Intended for
Premier Inn Hotels and Dominvs Group

Document type
Report

Date
November 2022

Document Number
5811-RAM-XX-XX-RP-GE-0001

ONE MEDLOCK STREET, MANCHESTER
GEOTECHNICAL INTERPRETATIVE REPORT



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GEOTECHNICAL INTERPRETATIVE REPORT

Project name	One Medlock Street, Manchester
Project no.	1620005811
Recipient	Whitbread PLC
Document type	Geotechnical Interpretative Report
Version	P03
Date	03/11/2022
Prepared by	Mohammad Fazal
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Description	Final Issue

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GEO-ENVIRONMENTAL FACTUAL REPORT FOR PREMIER INN, DEANSGATE, MANCHESTER. REPORT REF. MAN.260.001.GE.R.001.A, ENZYGO, AUGUST 2019.

Appendix 2

GROUNDWATER MONITORING RESULTS NOVEMBER 2020 TO JANUARY 2021

1. EXECUTIVE SUMMARY

Scope

Purpose of the report

This report summarises the findings of the ground investigation carried out at the One Medlock Street, Manchester. It provides an interpretation of the factual data obtained from the investigation in relation to the proposed redevelopment. Characteristic geotechnical parameters have been derived for foundation design and are presented in Table 6-11. A preliminary geotechnical assessment is presented in Section 7.

This report was first issued (Rev 01) in September 2019. This current version (Rev P02) has been updated based on further groundwater monitoring data, revised project proposals and increased pile capacity requirements.

Proposed development

The development proposal includes construction of three blocks of multistoried buildings.

Site Information

National Grid Reference

383630E, 397160N

Current Site Description

The site is located approximately 1.3 km southwest of Manchester city centre and is approximately 0.85 Ha in area. The postcode of the site is M15 5FJ. The site is currently occupied by a Premier Inn building and a car park, pavements and hard landscaped areas and the current ground level ranges from 33.6 m AOD to 34.5 m AOD.

Site History

Historic maps show that earlier buildings at the site were demolished prior to construction of the existing Premier Inn.

Ground Investigation

Scope of Works

In May 2019 Enzygo Ltd were instructed by Whitbread PLC to carry out a ground investigation (GI) to inform the proposed development works within the site.

Ground Conditions

Geology

The geology of the site, as identified during the GI, comprises Made Ground, overlying superficial glaciofluvial deposits. The superficial deposits are underlain by the Chester Formation of Sandstone.

Groundwater

Monitoring indicates that groundwater is present within the bedrock and within the overlying glaciofluvial deposits. For the current proposals a design groundwater level of 29.2 mAOD (the highest water level monitored in the winter season) has provisionally been adopted.

Ground Aggressivity

For cast in-situ concrete the following are recommended: Design Sulphate Class of DS-1 and Aggressive Chemical Environment for Concrete (ACEC) AC-1.

Foundation Design

Pavement Foundations

A design CBR value of 15% is recommended for the design of pavement foundations and external areas except where soft Made Ground is encountered. It is recommended that at the formation level, if soft or uncharacteristic material is encountered, it should be replaced by suitably compacted acceptable granular material.

Shallow Foundations	For ground bearing structures (i.e. ground bearing floor slabs) the bearing capacity of the soil has been assessed to be suitable for use across the site, subject to removal of areas of soft or loose material and replacement with compacted structural fill.
Building Foundations	Piles founded within the Sandstone would be suitable to carry the anticipated structural column loads and to reduce settlements to within acceptable limits.

Material Re-Use

In-situ Material	It is unlikely that any in-situ material excavated as part of the works will be reused.

2. INTRODUCTION

Ramboll UK Ltd (Ramboll) has been appointed by Premier Inn Hotels and Dominvs Group as multidisciplinary Engineer for One Medlock Street redevelopment in Manchester. The proposed development location is shown in Figure 2-1.

As part of this work, an intrusive ground investigation was undertaken by Enzygo (Enzygo Ltd, August, 2019) in order to obtain information required to make an assessment of the underlying ground conditions. Further goundwater monitoring was carried out by Enzygo in winter 2020-21.

This report discusses the findings of the ground investigation and provides recommendations for foundation design and construction and assesses the potential risks and constraints on development at the site.

2.1 Scope and objective of the report

The purpose of the report is to summarise the nature and extent of ground and groundwater within the site boundaries, together with a geotechnical characterisation of the ground. The characterisation is to inform foundation design, design of pavements, infrastructure works and ground remedial works such that the development can be safely designed and constructed.

2.2 Description of the project

The demolition of the existing hotel building and structures and the development of the site for office uses (Use Class E), flexible office/community use (Use Class E/F1/F2) and purpose-built student accommodation (Sui Generis) comprising two separate buildings, along with associated ancillary internal and external amenity space, hard and soft landscaping and associated highway works.



Figure 2-1 Site Plan

3. EXISTING INFORMATION

3.1 Site History

Historical Ordnance Survey maps, historical building plans and aerial imagery for the site were examined as part of the Desk Study and are presented in Section 3.0 of the Desk Study report (Ramboll, May, 2019).

The site was historically occupied by terraced housing and two public houses with later a school in the west of the site. The houses and one of the public houses were cleared around 1938. The site remained the same until around 2000 when the site was redeveloped as a hotel and car park which are still present today.

3.2 Published Geology

The BGS GeoIndex (online) [https://www.bgs.ac.uk/GeoIndex/] indicates that bedrock underlying the majority of the site is the Chester Formation of Sandstone.

Superficial Glaciofluvial Sheet Deposits (i.e. sand and gravel) are shown to be present underlying the site.

3.3 Hydrogeology and Hydrology

Groundwater vulnerability maps presented within the Envirocheck Report indicate that the glaciofluvial deposits are classified as a Secondary A aquifer. The underlying Chester Formation of Sandstone (bedrock) is classified as a Principal Aquifer, which has a high groundwater vulnerability.

The site is approx. 110 m east from a Zone 3 of a groundwater source protection zone (SPZ) defined to protect water supply abstractions. The Envirocheck report has records of four groundwater abstractions within 1 km of the site, the closest being 400 m south for Manchester Metropolitan University for heat pump and general use.

The nearest surface water feature is the River Medlock which is culverted approximately 180 m north of the site. The Envirocheck report states that Corn Brook is approx. 220 m S of the site.

3.4 Existing Ground Investigation

A site investigation was previously undertaken for the existing Premier Inn. However, this has not been made available to date. From BGS records there are 8 boreholes, which are shown to be confidential.

4. FIELD AND LABORATORY STUDIES

4.1 Ground Investigation

In order to provide information on ground conditions and material parameters to inform the design, a ground investigation was scoped and supervised by Ramboll and the field works were carried out by Enzygo (Enzygo Ltd, August, 2019).

The Ground Investigation comprised the following items of fieldwork:

- Six dynamic sampling boreholes (BH01 to BH05) followed by rotary coring to depths ranging from 9.3 m bgl (BH06) to 24.6 m bgl (BH03);
- Nine windowless sampling boreholes (WS01 to WS06B) by dynamic sampling methods to depths from 0.45 m bgl (WS04 & WS06B) to 5.0 m bgl (WS01, WS04A & WS05);
- Five Plate (600 mm diameter) Load Testing (PLT01 to PLT05) for in situ CBR determination in trial pits at approximately 600 mm below existing ground level;
- Three soakaway tests (SA) in accordance with BRE 365 at shallow depth within the top 2.0 m bgl;
- Soil sampling for geotechnical laboratory testing;
- In-situ geotechnical testing;
- Groundwater monitoring well installations;
- Surveying of all exploratory hole locations and elevations.

The data from the ground investigation is contained in the Factual Report prepared by Enzygo Ltd which is provided in Appendix 1. The exploratory hole locations are shown on Figure 4-1 Exploratory Hole Location Plan.

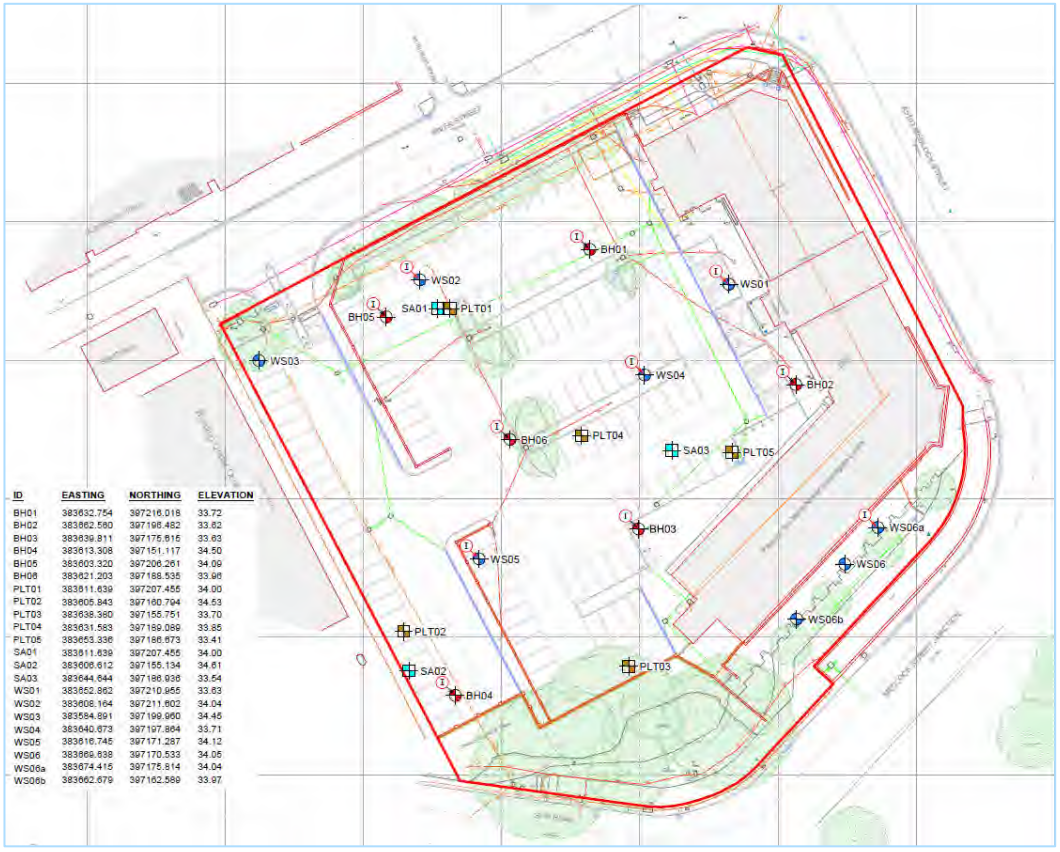


Figure 4-1 Exploratory Hole Location Plan

4.2 Laboratory Testing

Geotechnical laboratory testing was undertaken by Professional Soils Laboratory (PSL) UKAS accredited testing laboratory and chemical laboratory testing was undertaken by Envirolab UKAS accredited testing laboratory.

Copies of the laboratory test certificates are contained within the Factual report (Enzygo Ltd, August, 2019) presented in Appendix 1.

5. GROUND SUMMARY

5.1 Geology and Ground Conditions

A summary of the geological strata encountered during the ground investigation is presented in Table 5-1.

