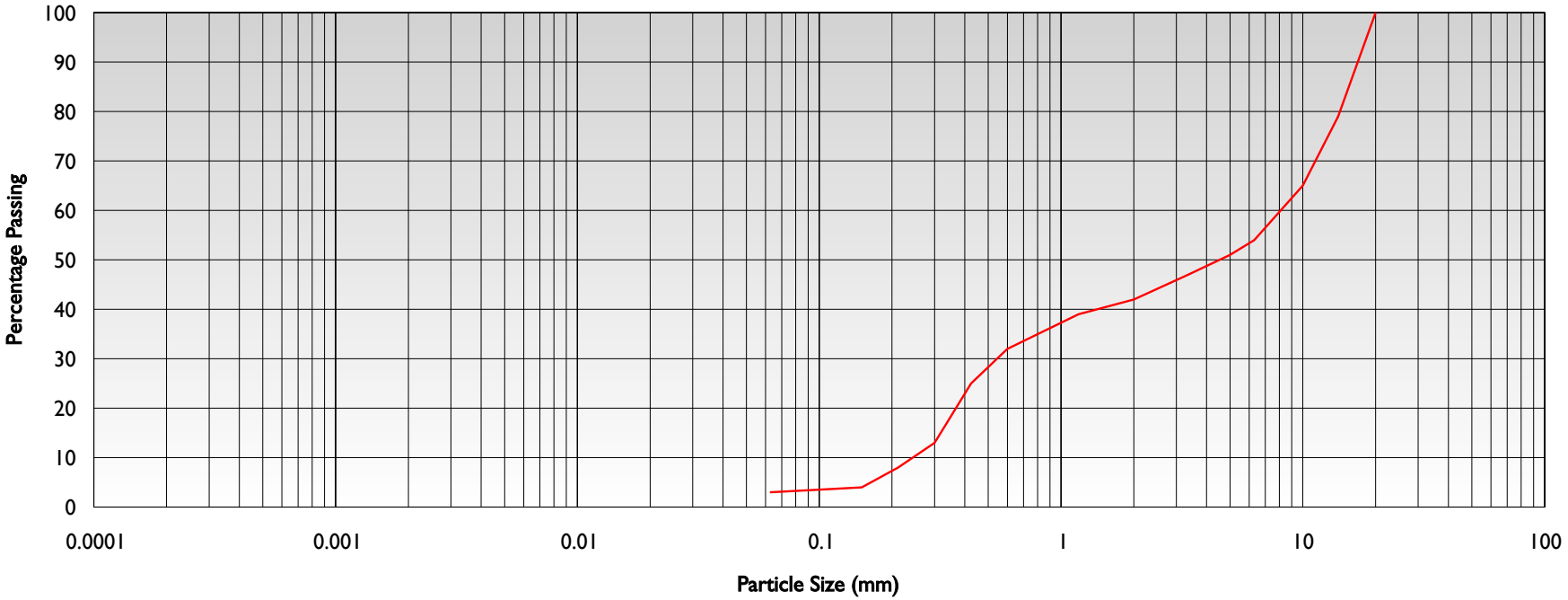
Location: **BH4**
Sample: **B5**
Depth, m: **5.50**

Description:-
Brown silty gravelly SAND

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 9/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