Table 5-1 Summary of Geology Encountered

Stratum		Level of Top of Stratum (m AOD)	Thickness (m)	Reference Exploratory Hole
Made Ground		33.6 to 34.5	0.4 to 5.2	BH02, BH03, WS01, BH05, BH04 & WS03 for levels, BH03 & BH04 for thicknesses
Glacial Sand and Gravel		31.0 to 33.7	1.6 to 4.6	BH06 & BH05 for both levels and thicknesses
Glacial Clay		28.9 to 29.5	3.0 to 5.8	BH03 & BH05 for levels and BH06 & BH03 for thicknesses
Sandstone	Completely Weathered Zone	23.1 to 26.5	1.0 to 3.0	BH03 & BH06 for levels
	Intact Rock	21.1 to 25.0	>13.5	

The summary of the geology encountered during the ground investigation has been used to derive the ground profile. A ground profile for design purposes is presented in Table 5-2.

Table 5-2 Design Ground Profile

Stratum		Level of Top of Stratum (m AOD)	Thickness (m)
Made Ground		34.0	1.0
Glacial Sand and Gravel		33.0	4.0
Glacial Clay		29.0	4.2
Sandstone	Weathered Zone	24.8	2.3
	Intact Rock	23.0	>13.5 (proven)

6. GROUND CONDITIONS AND MATERIAL PROPERTIES

The data presented in this section is based upon the results of the ground investigation.

The derivation of characteristic geotechnical parameters is described for the soils that are expected to be encountered. Where direct measurement of parameters has not been carried out, established correlations with measured properties have been used to derive values. Characteristic values were determined by considering derived values, directly measured values, soil descriptions and bearing in mind associated risk/consequences for design.

Characteristic values are defined as a cautious estimate of the value affecting the occurrence of a limit state based on Clause 2.4.5.2, from BS EN 1997-1: 2004 (Eurocode 7). Characteristic values will be used with appropriate partial factors in design to ensure appropriate overdesign ratios, as required.

The following plots are shown in Section 10.

Figure 10-1 SPT N60 with Level for Granular Made Ground
Figure 10-2 PSD for Granular Made Ground
Figure 10-3 SPT N60 with Level for Sand & Gravel
Figure 10-4 PSD for Sand & Gravel
Figure 10-5 SPT N60 with Level for Glacial Clay
Figure 10-6 Plasticity Index for Glacial Clay
Figure 10-7 Undrained Shear Strength with Level for Glacial Clay
Figure 10-8 UCS with Level for Sandstone

Strength

Cohesive Soils – Total Stress Parameters (Undrained)

Characteristic undrained shear strength for normally and over-consolidated cohesive soils has been assessed from the following information:

- Correlation to SPT N values using Stroud and Butler (MA & Butler, 1975), with factor f1 derived from Figure 31 CIRIA 143 (Clayton, 1995) using the Plasticity Index (PI), (f1 increases with reducing PI and generally an upper bound PI value should be selected to derive f1);
- Laboratory Unconsolidated Undrained (UU) Triaxial shear strength tests;
- Material descriptions from boreholes and windowless sampler holes, based on British Standard (BS) 5930: 2015 (BSI Global, 2015) and EC7 (BSI Global, Feb 2009)

The characteristic value for undrained strength vs. reduced level plot will be a value (or line) giving a cautious estimate of the strength, excluding any extreme values. Extreme values were reviewed, as appropriate, as they could have indicated a different soil type or other anomaly that needs to be accounted for in design.

Cohesive Soils - Effective Stress Parameters (Drained)

Effective stress (drained) strength parameters for predominantly fine grained (cohesive) soils have been derived from guidance in BS 8004:2015 (BSI Global, 2015)

$$\Phi' = 42^{\circ} - 12.5 \times \log_{10}(I_p)$$

Granular Soils
For soils described as sands and/or gravels, and assessed as well-graded, SPT N_{60} values have been used to interpret the effective angle of shearing resistance (φ') using the relationship of Peck, Hanson and Thorburn (Peck, Hanson, & Thornburn, 1974).

The results obtained have been checked as appropriate against the method described in BS 8004:2015 (BSI Global, 2015).

For sands and gravels, a characteristic value of c' = 0 kN/m² has been recommended for design in accordance with BS8004:2015 (BSI Global, 2015).

Rock
A combination of the point load index test results and the unconfined compressive strength (UCS) results have been used to derive characteristic strength values for the bedrock. Bowden et al (AJ Bowden, 1998) suggest that the correlation between UCS and point load $Is_{(50)}$ can be described using the following equation:

$$UCS = k \times Is_{(50)}$$

Stiffness and Compressibility
Cohesive Soils
Where determination of settlement of foundations on cohesive soils is required then stiffness has been assessed from SPT N values using the relationship described in CIRIA Report 143 (Clayton, 1995).

Stiffness based on Young's Modulus (E_u) has been assessed using correlations between the undrained shear strength, plasticity index and over-consolidation ratio as expressed in Tomlinson (Tomlinson, 1994). The relationship between E_u and E′ has been described using the following relationship:

$$E' = \{0.66 \text{ to } 0.8\} \times E_u$$

The relationship between the undrained shear strength (C_u) and stiffness (E_u) is considered from the chart suggested by Jamiolkowski *et. al*. (1979) (Jamiolkowski, 1979).

The settlements calculated from soil modulus values interpreted following the guidance in CIRIA Report 143 are likely to represent worst case settlements.

Granular Soils
Where settlement calculations for foundations in granular soils are required, settlement of granular soils has been determined using the following relationship between SPT N values and E′ as stated in CIRIA Report 143 (Clayton, 1995).

$$E' \approx 1 \times N_{60}$$

Aggressivity

The soil chemistry has been assessed in accordance with BRE Special Digest 1 (BRE Construction Divison, 2005) to provide guidance on the concrete class required for embedded structures.

6.1 Made Ground

Made Ground (granular) was encountered in all exploratory boreholes with thickness ranging from 0.4 m (BH03) to 5.2 m (BH04). Made Ground comprised red brown slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.

6.1.1 *Material Testing*

The in-situ and geotechnical laboratory tests listed in Table 6-1 were undertaken on Made Ground materials.

Table 6-1 Geotechnical Soil Testing of Made Ground

Geotechnical Test	Number	Limits		
		Upper	Lower	Average
Particle Size Distribution – Cobbles (%)	6	15	0	4
Particle Size Distribution – Gravel (%)	6	67	20	40
Particle Size Distribution – Sand (%)	6	66	27	39
Particle Size Distribution – Silt / Clay (%)	6	46	5	17
Standard Penetration Test (SPT), N_{60}	9	21	1	12
Plate Load Test – CBR (%)	5	12	17	15
Aggressivity – pH	8	7.7	11.1	-
Aggressivity – WS Sulphate (mg/L)	8	370	18	-

6.1.2 *Geotechnical Interpretation*

The Standard Penetration Test (SPT) results indicate that the Made Ground is medium dense to dense. The results are plotted in Figure 10-1. A characteristic SPT N_{60} value of 10 has been selected for design, which corresponds to an angle of internal friction of Ø′= 30°.

Based on information from the borehole log descriptions and Table 1 in BS 8002: 2015 Earth Retaining Structures, the characteristic unit weight has been estimated as 18 KN/m^3.

A characteristic stiffness (E′) of 10 MPa has been adopted, based on the SPT results.

Five Plate Load Tests (PLT) were undertaken at depths ranging from 0.45 mbgl to 0.6 mbgl, using a 600mm diameter plate. CBR values were calculated from a range from 12% to 17% with an average of 15%. Considering the soil description and PLT test results a characteristic CBR value of 15% is considered appropriate for the site.

6.1.3 *Geotechnical Characteristic Design Parameters for Made Ground*

The Made Ground was encountered in all exploratory hole locations across the site.

The soil descriptions, in-situ testing and laboratory testing have been used to derive the geotechnical characteristic parameters in Table 6-2.

Table 6-2 Geotechnical Characteristic Parameters for Made Ground

Made Ground Characteristic Values	
Unit Weight – ɣ (kN/m3)	18
CBR (%)	15
Effective Stress – c′ (kPa)	0
Effective Stress – φ′ (deg)	30
Effective Stress – E′ (MPa)	10
Design Sulphate Class	DS-1
Aggressive Chemical Environment Class	AC-1

6.2 Sand and Gravel (Glaciofluvial Sheet Deposits)

Medium dense brown Sand and Gravel was encountered beneath the Made Ground. Sands are described as orange brown slightly gravelly fine to coarse and gravels are described as subangular to subrounded fine to coarse of quartz, sandstone and granite.

The thickness of the Sand and Gravel layer ranged from 1.6 m (BH06) to 4.6 m (BH05).

Table 6-3 summarises the tests which were undertaken on the Sand and Gravel.

Table 6-3 Geotechnical Soil Testing of Sand and Gravel

Geotechnical Test	Number	Limits		
		Upper	Lower	Average
Particle Size Distribution – Cobbles (%)	10	0	0	0
Particle Size Distribution – Gravel (%)	10	74	6	43
Particle Size Distribution – Sand (%)	10	79	23	45
Particle Size Distribution – Silt / Clay (%)	10	55	3	12
Standard Penetration Test (SPT)	34	59	4	22
Soakaway Test, Infiltration f (m/s)	3	6.14E-05	1.31E-05	3.86E-05
Aggressivity – pH	15	7.1	8.3	-
Aggressivity – WS Sulphate (mg/L)	15	90	12	-

6.2.1 *In-Situ Testing*

Thirty-four SPTs were carried out in the Sand and Gravel layer which showed SPT N_{60} values ranging from 4 (WS04) to 59 (BH06).

The relationship between the reduced level and the SPT N_{60} value is plotted on Figure 10-3 and an SPT N_{60} of 14 is considered appropriate.

6.2.2 *Soakaway Testing*

Three trial pit soakaway tests were carried out as part of the ground investigation in accordance with BRE 365 at shallow depth.

Copies of the soakaway test results are contained within the Factual report (Enzygo Ltd, August, 2019) presented in Appendix 1 and a summary of the testing is given in Table 6-4.

Table 6-4 Summary of Soakaway Tests

Test Location	Depth (m bgl)	Effective Depth, m	Soil Descriptions / Strata	Infiltration Rate, f (m/s)
SA01	2.5	1.5	Made Ground and Glaciofluvial Sheet Deposits	4.13E-05
SA02	2.3	1.3	Glacial Till and Glaciofluvial Sheet Deposits	1.31E-05
SA03	2.0	1.4	Glaciofluvial Sheet Deposits	6.14E-05

6.2.3 *Strength Parameters*

Based on an SPT N_{60} value of 14, the corresponding angle of internal friction, Ø'= 32°.

Value for unit weight , taken from the borehole log descriptions and Table 1 in BS 8002: 2015 Earth Retaining Structures, as conservatively estimated to be 19 kN/m^3.

For the Sand and Gravel, a value for drained Young's Modulus, E', for shallow foundations has been approximated as 14 MPa.

6.2.4 *Geotechnical Characteristic Parameters for Sand and Gravel*

The soil descriptions and in-situ and laboratory test results have been used to derive the geotechnical characteristic parameters in Table 6-5.

Table 6-5 Geotechnical Characteristic Parameters for Sand and Gravel

Sand and Gravel Characteristic Values	
Unit Weight – ɣ (kN/m3)	19
Effective Stress – c' (kPa)	0
Effective Stress – φ' (deg)	32
Effective Stress – E (MPa)	14
Design Sulphate Class	DS-1
Aggressive Chemical Environment Class	AC-1

6.3 Glacial Clay (Glacial Till)

The Glacial Clay was described as stiff consistency grey brown slightly sandy gravelly Clay. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. The Glacial Clay was encountered with a range of thickness from 3.0 m (BH06) to 5.8 m (BH03) with an average of 4.4 m. The in-situ and geotechnical laboratory tests listed in Table 6-6 were undertaken on Glacial Clay.