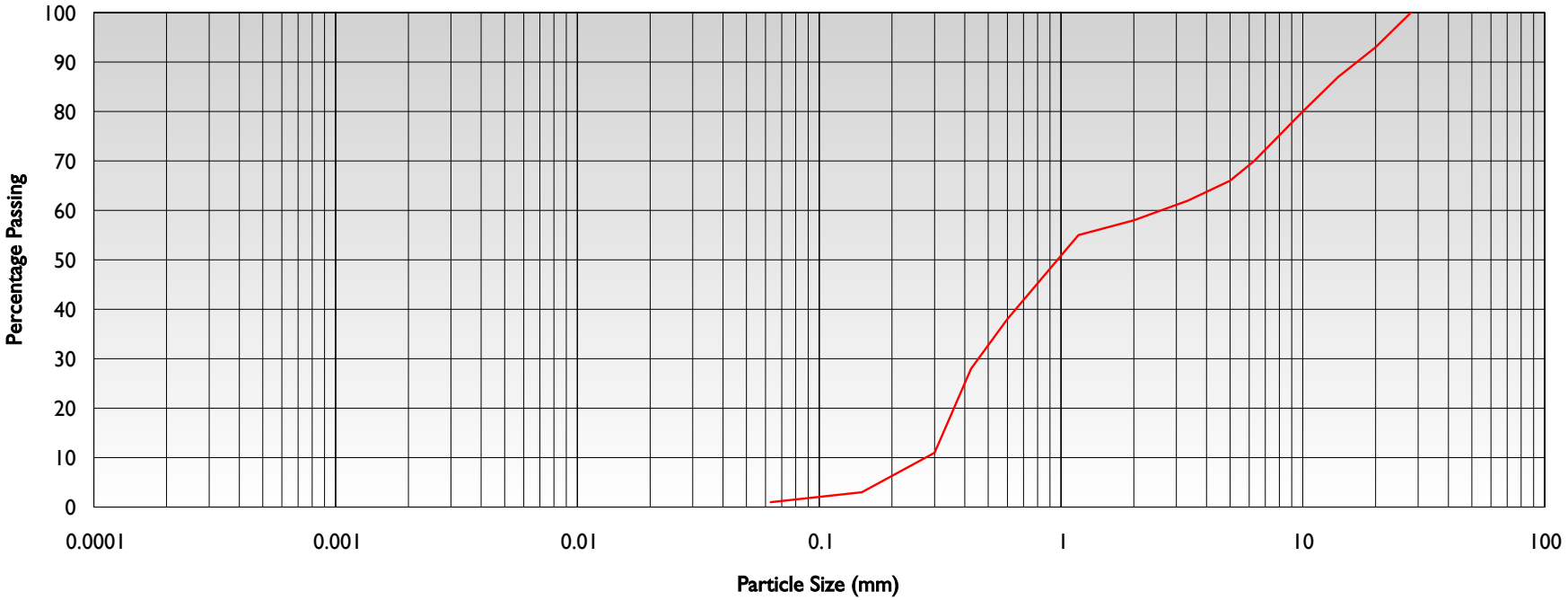
Location: **BH5**
Sample: **B2**
Depth, m: **2.00**

Description:-
Brown very sandy GRAVEL

PARTICLE SIZE DISTRIBUTION

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 10/10



	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
Clay	Silt			Sand			Gravel			Cobbles
Hydrometer				Sieve						

Location: **BH5**
Sample: **B4**
Depth, m: **4.00**

Description:-
Brown very gravelly SAND

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/4

Location	Sample	Depth m	Arsenic	Cadmium	Chromium trivalent	Copper	Lead	Mercury inorganic	Nickel	Selenium	Zinc	Boron water sol.	Chromium hexavalent	Phenols tot. monohydric	PCB tot.	TPH by GCMS C8 - C10	TPH by GCMS C10 - C12	TPH by GCMS C12 - C16	TPH by GCMS C16 - C21	TPH by GCMS C21 - C35	TPH by GCMS C35 - C40	TPH by GCMS Total C8 - C40	pH
WS2	C1	0.40	13.7	<0.5	73.9	56.9	193	0.9	71.3	<1.0	112	2.6	<0.8	<5									
	C3	2.90														84.8	378	1190	1040	318	<1.0	3010	
WS3	C1	0.50	13.8	<0.5	24.2	32.9	136	<0.5	19.4	<1.0	71	0.9	<0.8										
WS4	C1	0.50	18.2	0.9	28.3	49.3	1350	1.6	24.3	1.2	453	2.2	<0.8	<5		<1.0	<1.0	<1.0	<1.0	6.0	<1.0	6.0	
WS5	C1	0.50	24.5	<0.5	44.7	51.4	217	<0.5	31.3	<1.0	161	5.2	<0.8	<5									
	C3	1.80														<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
S4UL[1]	residential[3]		37	11	910	2400		40	180	250	3700	290	6	380									
	residential[3a]		40	85	910	7100		56	180	430	40000	11000	6	1200									
	commercial		640	190	8600	68000		1100	980	12000	730000	240000	33	1300									
CLEA[2]	residential		32					170	130	350													
	commercial		640					3600	1800	13000													

Notes

1. S4UL given at 6% soil organic matter
2. CLEA SGVs given at 6% soil organic matter
3. Residential with plant uptake
3a. Residential without plant uptake

All units are mg/kg dry weight of soil unless otherwise stated, except for pH which is dimensionless

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 2/4

Location	Sample	Depth	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	Boron	Chromium	Phenols	PCB	TPH by GCMS							pH
		m			trivalent			inorganic				water sol.	hexavalent	tot. monohydric	tot.	C8 - C10	C10 - C12	C12 - C16	C16 - C21	C21 - C35	C35 - C40	Total C8 - C40	
WS6A	C2	0.80	10.7	<0.5	32.4	23.9	51.9	<0.5	18.6	<1.0	73.9	1.1	<0.8	<5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
WS7	C1	1.00	12.3	<0.5	142	30.1	114	<0.5	31.6	<1.0	89.9	1.1	<0.8	<5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
	C2	3.50														<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
WS8	C1	0.50	16.1	<0.5	30.9	62.1	333	0.8	22.8	1.2	208	2.3	<0.8	<5		<1.0	<1.0	<1.0	<1.0	14.8	1.3	16.1	
	C2	1.00	10.7	<0.5	28.4	23.1	44.2	<0.5	16.3	<1.0	71.4	1.2	<0.5	<5									
WS9	C2	1.00	10.1	<0.5	29.6	17.5	27.2	<0.5	16.5	<1.0	56.2	0.6	<0.8	<5	<0.03								
	C3	3.00													<0.03								
S4UL[1]	residential[3]		37	11	910	2400		40	180	250	3700	290	6	380									
	residential[3a]		40	85	910	7100		56	180	430	40000	11000	6	1200									
	commercial		640	190	8600	68000		1100	980	12000	730000	240000	33	1300									
CLEA[2]	residential		32					170	130	350													
	commercial		640					3600	1800	13000													

Notes

1. S4UL given at 6% soil organic matter
2. CLEA SGVs given at 6% soil organic matter
3. Residential with plant uptake
3a. Residential without plant uptake

All units are mg/kg dry weight of soil unless otherwise stated, except for pH which is dimensionless

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 3/4

Location	Sample	Depth m	Arsenic	Cadmium	Chromium trivalent	Copper	Lead	Mercury inorganic	Nickel	Selenium	Zinc	Boron water sol.	Chromium hexavalent	Phenols tot. monohydric	PCB tot.	TPH by GCMS C8 - C10	TPH by GCMS C10 - C12	TPH by GCMS C12 - C16	TPH by GCMS C16 - C21	TPH by GCMS C21 - C35	TPH by GCMS C35 - C40	TPH by GCMS Total C8 - C40	pH
WS10	C1	0.40	17.4	0.6	31.0	56.3	230	<0.5	22.7	<1.0	255	0.8	<0.8	<5		<1.0	<1.0	<1.0	<1.0	4.5	<1.0	4.5	
	C2	0.90	10.9	<0.5	30.5	16.9	23.7	<0.5	18.7	<1.0	53.0	<0.5	<0.8	<5									
WS13	C1	0.40	12.4	<0.5	27.0	33	165	0.6	17.3	<1.0	195	0.7	<0.8	<5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
	C3	3.00														<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
WS15	C1	3.00												<5									
WS16	C1	0.50	12.0	<0.5	29.0	40.7	167	0.6	20.2	<1.0	186	1.0	<0.8	<5		43.7	113	381	323	76.7	<1.0	937	
	C4	2.20														<1.0	1.5	8.1	10.6	5.4	<1.0	25.6	
S4UL[1]	residential[3]		37	11	910	2400		40	180	250	3700	290	6	380									
	residential[3a]		40	85	910	7100		56	180	430	40000	11000	6	1200									
	commercial		640	190	8600	68000		1100	980	12000	730000	240000	33	1300									
CLEA[2]	residential		32					170	130	350													
	commercial		640					3600	1800	13000													

Notes

1. S4UL given at 6% soil organic matter
2. CLEA SGVs given at 6% soil organic matter
3. Residential with plant uptake
3a. Residential without plant uptake

All units are mg/kg dry weight of soil unless otherwise stated, except for pH which is dimensionless

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 4/4

Location	Sample	Depth	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	Boron	Chromium	Phenols	PCB	TPH by GCMS							pH
		m			trivalent			inorganic				water sol.	hexavalent	tot. monohydric	tot.	C8 - C10	C10 - C12	C12 - C16	C16 - C21	C21 - C35	C35 - C40	Total C8 - C40	
WS17	C1	2.50														<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
WS18	C1	0.40	9.3	<0.5	158	28.3	102	<0.5	23.4	<1.0	92.7	<0.8	1.5	<5									
S4UL[1]	residential[3]		37	11	910	2400		40	180	250	3700	290	6	380									
	residential[3a]		40	85	910	7100		56	180	430	40000	11000	6	1200									
	commercial		640	190	8600	68000		1100	980	12000	730000	240000	33	1300									
CLEA[2]	residential		32					170	130	350													
	commercial		640					3600	1800	13000													

Notes

1. S4UL given at 6% soil organic matter
2. CLEA SGVs given at 6% soil organic matter
3. Residential with plant uptake
3a. Residential without plant uptake