Table 6-6 Geotechnical Soil Testing of Glacial Clay

Geotechnical Test	Number	Limits		
		Upper	Lower	Average
Liquid Limit (%)	10	40	31	35
Plastic Limit (%)	10	21	16	18
Plasticity Index (%)	10	20	15	18
Standard Penetration Test (SPT)	13	59	12	30
Undrained Triaxial Test, Cu (kPa)	2	160	131	145
Aggressivity – pH	4	8.3	8.1	-
Aggressivity – WS Sulphate (mg/L)	4	93	58	-

Plasticity Index and Liquid Limit results indicate that the Glacial Clay is a low to intermediate plasticity clay.

Values for unit weight , taken from the borehole log descriptions and Table 1 in BS 8002: 2015 Earth Retaining Structures, are conservatively estimated to be 19 KN/m^3.

6.3.1 *In-Situ Testing*

Thirteen SPTs were carried out in the Glacial Clay layer which showed SPT N_{60} values ranging from 12 to 59; however, there is no appreciable increase with depth. The relationship between the reduced level and the SPT N_{60} value is plotted on Figure 10-5 a characteristic design SPT N of 20 is considered appropriate for the Glacial Clay.

6.3.2 *Strength Parameters*

The characteristic undrained shear strength has been derived considering the correlation between the SPT N_{60} and plasticity index using an f_1=5.0. When undrained strength derived from SPT N_{60} and triaxial (UU) test results are plotted on a chart (Figure 10-7) there is no appreciable increase in depth. An undrained shear strength value of 100 kN/m^2 is considered appropriate.

Based on a Plasticity Index of 18 (average) for the material, the following correlation is adopted:

$$E_u = 300 \times c_u$$

Therefore, E_u can be taken as 30 MPa.

6.3.3 *Geotechnical Characteristic Parameters for Glacial Clay*

Table 6-7 presents the recommended geotechnical characteristic values for the Glacial Clay.

Table 6-7 Geotechnical Characteristic Parameters for Glacial Clay

Glacial Clay Characteristic Values	
Unit Weight – ɣ (kN/m3)	19
Effective Stress – c′ (kPa)	1
Effective Stress – φ′ (deg)	27
Effective Stress – E′ (MPa)	18

Total Stress – C_u (kPa)	100
Total Stress – E_u (MPa)	30
Design Sulphate Class	DS-1
Aggressive Chemical Environment Class	AC-1

6.4 Weathered Sandstone

The upper horizon of the Sandstone is completely weathered and has been considered as very dense sand. Weathered sandstone was encountered in all six exploratory holes (BH01 – BH06) and comprises very dense red brown slightly gravelly fine to coarse Sand. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite (Weathered Chester Formation of Sandstone).

The top of the weathered sandstone ranges from 23.0 m AOD (i.e. 10.5 m bgl) in BH03 to 25.5 m AOD (i.e. 7.5 m bgl) in BH06. The thickness of the layer was proven to a range from 1.0 m to 3.0 m.

The value for unit weight, taken from the borehole log descriptions and considering granular residual soil Table 1 in BS 8002: 2015 Earth Retaining Structures, is conservatively estimated to be 19 KN/m^3.

6.4.1 *In-Situ Testing*

Nine SPTs were carried out in the weathered sandstone; one test recorded an SPT N_{60} value of 21 (discounted as it appears to be erroneous and is not representative), and the others all refused (i.e. an N_{60} value of greater than 50 was recorded).

A characteristic SPT N_{60} value of 50 is considered appropriate for the weathered rock.

6.4.2 *Strength Parameters*

Based on the SPT results a friction angle (angle of internal friction) of 40° is recommended for the weathered sandstone.

Using the correlation given in 6.2.2 above, a drained Young's Modulus in the order of 50 MPa can be taken for the weathered sandstone.

6.4.3 *Geotechnical Characteristic Parameters for Weathered Sandstone*

Table 6-8 presents the recommended geotechnical characteristic values for the weathered Sandstone.

Table 6-8 Geotechnical Characteristic Parameters for Weathered Sandstone

Weathered sandstone Characteristic Values	
Unit Weight – ɣ (kN/m3)	19
Effective Stress – c′ (kPa)	0
Effective Stress – φ′ (deg)	40
Effective Stress – E′ (MPa)	50

6.5 Intact Sandstone

Intact Sandstone was encountered in five deep exploratory hole investigations. Intact Sandstone was typically described as weak to medium strong red brown slightly gravelly fine to coarse Sandstone. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. The bedrock fractures are subhorizontal (0-25°), very close to closely spaced.

The depth of the top of the sandstone ranged from 9.0 m bgl (i.e. 25.0 m AOD) in BH06 to 12.5 m bgl (i.e. 21.1 m AOD) in BH02. The full extent of this stratum was not explored, but it was proven to a thickness of 13.5 m.

The geotechnical laboratory tests listed in Table 6-9 were undertaken on intact Sandstone.

Table 6-9 Geotechnical Soil Testing of Intact Sandstone

Geotechnical Test	Number	Limits		
		Upper	Lower	Average
Moisture Content (%)	13	15	10	13
Bulk Density (Mg/m^3)	13	2.59	2.14	2.32
Unconfined Compressive Strength, UCS (MPa)	13	15.2	4.1	7.5
Point Load Index, Is50 (MPa)	30	0.59	0.06	0.24

The bulk densities of the Sandstone were found to range from 2.14 Mg/m^3 to 2.59 Mg/m^3 and a characteristic value of 2.32 Mg/m^3 has been taken for the stratum.

6.5.1 Strength Parameters

Thirteen Unconfined Compressive Strength (UCS) tests and thirty Point Load Index (PLI) were conducted on the sandstone. The PLI tests results were converted to UCS using k of 20 as suggested by Tomlinson (Tomlinson, 1994). This conversion results in a lower design UCS value than the UCS test data suggests. The lower value is considered appropriate, because PLI tests are typically carried out on smaller pieces of rock, whereas UCS tests require larger specimens so can give an unconservative impression of the intact strength of the material. The data are shown in (Figure 10-8), along with a design line showing the characteristic UCS value of 3.0 MPa which has been adopted.

6.5.2 Geotechnical Characteristic Parameters for Intact Sandstone

Table 6-10 presents the recommended geotechnical characteristic values for the Intact Sandstone.

Table 6-10 Geotechnical Characteristic Parameters for Intact Sandstone

Intact Sandstone Characteristic Values	
Unit Weight – ɣ (kN/m3)	22
Unconfined Compressive Strength UCS – σc (MPa)	3.0

6.6 Summary of Material Parameters

A summary of recommended characteristic parameters is presented in Table 6-11.

Table 6-11 Summary of Soil Parameters

Strata Type	Unit Weight (kN/m^3)	Effective Stress		Total Stress		Aggressivity	
		ϕ′ (deg)	**E′ (MPa)**	c_u (kPa) / UCS (MPa)	E_u (MPa)	DS Class	ACEC
Made Ground	18	30	10	-	-	DS-1	AC-1
Sand and Gravel	19	32	14	-	-	DS-1	AC-1
Glacial Clay	19	27	18	100	30	DS-1	AC-1
Weathered Sandstone	19	40	50	-	-	-	-
Intact Sandstone	22	-	-	UCS=3.0	-	-	-

6.7 Groundwater

Groundwater strikes were not observed during the ground investigation. BH04 recorded that soil at 0.7 m bgl within Made Ground was damp.

The following discussion excludes isolated readings which appear to be spurious.

Twelve groundwater monitoring wells were installed within the exploratory holes, and groundwater monitoring was undertaken in two phases: Summer 2019 and Winter 2020/21. The winter monitoring was carriedout to ensure that the data picked up any seasonal variation which may occur. The average increase in water level between the two periods, per well, was 0.2m.

The summer results are included in the Enzygo factual report in Appendix 1, and the winter results are included as Appendix 2.

The results from the boreholes with monitoring response zones in bedrock indicate that the groundwater table in the sandstone aquifer is at a depth in the range 24.2 to 25.0 mAOD, which corresponds approximately to the top of the bedrock, or towards he base of the glacial deposits. The depths at which water was encountered are relatively consistent throughout both periods of monitoring, and between boreholes with varying depths of monitoring installation response zone.

Window sample boreholes were installed with 'shallow' response zones (i.e. at various depths within the superficial material above bedrock). The deepest response zone of these wells extended to 29.1mOD, in WS05. None of these wells recorded groundwater during the monitoring visits.

Borehole BH06 was installed with a response zone from 27.0 to 30.0 mAOD (4.0 to 7.0m bgl), i.e. entirely within the glacial deposits which at this location comprised bands of sand and clay. Water was recorded at a depth in the range 29.1 to 29.2 mAOD throughout the monitoring periods. The glaciofluvial deposits in which the water was encountered are classified as a Secondary Aquifer.

Based on the current design proposals, the formation level for the majority of the site will be within the glacial materials. Therefore the data from BH06 should be provisionally adopted as the design groundwater level (29.2 mAOD). It is unclear whether this represents a large body of water or a localised pocket; but the level is consistent throughout the monitoring periods so it must be assumed that the water is being recharged. A sensibly conservative assumption therefore is that perched water will remain at this level during and post-construction and so it must be accounted for in the design. Should the design involve excavation to greater depth, thereby puncturing the glacial till layer and effectively providing a permanent drainage pathway for the perched water, a re-assessment of the design water level would be recommended.

7. PRELIMINARY GEOTECHNICAL ASSESSMENT

The proposed buildings are medium and high rise structures which will impart large loads onto the foundations. Conventional shallow pad foundations are unlikely to be suitable for transferring structural loads without the risk of excessive settlement or bearing failure, due to the variability in composition and thicknesses of superficial materials. A raft foundation has not been ruled out at this stage, particularly for the central area of the office building. However, raft foundations for the whole structure are unlikely to be appropriate because of:

- Practical constraints associated with excavation near the boundaries of the site;
- Proposed basement levels are for the majority of the footprint insufficiently deep to facilitate founding on bedrock without significant additional excavation and temporary works, as well as additional disposal of material off-site;
- The orientation of the buildings is such that a combined raft would be long compared to its width and may not offer sufficient support.

Piled foundations have therefore been considered as the most likely foundation solution for supporting structural column loads.

7.1 Piled Foundation Assessment

To provide suitable resistance to the design loads, it will be necessary to found piles within the sandstone bedrock. The pile design will derive resistance primarily from shaft friction and end-bearing within the bedrock, with some contribution to shaft friction from the superficial deposits (i.e. made ground/glacial sand & gravel/glacial clay).

The intact bedrock (sandstone) at the site is encountered typically at depth of 9.0 to 12.5 m bgl (i.e. 25.0 m AOD to 21.1 m AOD) with an average depth of 11.5 m bgl (23.0 m AOD).

Appropriate Eurocode material, action, and resistance factors have been used to calculate indicative pile capacities, which are presented in Table 7-1. The ground model has conservatively assumed that the rock strength remains constant with depth. The capacities assume that piles commence at existing ground level.

Verification of the design concrete strength should be made to ensure that the structural strength of the pile is appropriate to achieve the design loads. Higher strength concrete may be required for longer/higher capacity piles, or conversely the concrete strength may be a limiting factor on available pile capacities.