All units are mg/kg dry weight of soil unless otherwise stated, except for pH which is dimensionless

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/2

Speciated Total Petroleum Hydrocarbons (Aromatic / Aliphatic Split with BTEX)											
Location	WS2	WS2	WS9	WS13	WS13	WS15	WS16	WS16	LQM/CIEH S4UL		
Sample	C2	C4	C3	C2	C4	C1	C2	C3			
Depth, m	2.00	4.00	3.00	1.50	4.00	3.00	1.00	1.70	residential	allotments	commercial
Determinand	Concentration, mg/kg										
Aromatic Hydrocarbons											
C5 - C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	300	57	86000
>C7 - C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	660	120	180000
>C8 - C10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18.0	<1.0	190	51	17000
>C10 - C12	83.9	<1.0	<1.0	<1.0	<1.0	<1.0	40.9	<1.0	380	74	34000
>C12 - C16	453	2.9	<1.0	<1.0	<1.0	<1.0	122	1.6	660	130	38000
>C16 - C21	470	5.2	<1.0	<1.0	<1.0	<1.0	104	2.1	930	260	28000
>C21 - C35	214	4.5	<1.0	<1.0	<1.0	<1.0	24.5	<1.0	1700	1600	28000
>C35 - C40	18.8	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1700	1600	28000
Total Aromatic Hydrocarbons	**1240**	**14**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**309**	**3.7**			
Aliphatic Hydrocarbons											
C5 - C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	160	3900	12000
>C6 - C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	530	13000	40000
>C8 - C10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18.2	<1.0	150	1700	11000
>C10 - C12	117	<1.0	<1.0	<1.0	<1.0	<1.0	38.9	<1.0	760	7300	47000
>C12 - C16	534	3.0	<1.0	<1.0	<1.0	<1.0	112	1.4	4300	13000	90000
>C16 - C21	437	4.8	<1.0	<1.0	<1.0	<1.0	96.1	1.9			
>C21 - C35	172	3.6	1.7	<1.0	<1.0	<1.0	20.8	<1.0			
>C35 - C40	19.1	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Total Aliphatic Hydrocarbons	**1279**	**13**	**1.7**	**<1.0**	**<1.0**	**<1.0**	**286**	**3.3**			
Total Petroleum Hydrocarbons	**2519**	**27**	**1.7**	**<1.0**	**<1.0**	**<1.0**	**595**	**7.0**			
BTEX	Concentration, µg/kg										
Benzene	<10	<10	<10	<10	<10	<10	<10	<10	370	75	90000
Toluene	<10	<10	<10	<10	<10	<10	<10	<10	660000	120000	180000000
Ethyl Benzene	<10	<10	<10	<10	<10	<10	<10	<10	260000	91000	27000000
Xylenes*	<10	<10	<10	<10	<10	<10	13.8	<10	310000	160000	30000000
MTBE	<10	<10	<10	<10	<10	<10	<10	<10			

Notes
Total = Sum of compounds above detection limit.
S4UL given at 6% soil organic matter
*Results given as total of (ortho), (meta) and (para) xylene. SGV given is the lowest permissible value for any xylene compound

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 2/2

Speciated Total Petroleum Hydrocarbons (Aromatic / Aliphatic Split with BTEX)											
Location	WS17	WS17							LQM/CIEH S4UL		
Sample	C2	C3									
Depth, m	3.00	4.00							residential	allotments	commercial
Determinand	Concentration, mg/kg										
Aromatic Hydrocarbons											
C5 - C7	<0.01	<0.01							300	57	86000
>C7 - C8	<0.01	<0.01							660	120	180000
>C8 - C10	3.0	<1.0							190	51	17000
>C10 - C12	75.6	<1.0							380	74	34000
>C12 - C16	1020	1.1							660	130	38000
>C16 - C21	1360	1.9							930	260	28000
>C21 - C35	382	<1.0							1700	1600	28000
>C35 - C40	<1.0	<1.0							1700	1600	28000
Total Aromatic Hydrocarbons	**2841**	**3.1**									
Aliphatic Hydrocarbons											
C5 - C6	<0.01	<0.01							160	3900	12000
>C6 - C8	<0.01	<0.01							530	13000	40000
>C8 - C10	4.0	<1.0							150	1700	11000
>C10 - C12	98.3	<1.0							760	7300	47000
>C12 - C16	1140	<1.0							4300	13000	90000
>C16 - C21	1430	<1.0									
>C21 - C35	390	<1.0									
>C35 - C40	<1.0	<1.0									
Total Aliphatic Hydrocarbons	**3062**	<1.0									
Total Petroleum Hydrocarbons	**5910**	**3.1**									
BTEX	Concentration, µg/kg										
Benzene	<10	<10							370	75	90000
Toluene	<10	<10							660000	120000	180000000
Ethyl Benzene	<10	<10							260000	91000	27000000
Xylenes*	<10	<10							310000	160000	30000000
MTBE	<10	<10									

Notes
Total = Sum of compounds above detection limit.
S4UL given at 6% soil organic matter
*Results given as total of (ortho), (meta) and (para) xylene. SGV given is the lowest permissible value for any xylene compound

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/2

Speciated Polyaromatic Hydrocarbons by GCMS

Location	WS2	WS2	WS2	WS3	WS4	WS6A	WS8	WS8	WS10	WS13	WS13	LQM/CIEH S4UL[3]			
Sample	C1	C2	C4	C1	C1	C2	C1	C2	C1	C1	C3				
Depth, m	0.40	2.00	4.00	0.50	0.50	0.80	0.50	1.00	0.40	0.40	3.00	residential4	residential5	allotments	commercial
Determinand	Concentration, mg/kg														
PAH															
Naphthalene	0.2	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	13	13	24	1100
Acenaphthylene	0.9	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	920	6000	160	100000
Acenaphthene	<0.1	0.5	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1100	6000	200	100000
Fluorene	<0.1	0.2	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	860	4500	160	71000
Phenanthrene	1.6	1.0	<0.1	0.3	10.9	<0.1	0.3	<0.1	0.4	0.3	<0.1	440	1500	90	23000
Anthracene	0.6	1.0	<0.1	<0.1	17.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11000	37000	2200	540000
Fluoranthene	8.5	<0.1	<0.1	1.0	13.3	<0.1	1.1	0.1	1.0	0.8	<0.1	890	1600	290	23000
Pyrene	7.9	0.1	<0.1	0.8	9.9	<0.1	0.9	0.1	0.8	0.6	<0.1	2000	3800	620	54000
Benzo(a)anthracene	5.1	<0.1	<0.1	0.6	5.6	<0.1	0.6	<0.1	0.4	0.4	<0.1	13	15	13	180
Chrysene	5.5	<0.1	<0.1	0.7	8.5	<0.1	0.7	<0.1	0.7	0.5	<0.1	27	32	19	350
Benzo(b)fluoranthene	5.7	0.5	<0.1	0.8	4.8	<0.1	0.8	<0.1	0.8	0.4	<0.1	3.7	4.0	3.9	45
Benzo(k)fluoranthene	5.6	0.4	<0.1	0.7	4.7	<0.1	0.8	<0.1	0.9	0.6	<0.1	100	110	130	1200
Benzo(a)pyrene	6.8	<0.1	<0.1	0.7	5.5	<0.1	0.8	<0.1	1.4	0.5	<0.1	3	3.2	3.5	36
Indeno(123-cd)pyrene	5.3	<0.1	<0.1	0.7	3.6	<0.1	0.7	<0.1	1.0	0.5	<0.1	41	46	39	510
Dibenzo(ah)anthracene	1.3	<0.1	<0.1	0.2	1.1	<0.1	0.2	<0.1	0.3	0.2	<0.1	0.3	0.32	0.43	3.6
Benzo(ghi)perylene	4.7	<0.1	<0.1	0.6	3.3	<0.1	0.7	<0.1	1.6	0.4	<0.1	350	360	640	4000
Total PAH (16)	**59.7**	**2.9**	**<0.4**	**7.5**	**90.4**	**<0.4**	**7.7**	**0.6**	**9.4**	**5.3**	**<0.4**				

Notes

1. Total PAH = Sum of EPA16 identified components
2. The results are expressed as mg/kg dry weight soil after correction for moisture content
3. S4UL given at 6% soil organic matter
4. Residential with plant uptake
5. Residential without plant uptake