Continuous Flight Auger (CFA) piles are likely to represent the most economical and practical solution for pile diameters up to 900mm, and pile lengths up to 6m. Beyond this, conventional bored piles are likely to be more feasible. The advice of a piling specialist should be sought with regard to the optimal method of piling, and pile capacities for the ground conditions identified.

Table 7-1 Indicative Pile Capacity

Pile Diameter (mm)	Intact Rock Socket Length (m)	Ultimate Bearing Resistance Compression, Unfactored (kN/Pile)	EC7 Bearing resistance Compression (kN/Pile)		EC7 Tension Resistance (kN/Pile)
			ULS Set B	ULS Set C	
600	2	3690	2635	1495	710
	3	4370	3120	1795	955
	4	5045	3605	2100	1195
750	2	5140	3675	2060	890
	3	5990	4280	2435	1190
	4	6840	4885	2815	1495
900	2	6810	4860	2695	1065
	3	7825	5590	3150	1430
	4	8845	6315	3605	1795
1050	2	10418	7442	4033	1247
	3	11606	8290	4563	1671
	4	12793	9138	5093	2095
	5	13981	9986	5623	2519
	6	15169	10835	6153	2943
	7	16356	11683	6683	3367
	8	17544	12531	7213	3792
	9	18731	13379	7744	4216
	10	19919	14228	8274	4640
1200	2	13038	9313	5013	1425
	3	14395	10282	5618	1910
	4	15752	11252	6224	2394
	5	17109	12221	6830	2879
	6	18466	13190	7436	3364
	7	19824	14160	8042	3849
	8	21181	15129	8648	4333
	9	22358	16099	9254	4818
	10	23895	17068	9860	5303

7.2 Excavations

During shallow excavations (i.e. excavation within the made ground) if groundwater is present within the surrounding soils this is likely to be a localised perched water body and based on the findings of the ground investigation, any such water flows at shallow depth would not be persistent.

Excavations into the glaciofluvial sands are likely to encounter groundwater at depths of approximately 4.75m (29.2 mAOD) and greater. This could result in significant and persistent flows into excavations. Dewatering control methods would need to be developed during detailed design and this could involve the need for further monitoring or investigation.

7.3 Pavement Foundation Design

The presence of, and nature of Made Ground (i.e. CBR values ranging from 12% to greater than 17%) suggests that a pavement foundation might be achieved in this material without ground improvement such as excavation/replacement or appropriate compaction of the made ground. A design CBR value of 15% is recommended.

The pavement foundation material and thickness are dependent on the foundation design class. It is recommended that this is determined by the highways/pavement engineer for the scheme.

The subgrade CBR should be verified at representative locations by in-situ testing during construction. If the CBR attained from this testing is less than the design CBR, the guidance of the engineer should be sought.

7.4 Shallow Foundation Design

The made ground is typically medium dense granular material and as such might be suitable for supporting loads from conventional shallow foundations, subject to inspection and assessment.

Because of the uncertainties associated with founding in made ground, and the likely scale of the proposed structures, piled foundations are recommended as described in Section 7.1. It may be appropriate to construct small, ancillary structures on shallow foundations providing the formation is suitably prepared prior to construction.

For light structures which will require shallow foundations, the bearing capacity of the soil has been assessed based on guidelines provided in EC7 Annex D.

The bearing resistance for the Made Ground at 1.0 m below existing ground level is approximately 150 kN/m^2 [EC7 Design Approach 1 Combination 2]. Settlements at this loading intensity are anticipated to be less than 20 mm.

Based on this assessment, shallow foundations for lightly loaded structures are assessed to be suitable for use across the site, subject to suitably prepared the formation prior to construction.

The site is likely to be suitable for ground-bearing floor slabs, subject to inspection and proof-rolling of the formation.

7.5 Working Platform

A working platform will be required for all piling works that are to take place across the site as well as any other works requiring tall/heavy plant. The working platform should be designed, installed, maintained and repaired in accordance with appropriate standards such as BRE document BR470 'Working platforms for tracked plant' (2004), (BRE Construction Division, 2004), and comply with FPS requirements for certification.

8. GEOTECHNICAL RISK REGISTER

This section considers the geotechnical risks associated with the project. This register should be updated in subsequent phases of the project and be carried through design and construction. An assessment of geotechnical risks is presented in Table 8-1.

Table 8-1 Geotechnical Risk Register

Geotechnical Hazard Description	Current Risk Rating (Prior to Risk Control Measures being Applied)	Description of Current Risk	Risk Control Measures
Unexpected/ unfavourable ground conditions	Medium	In-situ tests show loose to medium dense strength of Made Ground hence potential for excessive/ differential settlement.	Consider a foundation solution that will found on suitable strength soil or structural fill. Appropriate design parameters adopted.
Distortion of Pavement	Low-medium	Poor subgrade materials yield under traffic loading and cause surfacing to crack or deform.	Pavement foundation to be designed based on CBR of subgrade. Soft areas to be removed and replaced and recompacted.
Excessive settlement of foundations	Low-medium	Minor structures on shallow foundations may settle excessively or experience differential settlement.	Design using appropriate partial factors to minimise serviceability issues.
Ground aggressivity	Low	Water soluble sulphate concentrations in the Made Ground, Concrete classification of DS-1 AC-1 for the site.	Use the appropriate concrete classification for cast in-situ concrete.
Groundwater	Medium	Perched groundwater may ingress to shallow excavations. destabilisation of deep excavations works.	Use appropriate water barriers or water pump during excavation. Further investigation if necessary for temporary works design.
Encountering uncharted buried services	Low	Risk of delay and health & safety issues where uncharted services are encountered.	Ensure all services information is provided to contractor. Carry out underground services / utilities survey prior to starting ground works. Be vigilant during all excavations during construction.
Buried obstructions	Low – Medium	Risk of delay where unknown existing sub-structures or obstructions are encountered and require breaking out. Note that obstructions were not encountered during the ground investigation.	Contractor to develop and implement necessary measures to minimise the impact of buried obstructions.