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 2/2

Speciated Polyaromatic Hydrocarbons by GCMS

Location	WS15	WS16	WS18								LQM/CIEH S4UL[3]			
Sample	C1	C1	C1											
Depth, m	3.00	0.50	0.40								residential4	residential5	allotments	commercial
Determinand	Concentration, mg/kg													
PAH														
Naphthalene	<0.1	3.3	<0.1								13	13	24	1100
Acenaphthylene	<0.1	3.6	<0.1								920	6000	160	100000
Acenaphthene	<0.1	2.0	<0.1								1100	6000	200	100000
Fluorene	<0.1	0.8	<0.1								860	4500	160	71000
Phenanthrene	<0.1	2.6	<0.1								440	1500	90	23000
Anthracene	<0.1	1.2	<0.1								11000	37000	2200	540000
Fluoranthene	<0.1	2.7	0.1								890	1600	290	23000
Pyrene	<0.1	1.3	<0.1								2000	3800	620	54000
Benzo(a)anthracene	<0.1	0.7	<0.1								13	15	13	180
Chrysene	<0.1	0.8	<0.1								27	32	19	350
Benzo(b)fluoranthene	<0.1	0.7	<0.1								3.7	4.0	3.9	45
Benzo(k)fluoranthene	<0.1	0.7	0.1								100	110	130	1200
Benzo(a)pyrene	<0.1	0.6	<0.1								3	3.2	3.5	36
Indeno(123-cd)pyrene	<0.1	0.5	<0.1								41	46	39	510
Dibenzo(ah)anthracene	<0.1	0.2	<0.1								0.3	0.32	0.43	3.6
Benzo(ghi)perylene	<0.1	0.5	<0.1								350	360	640	4000
Total PAH (16)	**<0.4**	**22.3**	**<0.4**											

Notes

1. Total PAH = Sum of EPA16 identified components
2. The results are expressed as mg/kg dry weight soil after correction for moisture content
3. S4UL given at 6% soil organic matter
4. Residential with plant uptake
5. Residential without plant uptake

Exceptions denoted thus: Residential XX
Commercial XX

CONTAMINANTS IN SOIL

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/1

Location	Sample	Depth	Asbestos identification		
		m	Description of matrix	Overall percentage of asbestos identified (approx.)	Type of asbestos identified
WS2	C1	0.40	Brown soil, stones, brick		none detected
WS2	C2	2.00	Brown sandy soil, stones		none detected
WS3	C1	0.50	Brown sandy soil, stones		none detected
WS4	C1	0.50	Brown soil, stones, clinker		none detected
WS5	C1	0.50	Brown sandy soil, clinker, stones		none detected
WS6A	C2	0.80	Brown soil		none detected
WS7	C1	1.00	Brown soil, stones		none detected
WS8	C1	0.50	Brown soil,, stones, brick, clinker		none detected
WS8	C2	1.00	Brown soil		none detected
WS9	C2	1.00	Brown soil, stones		none detected
WS10	C1	0.40	Brown soil, stones		none detected
WS10	C2	0.90	Brown soil		none detected
WS13	C1	0.40	Brown soil		none detected
WS16	C1	0.50	Brown soil		none detected
WS18	C1	0.40	Brown soil, stones		none detected

CONTAMINANTS IN WATER

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/1

Location	Sample	Depth	Arsenic	Boron	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Selenium	Zinc	PAH	Phenols	Hexavalent	TPH by GCMS							pH
		m						inorganic					screen	tot. monohydric	Chromium	C8 - C10	C10 - C12	C12 - C16	C16 - C21	C21 - C35	C35 - C40	Total C8 - C40	value
BH1	W1	s'pipe	<5		<1	<5	<5	<0.1	8	<1	<5	<5		<1	<100								
BH2	W1	s'pipe	19		<1	<5	<5	<0.1	84	<1	<5	14		<1	<100								
BH5	W1	s'pipe	<5		<1	<5	<5	<0.1	<5	<1	<5	<5		<1	<100								
UK Drinking Water			10	1000	5	50	2000	1	20	10	10	5000		0.5									
EQS freshwater			50	2000	5	5-250[1]	1-28[1]	1	50-200[1]	4-250[1]	-	8-500[1]		30									

Notes

1. Depends on hardness, use lower value if unknown

All units are µg/l unless otherwise stated, except for pH which is dimensionless

Exceptions denoted thus: United Kingdom Drinking Water XX
Environmental Quality Standards freshwater XX