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10. FIGURES

Figure 10-1 SPT N60 with Level for Granular Made Ground

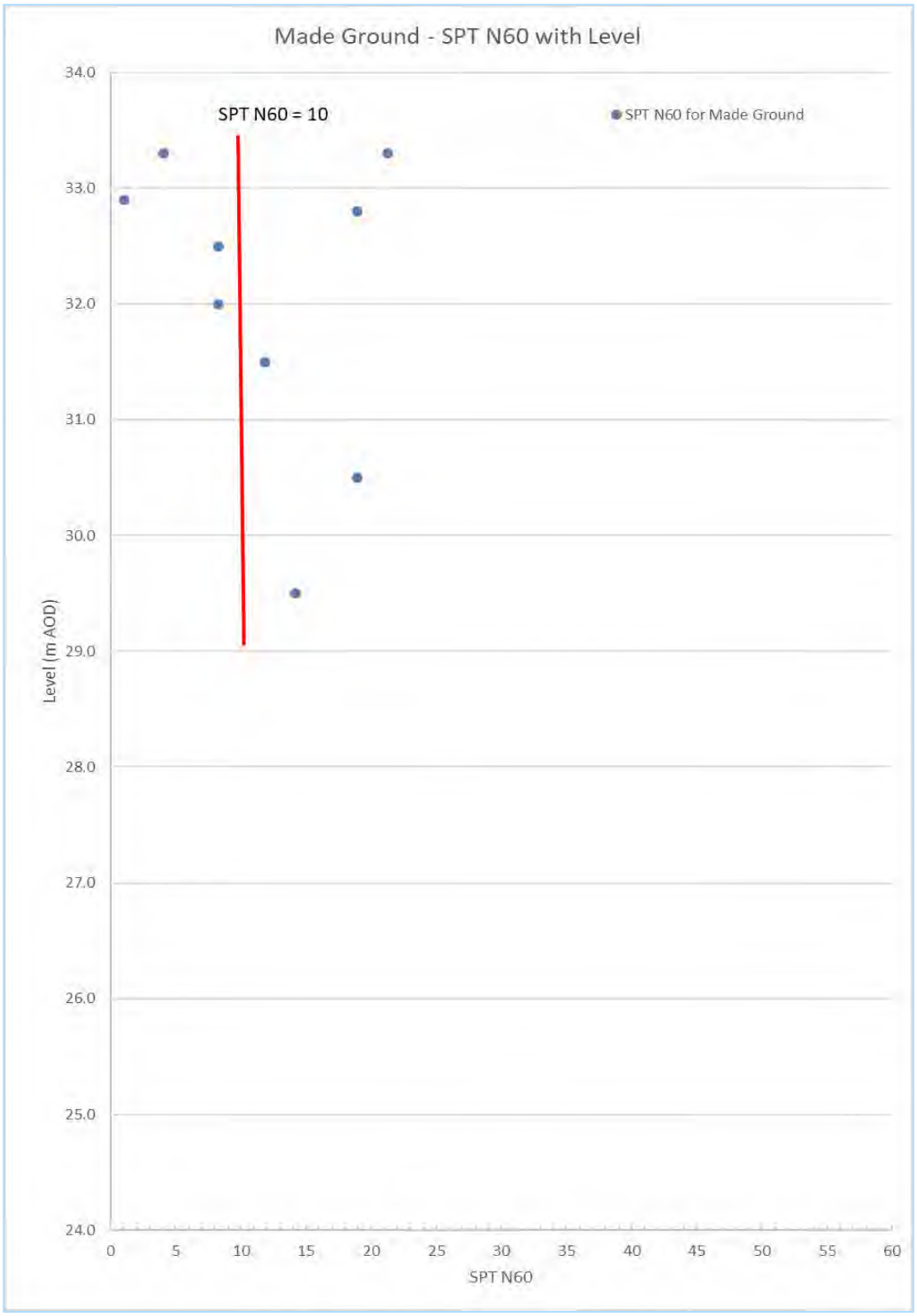


Figure 10-2 PSD for Granular Made Ground

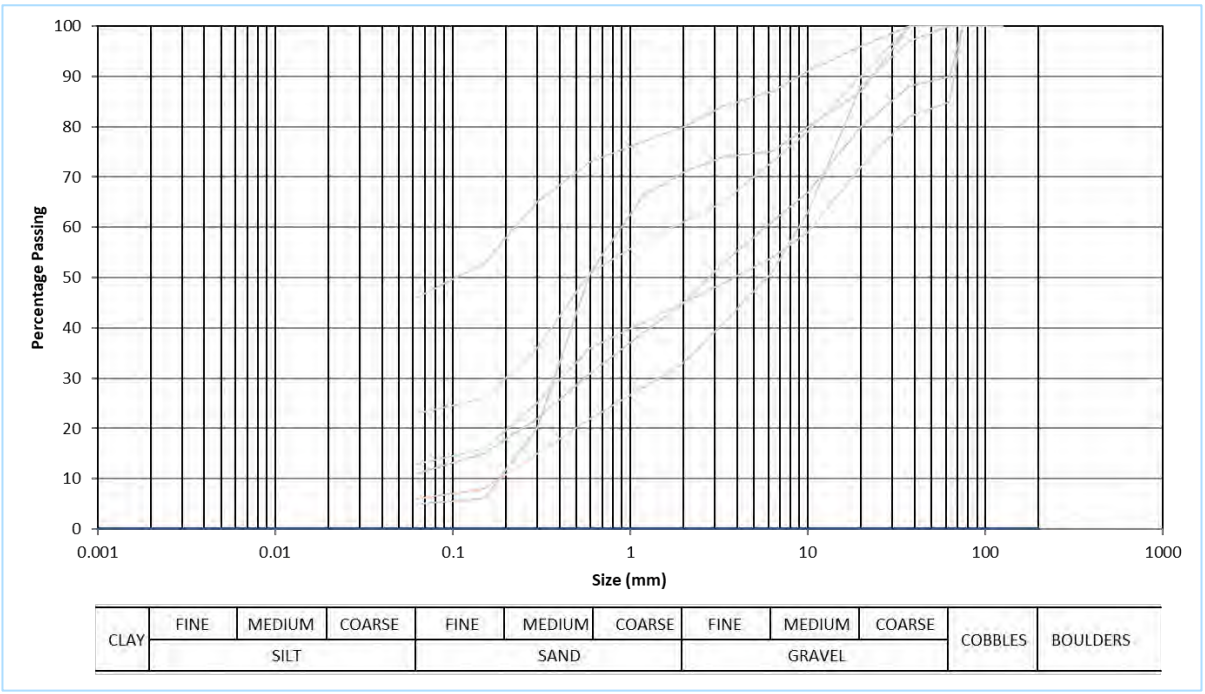


Figure 10-3 SPT N60 with Level for Sand & Gravel

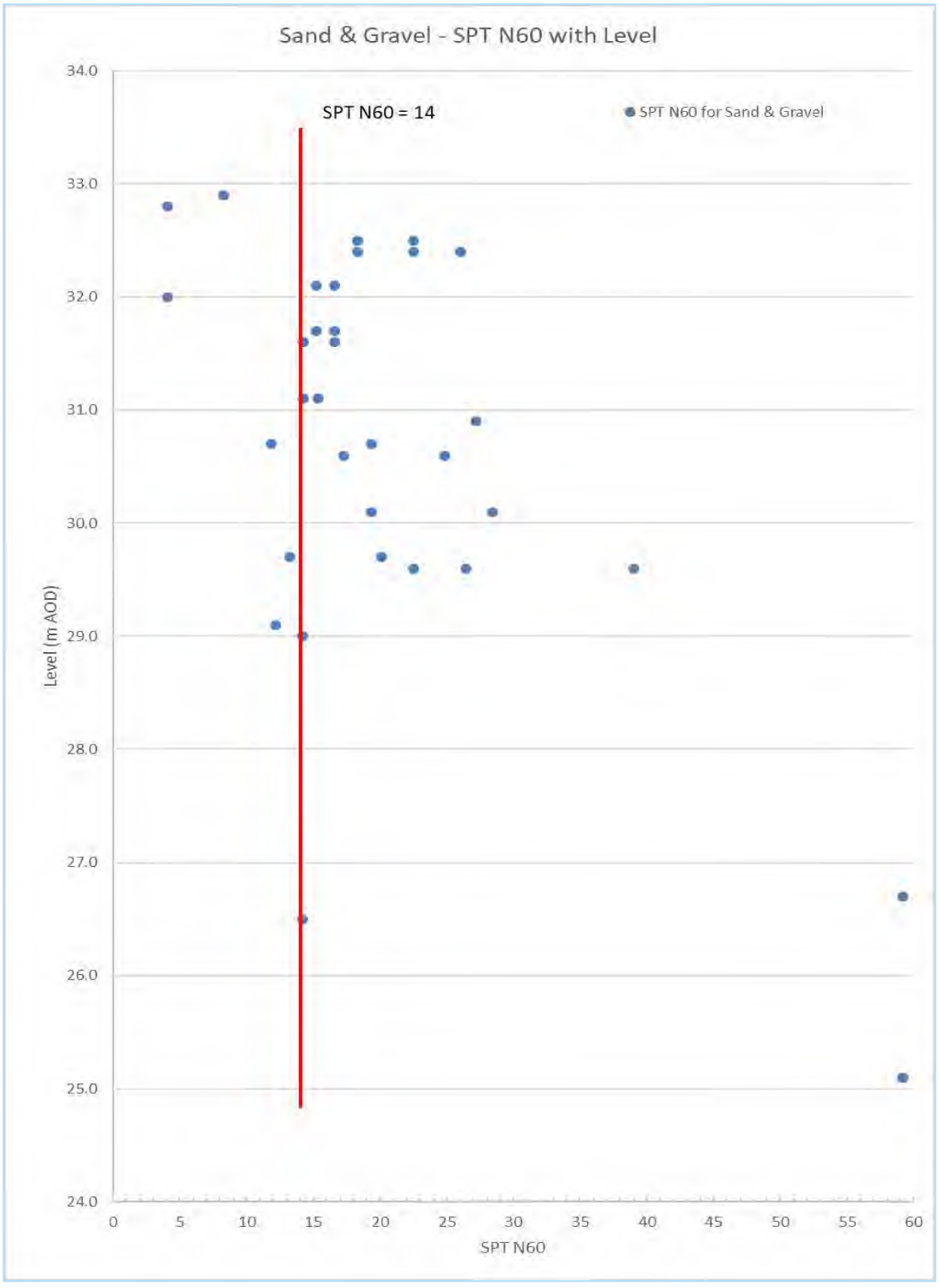


Figure 10-4 PSD for Sand & Gravel

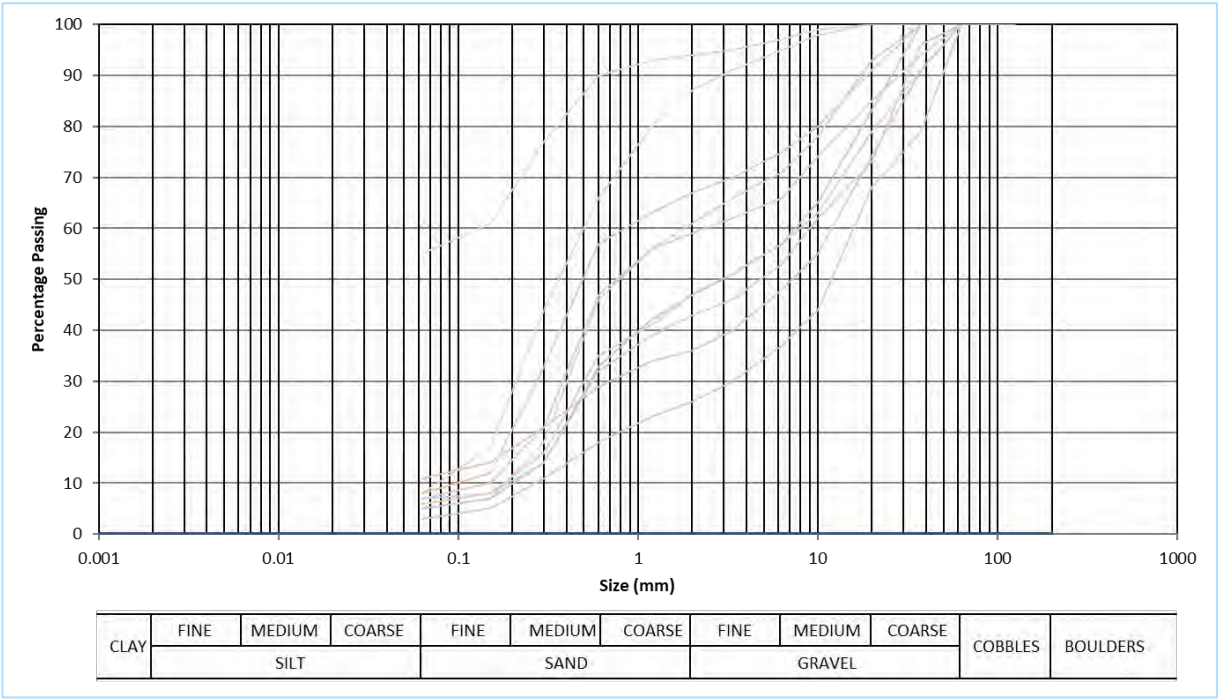


Figure 10-5 SPT N60 with Level for Glacial Clay

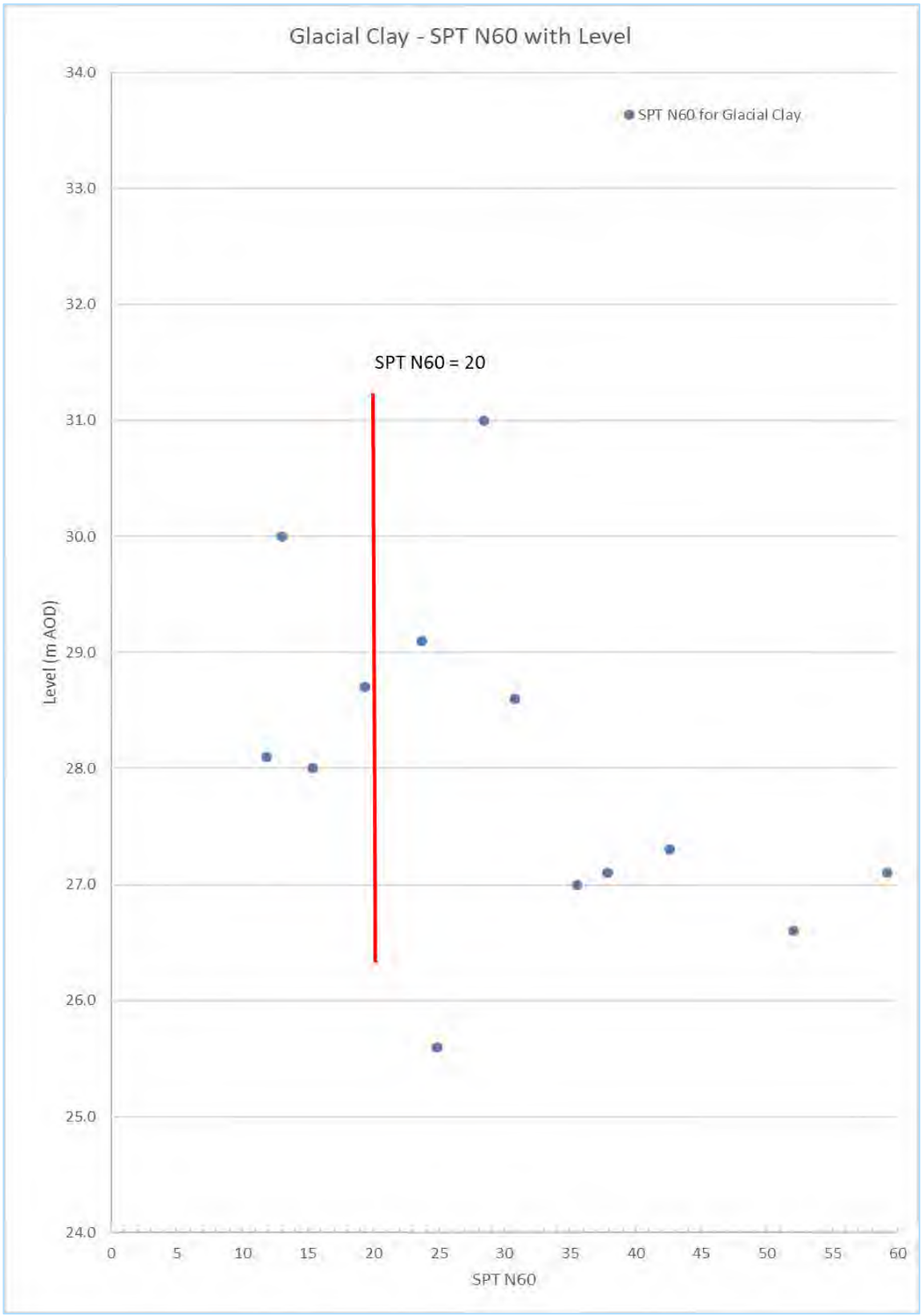


Figure 10-6 Plasticity Index for Glacial Clay

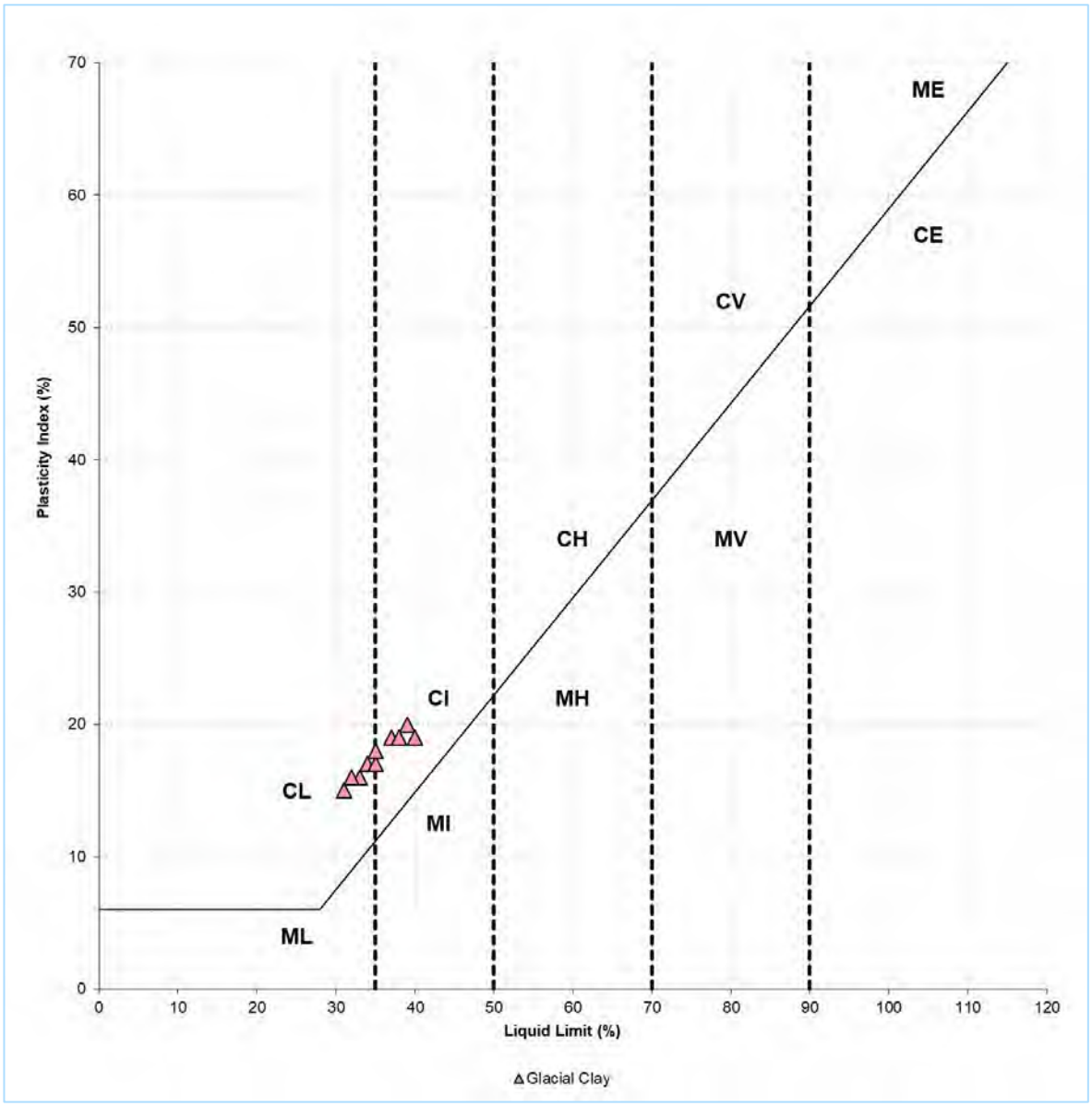


Figure 10-7 Undrained Shear Strength with Level for Glacial Clay

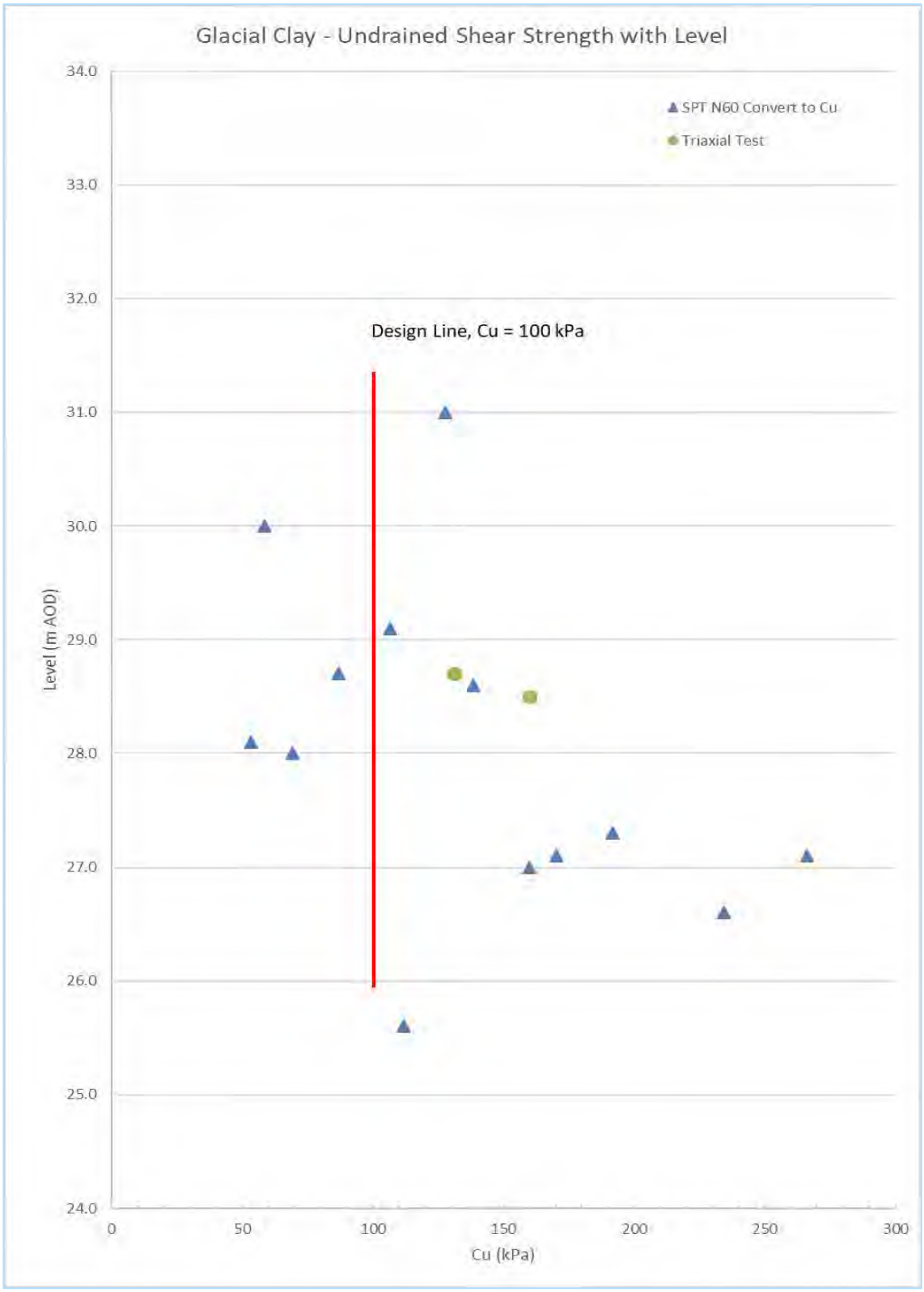
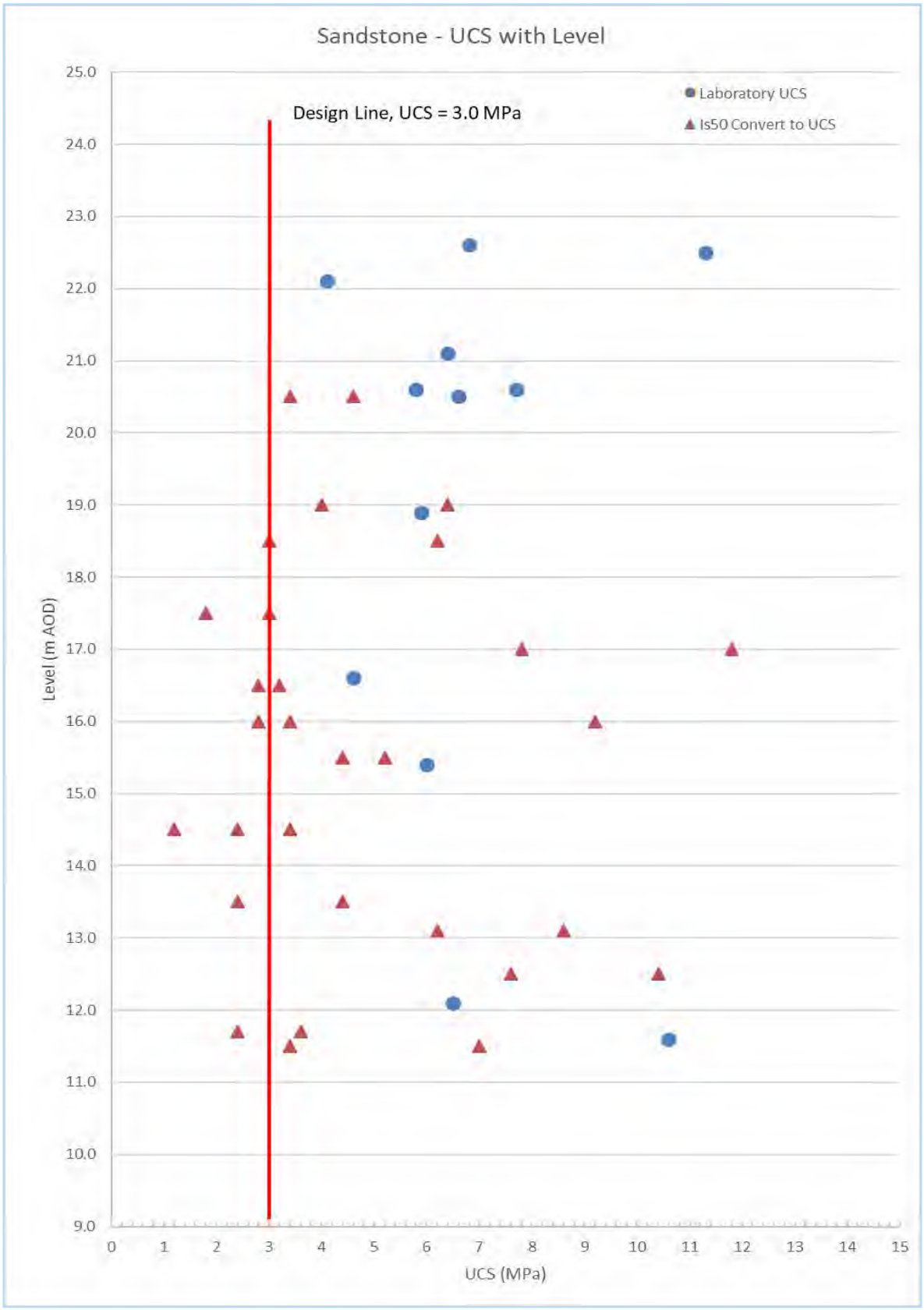


Figure 10-8 UCS with Level for Sandstone



Appendix 1

GEO-ENVIRONMENTAL FACTUAL REPORT FOR PREMIER INN, DEANSGATE, MANCHESTER. REPORT REF. MAN.260.001.GE.R.001.A, ENZYGO, AUGUST 2019.