CONTAMINANTS IN WATER

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/1

Speciated Total Petroleum Hydrocarbons (Aromatic / Aliphatic Split with BTEX)										
Location	BH1	BH2	BH5							
Sample	W3	W3	W3							
Depth, m	s'pipe	s'pipe	s'pipe							
Determinand	Concentration, µg/l									
Aromatic Hydrocarbons										
>C5 - C7	<1.0	<1.0	<1.0							
>C7 - C8	<1.0	<1.0	<1.0							
>C8 - C10	<5.0	<5.0	<5.0							
>C10 - C12	<5.0	<5.0	<5.0							
>C12 - C16	<5.0	<5.0	<5.0							
>C16 - C21	6.2	<5.0	<5.0							
>C21 - C35	18.9	<5.0	31.3							
>C35 - C40	<5.0	<5.0	<5.0							
Total Aromatic Hydrocarbons	**25.1**	**<5.0**	**31.3**							
Aliphatic Hydrocarbons										
>C5 - C6	<1.0	<1.0	<1.0							
>C6 - C8	<1.0	<1.0	<1.0							
>C8 - C10	<5.0	<5.0	<5.0							
>C10 - C12	<5.0	<5.0	<5.0							
>C12 - C16	<5.0	<5.0	<5.0							
>C16 - C21	<5.0	<5.0	<5.0							
>C21 - C35	9.6	<5.0	53.6							
>C35 - C40	<5.0	<5.0	<5.0							
Total Aliphatic Hydrocarbons	**9.6**	**<5.0**	**53.6**							
Total Petroleum Hydrocarbons	**34.7**	**<5.0**	**84.9**							
BTEX	Concentration, µg/l									
Benzene	<1.00	<1.00	<1.00							
Toluene	<1.00	<1.00	<1.00							
Ethyl Benzene	<1.00	<1.00	<1.00							
Xylenes*	<1.00	<1.00	<1.00							
MTBE	<1.00	<1.00	<1.00							

Notes
Total = Sum of compounds above detection limit.
*Results given as total of (ortho), (meta) and (para) xylene.

CONTAMINANTS IN WATER

Project: FORMER GREGGS BAKERY, GOULD ROAD, TWICKENHAM, TW2 6RT
Client: London Square Developments Limited

Project No: 4609-2
Sheet No: 1/1
Sampled on: 04/05/17

Speciated Polyaromatic Hydrocarbons by GCMS

Location	BH1	BH2	BH5									UK	EQS
Sample	W2	W2	W2									Drinking	Fresh
Depth, m	s'pipe	s'pipe	s'pipe									Water	Water
Determinand	Concentration, µg/l												
PAH													
Naphthalene	0.05	0.04	0.09										10
Acenaphthylene	0.35	0.04	0.02										
Acenaphthene	0.77	0.03	0.02										
Fluorene	0.21	0.02	0.04										
Phenanthrene	1.21	0.17	0.11										
Anthracene	0.74	0.07	0.03										
Fluoranthene	8.03	0.47	0.13										
Pyrene	6.67	0.39	0.12										
Benzo(a)anthracene	3.84	0.24	0.05										
Chrysene	3.82	0.26	0.06										
Benzo(b)fluoranthene	2.99	0.20	0.04										
Benzo(k)fluoranthene	3.47	0.22	0.06										
Benzo(a)pyrene	3.94	0.22	0.06									0.01	-
Indeno(123-cd)pyrene	2.07	0.11	0.04										
Dibenzo(ah)anthracene	0.76	0.04	0.02										
Benzo(ghi)perylene	2.26	0.13	0.05										
Total PAH(16)	**41.2**	**2.64**	**0.93**										

Notes

1. Total PAH = Sum of 16 identified components
2. UKDWS for total PAH = 0.10 µg/l and is the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene

Exceptions denoted thus: XX exceeds Drinking Water Standard
XX exceeds Environmental Quality Standard

Results Summary

Report No.: 17-13605

WAC Analysis								
Elab Ref:	109395					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:						**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	WS1 C1							
Depth (m)	0.50 - 0.80							
Site:	Greggs							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		4.40	3	5	6
Loss on Ignition		M	%		4.4	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		23	500	--	--
Total (of 17) PAHs		N	mg/kg		43.0	100	--	--
pH		M			9.3	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	0.016		0.16	0.5	2	25
Barium		N	0.011		0.11	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	< 0.005		< 0.05	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	< 0.005		< 0.05	0.5	10	30
Nickel		N	0.001		< 0.05	0.4	10	40
Lead		N	0.001		< 0.05	0.5	10	50
Antimony		N	< 0.005		< 0.05	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	< 0.005		< 0.05	4	50	200
Chloride		N	< 5		< 50	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	10		96.50	1000	20000	50000
Total Dissolved Solids		N	160		1600.00	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	9.210		92.00	500	800	1000
Leach Test Information								
pH		N	7.6					
Conductivity (uS/cm)		N	151					
Dry mass of test portion (g)			103.000					
Dry Matter (%)			91					
Moisture (%)			10					
Eluent Volume (ml)			994					

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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Results Summary