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Geo-Environmental Factual Report

Premier Inn, Deansgate

Whitbread PLC

MAN.160.001.GE.R.001.A

'Experience and expertise working in union'

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Geo-Environmental Factual Report for Premier Inn, Deansgate

Project:	Premier Inn, Deansgate
For:	Whitbread PLC.
Ref:	MAN.260.001.GE.R.001.A
Status:	Final
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1.0 INTRODUCTION

1.1 Background

1.1.1 Enzygo Geo-Environmental Limited [Enzygo] has been commissioned by Ramboll Ltd [the Consultant] on behalf of Whitbread PLC [client] to prepare a Geo-Environmental Factual Report for a proposed new development on an existing Premier Inn site located off Medlock Street, Deansgate, M15 5FJ.

1.2 Proposed Development

1.2.1 The project consists of the re-development of the Premier Inn Deansgate Locks Hotel site comprising of two large-scale residential buildings (24 and 34-storeys high) and a 13-storey office building.

1.3 Objectives

1.3.1 The objectives of the study are to:

- Undertake a targeted ground investigation;
- Assess ground conditions for foundation design purposes and potential contaminants;
- Determine CBR's for pavement design;
- Determine the permeability of the natural soils onsite;
- Determine ground water and gas levels for a ground gas assessment;
- Provide a full factual report relating to the ground investigation.

2.0 SITE SETTING

Table 2.0 Site Description

Item	Description
Site Address	Medlock Street, Manchester, M15 5FJ
National Grid Reference	E: 383630 N: 397190N

2.1 Current Site Description

2.1.1 The site currently comprises of an existing building [Premier Inn Hotel], associated outbuildings and car park which are bounded by commercial buildings to the north, west and east. The Mancunian Way is located directly south followed by residential dwellings. The site boundary is bounded with wooden fence panels with vehicular access to the west and pedestrian access to the north.

2.1.2 Access is off Medlock Street located to the northeast of site.

2.1.3 The site topography is generally level, with an elevation of approximately between 33-35m above Ordnance Datum (m aOD).

2.2 Surrounding Area

2.2.1 Land uses surrounding the site are summarised as follows:

Table 2.2 Land Use Surrounding the Area

Direction	Land Use
North	Bounded by commercial with commercial and commercial beyond.
East	Bounded by commercial with commercial and commercial beyond.
South	Bounded by the Mancunian Way with residential beyond.
West	Bounded by commercial with commercial beyond.

3.0 SITE INVESTIGATION

3.1 Investigation Rational

3.1.1 The Ground investigation was carried out in accordance to the specification provided by RAMBOLL Ltd (*Document ref: Premier Inn Redevelopment, Manchester, 1620005811-RAM-00-00-SPE-GE-0001, April 2019*).

3.2 General

3.2.1 A site investigation was undertaken by Enzygo from the 28th May until 10th June 2019 comprising six rotary boreholes (BH01 to BH06), nine windowless sampler boreholes (WS01 to WS06B), five plate load tests (PLT01-PLT05) and three machine excavated trial pits for the use of soakaway testing (SA01-SA03).

3.2.2 Locations of exploratory holes advanced by Enzygo are presented on Drawing MAN.260.001.GE.D.001 (Appendix 1); Exploratory holes were generally located in accordance with the Ramboll Specification however alterations were made due to the presence of services. The site works are summarised in the table below.

Table 3.2 Exploratory Holes

Hole	Type*	Depth (m)	Date Started	Date Finished	Backfill Details **	SPT Calibration Certificate Ref
BH01	BH	20.50	05/06/2019	06/06/2019	SP	G2
BH02	BH	23.50	04/06/2019	06/06/2019	SP	G1
BH03	BH	25.00	06/06/2019	07/06/2019	SP	G1
BH04	BH	20.00	28/05/2019	28/05/2019	SP	G1
BH05	BH	19.00	28/05/2019	28/05/2019	SP	G1
BH06	BH	10.50	06/06/2019	07/06/2019	SP	G2
WS01	WS	5.00	30/05/2019	30/05/2019	SP	DART435
WS02	WS	3.00	30/05/2019	30/05/2019	SP	DART435
WS03	WS	2.00	30/05/2019	30/05/2019	SP	DART435
WS04	WS	0.45	30/05/2019	30/05/2019	B	DART435
WS04A	WS	5.00	30/05/2019	30/05/2019	SP	DART435
WS05	WS	5.00	30/05/2019	30/05/2019	A	DART435
WS06	WS	1.20	30/05/2019	30/05/2019	A	DART435
WS06A	WS	1.35	30/05/2019	30/05/2019	SP	DART435
WS06B	WS	0.45	30/05/2019	30/05/2019	B	DART435
PLT01	PLT	0.60	31/05/2019	31/05/2019	A	N/A
PLT02	PLT	0.45	31/05/2019	31/05/2019	A	N/A
PLT03	PLT	0.60	31/05/2019	31/05/2019	A	N/A
PLT04	PLT	0.60	31/05/2019	31/05/2019	A	N/A
PLT05	PLT	0.60	31/05/2019	31/05/2019	A	N/A
SA01	SA	2.50	03/06/2019	03/06/2019	A	N/A
SA02	SA	2.30	03/06/2019	03/06/2019	A	N/A
SA03	SA	2.00	03/06/2019	03/06/2019	A	N/A

*BH= Rotary Borehole, WS= Windowless Sampler, SA= Soakaway, PLT= Plate Load Tests, SA= Soakaway Testing
**SP= Standpipe, B= Bentonite, A= Arisings

3.3 Site Works

3.3.1 Six boreholes (designated BH01-BH06) were sunk to depths between 10.50 and 23.50m begl, using a track-mounted rotary coring rig (Appendix 3). The boreholes were initially drilled through overburden by means of dynamic sampling until refusal. This was followed by a rock roller down the hole hammer, producing a 112mm nominal diameter hole, until material suitable for rotary coring was encountered. For coring, a 412 PWF triple-tube core barrel and Wireline Geobore S were used, recovering cores of 76 & 102mm nominal diameter, in a semi rigid plastic liner. Air was used as the flushing medium. The cores were stored in boxes immediately on extraction. Standard penetration tests (SPT's) were conducted in suitable materials. Boreholes were installed with 50mm diameter standpipes and reinstated on completion.

3.3.2 Nine windowless (percussive) sampling boreholes (designated WS01 to WS06 including WS04A, WS06A and WS06B) were each sunk to depths between 0.45 to 5.00m begl (Appendix 3). Windowless sampler boring is carried out with a small, track-mounted rig, which uses a chain driven trip hammer to drive sampling tubes or penetrometers into the ground. These tools are coupled to the anvil of the hammer by solid drill rods. Sampling tubes comprise "windowless samplers", which are plain sampler tubes in which a continuous disturbed sample is recovered within a semi-rigid plastic liner. In order to reduce friction within the borehole, sampling tubes of progressively smaller diameter are used as the borehole depth increases. Sampler diameters generally range from between 101mm to 47mm. Boreholes were installed with a 50mm standpipe or backfilled with bentonite and reinstated on completion. Windowless sample locations WS04, WS06 and WS6A were relocated due to early refusal in well compacted fill material.

3.3.3 Three trial pits (designated SA01 to SA03) were excavated to a depth between 2.00m and 2.50m begl, using a wheeled excavator (Appendix 3). In situ soakaway testing was carried out in the base of all trial pits, in accordance with the methods described in BRE Digest 365(2007) (Appendix 4). Due the nature of the natural underlying strata, all trial pits with installed with a standpipe and infilled with 20mm gravel in order to ensure the pit sides do not collapse during testing. The trial pits were backfilled immediately and reinstated on completion of testing.

3.3.4 Five plate bearing tests (PLT01-PLT05) were carried out at depths between 0.45m and 0.60m begl using a 610mm diameter plate. Testing was carried out in accordance with BS 1377: Part 9 1990 for the aid of pavement design (Appendix 4).

3.3.5 All exploratory hole locations were scanned by a MACC International Ltd (MACC) Unexploded Ordinance (UXO) Engineer. All locations were scanned from ground level until a suitably safe depth, as determined by the MACC Engineer.

3.3.6 In addition to the review of service plans each exploratory location was scanned using a Cable Avoidance Tool (CAT) in order to locate unrecorded underground services, and the exploratory locations were repositioned if necessary.

3.3.7 Representative soil samples were collected for chemical and geotechnical testing. Soil samples destined for chemical analysis were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.

3.3.8 The fieldwork was carried out generally in accordance with BS 5930:2015 Code of Practice for Site Investigations, Eurocode 7, unless otherwise stated.

3.4 Monitoring

3.4.1 Enzygo carried out groundwater/gas monitoring in standpipes after the fieldwork period (commencing 1st July 2019), the results of which are presented in the Appendix 5 of this report. The groundwater/gas monitoring was completed on the 31st July 2019 (6 of 6 visits completed in total).

3.4.2 On completion of the site works all rotary boreholes were developed by means of surging to prepare the wells for water sampling. During a return visit all wells with water were purged three times the well volume before water samples were collected for chemical testing.

3.5 Laboratory Testing

3.5.1 Samples for geotechnical testing were sent to the Envirolab Ltd, which is UKAS accredited, for the following analysis:

- Moisture Content;
- Particle Size Distributions;
- UCS Testing;
- Point Loads;
- Atterberg Limits;
- Consolidation testing; and
- Soluble sulphate and pH.