Report No.: 17-13605

WAC Analysis								
Elab Ref:	109396					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:						**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	WS5 C2							
Depth (m)	0.80 - 1.00							
Site:	Greggs							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		0.56	3	5	6
Loss on Ignition		M	%		1.8	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		8	500	--	--
Total (of 17) PAHs		N	mg/kg		3.0	100	--	--
pH		M			8.7	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	0.006		0.06	0.5	2	25
Barium		N	< 0.005		< 0.05	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	< 0.005		< 0.05	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	0.008		0.08	0.5	10	30
Nickel		N	< 0.001		< 0.05	0.4	10	40
Lead		N	< 0.001		< 0.05	0.5	10	50
Antimony		N	< 0.005		< 0.05	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	< 0.005		< 0.05	4	50	200
Chloride		N	5		52.00	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	31		312.00	1000	20000	50000
Total Dissolved Solids		N	320		3200.00	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	13.700		137.00	500	800	1000
Leach Test Information								
pH		N	7.9					
Conductivity (uS/cm)		N	298					
Dry mass of test portion (g)			101.000					
Dry Matter (%)			88					
Moisture (%)			14					
Eluent Volume (ml)			976					

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Results Summary

Report No.: 17-13605

WAC Analysis								
Elab Ref:	109397					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:						**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	WS6A C1							
Depth (m)	0.40 - 0.60							
Site:	Greggs							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		0.82	3	5	6
Loss on Ignition		M	%		2.0	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		8	500	--	--
Total (of 17) PAHs		N	mg/kg		14.0	100	--	--
pH		M			11.0	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	< 0.005		< 0.05	0.5	2	25
Barium		N	< 0.005		< 0.05	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	< 0.005		< 0.05	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	0.006		0.06	0.5	10	30
Nickel		N	< 0.001		< 0.05	0.4	10	40
Lead		N	< 0.001		< 0.05	0.5	10	50
Antimony		N	< 0.005		< 0.05	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	< 0.005		< 0.05	4	50	200
Chloride		N	8		79.00	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	84		841.00	1000	20000	50000
Total Dissolved Solids		N	300		3000.00	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	3.510		35.00	500	800	1000
Leach Test Information								
pH		N	10.3					
Conductivity (uS/cm)		N	379					
Dry mass of test portion (g)			101.000					
Dry Matter (%)			86					
Moisture (%)			17					
Eluent Volume (ml)			970					

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Results Summary

Report No.: 17-13605

WAC Analysis								
Elab Ref:	109398					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:						**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	WS9 C1							
Depth (m)	0.50 - 0.70							
Site:	Greggs							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		3.30	3	5	6
Loss on Ignition		M	%		4.4	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		< 5	500	--	--
Total (of 17) PAHs		N	mg/kg		14.0	100	--	--
pH		M			7.6	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	0.010		0.10	0.5	2	25
Barium		N	0.008		0.08	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	0.008		0.08	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	< 0.005		< 0.05	0.5	10	30
Nickel		N	0.001		< 0.05	0.4	10	40
Lead		N	< 0.001		< 0.05	0.5	10	50
Antimony		N	0.008		0.08	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	0.007		0.07	4	50	200
Chloride		N	5		50.00	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	6		63.50	1000	20000	50000
Total Dissolved Solids		N	< 10		< 100	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	15.600		156.00	500	800	1000
Leach Test Information								
pH		N	7.4					
Conductivity (uS/cm)		N	74					
Dry mass of test portion (g)			101.000					
Dry Matter (%)			81					
Moisture (%)			23					
Eluent Volume (ml)			950					

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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Results Summary

Report No.: 17-13605

WAC Analysis								
Elab Ref:	109399					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:						**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	WS14 C1							
Depth (m)	0.50 - 0.70							
Site:	Greggs							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		0.09	3	5	6
Loss on Ignition		M	%		0.7	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		< 5	500	--	--
Total (of 17) PAHs		N	mg/kg		< 2	100	--	--
pH		M			7.9	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	< 0.005		< 0.05	0.5	2	25
Barium		N	< 0.005		< 0.05	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	< 0.005		< 0.05	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	0.006		0.06	0.5	10	30
Nickel		N	0.002		< 0.05	0.4	10	40
Lead		N	< 0.001		< 0.05	0.5	10	50
Antimony		N	< 0.005		< 0.05	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	0.007		0.07	4	50	200
Chloride		N	18		181.00	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	7		74.40	1000	20000	50000
Total Dissolved Solids		N	130		1300.00	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	16.000		160.00	500	800	1000
Leach Test Information								
pH		N	7.5					
Conductivity (uS/cm)		N	123					
Dry mass of test portion (g)			103.000					
Dry Matter (%)			97					
Moisture (%)			3					
Eluent Volume (ml)			980					

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