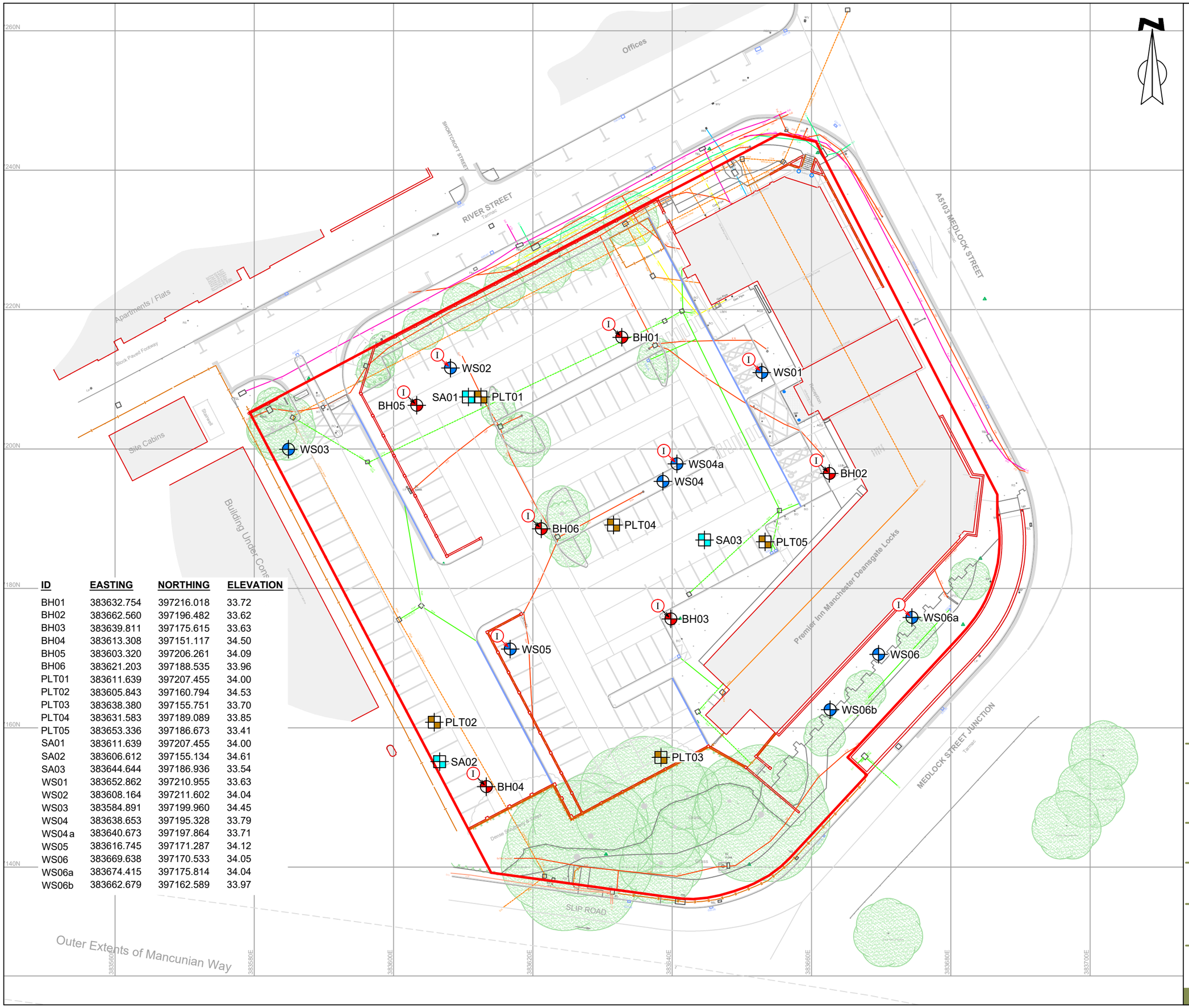
3.5.2 All geotechnical testing results are included within Appendix 6.

3.5.3 Soil samples were recovered for chemical analysis and were sent to Envirolab Ltd who are NAMAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, sulphide, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbon (TPH) and asbestos screen.

3.5.4 Groundwater samples were recovered for chemical analysis and were sent to Envirolab Ltd who are NAMAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, sulphide, Speciated Polycyclic Aromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbon (TPH), Ammoniacal Nitrogen and Hardness.

3.5.5 All Chemical testing results are included within Appendix 7.

Appendix 1 – Drawings



ID	EASTING	NORTHING	ELEVATION
BH01	383632.754	397216.018	33.72
BH02	383662.560	397196.482	33.62
BH03	383639.811	397175.615	33.63
BH04	383613.308	397151.117	34.50
BH05	383603.320	397206.261	34.09
BH06	383621.203	397188.535	33.96
PLT01	383611.639	397207.455	34.00
PLT02	383605.843	397160.794	34.53
PLT03	383638.380	397155.751	33.70
PLT04	383631.583	397189.089	33.85
PLT05	383653.336	397186.673	33.41
SA01	383611.639	397207.455	34.00
SA02	383606.612	397155.134	34.61
SA03	383644.644	397186.936	33.54
WS01	383652.862	397210.955	33.63
WS02	383608.164	397211.602	34.04
WS03	383584.891	397199.960	34.45
WS04	383638.653	397195.328	33.79
WS04 a	383640.673	397197.864	33.71
WS05	383616.745	397171.287	34.12
WS06	383669.638	397170.533	34.05
WS06a	383674.415	397175.814	34.04
WS06b	383662.679	397162.589	33.97

Key

- Site Boundary
- Dynamic (Windowless) Sampling Exploratory Holes
- Rotary Borehole Locations
- Plate Load Testing
- Soakaway Testing
- Borehole Installation (I)

Notes

- Do not scale from this drawing.
- All dimensions are in meters unless stated otherwise.
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.

enzygo
Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Whitbread PLC

SCALE: NTS

PROJECT REF: MAN.260.001

DRAWN: MG

CHECKED: NR

DATE: July 2019

PROJECT: Deansgate, Premier Inn

TITLE: Exploratory Hole Location Plan

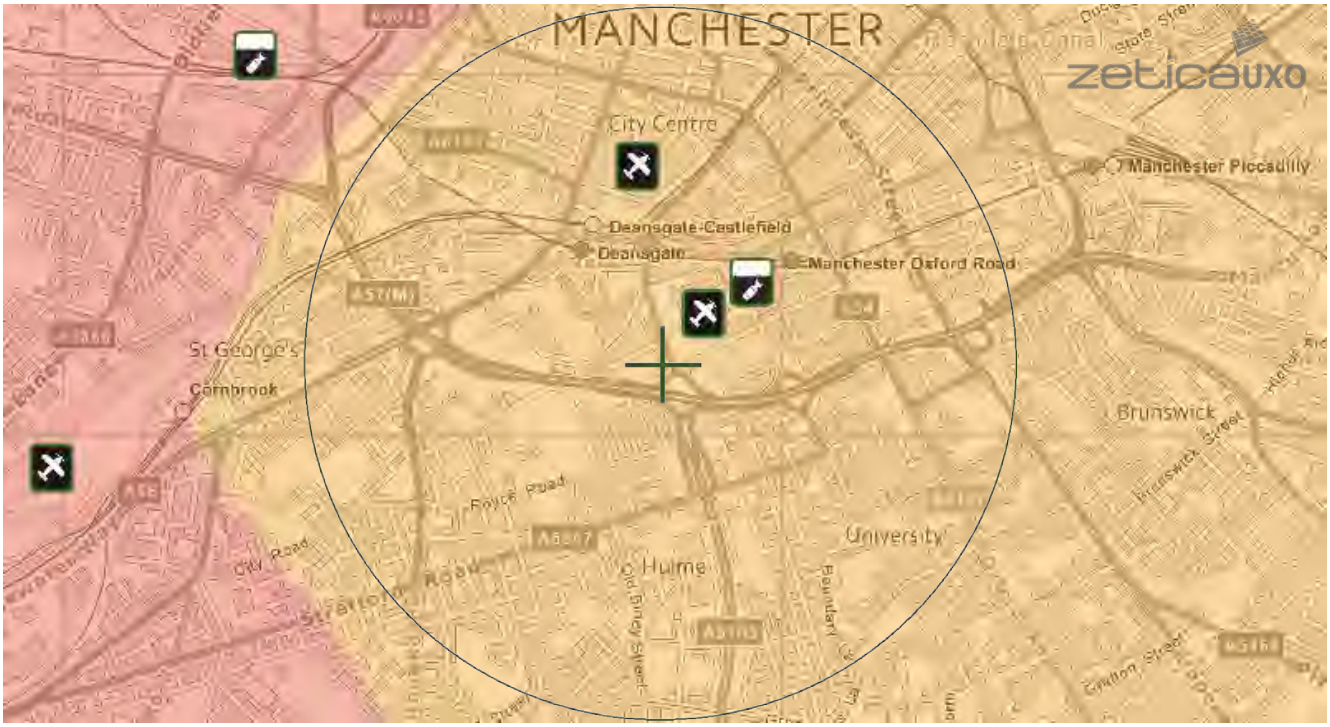
FIGURE NO: MAN.260.001.GE.D.001

Appendix 2 – UXO Risk Map

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Location: M15 5FJ,
Map Centre: 383673,397198



LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary | **industry** | **UXO find**
transport | **dock** | **Luftwaffe targets**
utilities | **other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Appendix 3 – Exploratory Hole Logs

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH01

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 05-06-19 Finish 06-06-19		

Client: Whitbread PLC

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES					0.15	33.57		MADE GROUND: Black macadam.
		0.20 - 0.40	2B					0.50	33.22		MADE GROUND: Brown grey slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.
		0.50	3ES								0.50 Landscaping membrane.
		0.80 - 1.00	4B	N=19				1.10	32.62		Orange brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		1.00	5ES								
		1.20	SPT								
		1.20 - 1.65	6B	N=14							
		1.20 - 1.70	7B								
		2.00	SPT								
		2.00 - 2.45	8ES								
		2.00 - 2.50	9D	N=10							
		3.00	10B								Medium dense yellow brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		3.00 - 3.45	SPT								3.50 - 3.60 Black sandy gravel of coal.
		3.00 - 3.50	11D	N=17							
		4.00	12B								
		4.00 - 4.45	SPT								
		4.80	13D					4.70	29.02		Stiff grey brown slightly sandy gravelly CLAY with a low cobble content of subangular to subrounded quartz, sandstone and granite. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
		5.00 - 5.45	14D								
			15U								
		5.60	16D								
		6.00	17D								
		6.40	SPT	N=36							
		6.40 - 6.85	18D								
		7.00	SPT	N=50				7.00	26.72		
			19D					7.30	26.42		Very dense red brown slightly gravelly silty fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
		8.00	20D								Very stiff grey brown slightly sandy gravelly CLAY with a low cobble content of subangular to subrounded quartz, sandstone and granite. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
		9.10	21ES					9.10	24.62		
		9.50 - 10.00	22D								
		10.00	SPT	N=50							Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation)
		10.00 - 11.50	C			TCR 33 SCR 40 RQD 0	NI 60 200				10.00 - 11.00 Assumed zone of core loss.
								11.00	22.72		
		11.50	SPT	N=50				11.30	22.42		Extremely weak red brown residual SANDSTONE recovered as dense red brown slightly gravelly silty fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Chester Formation)
		11.50 - 13.00	C			TCR 87 SCR 77 RQD 10					11.00 - 11.30 Non intact recovered as red brown sand.
		13.00 - 14.50	C			TCR 93 SCR 100 RQD 51					Medium strong red brown slightly gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar sandy silty. (Chester Formation)
		14.50 - 17.50	C			TCR 90 SCR 9	NI NI	14.80	18.92		11.50 - 11.70 Assumed zone of core loss. 12.50 - 12.80 Non intact recovered as red brown sand.
								{15.00}			Continued next sheet

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 17.00m begl; 50mm slotted pipe with gravel between 17.00m begl to 20.00m begl; Bentonite seal from 20.00m begl to 20.50m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH01

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 05-06-19 Finish 06-06-19		

Client: Whitbread PLC

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
						RQD 42	100				13.00 - 13.10 Assumed zone of core loss. 14.50 - 14.80 Assumed zone of core loss. Extremely weak red brown destructed fine to coarse SANDSTONE. Recovered as red brown gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced, rough sand
		17.50 - 20.50	C			TCR 92 SCR 88 RQD 47	NI 80 190	17.26 20.50	16.46 13.22		Medium strong red brown gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar sandy. (Chester Formation) 17.50 - 17.75 Assumed zone of core loss.
								{30.00}			Borehole completed at 20.50m.

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 17.00m begl; 50mm slotted pipe with gravel between 17.00m begl to 20.00m begl; Bentonite seal from 20.00m begl to 20.50m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH02

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 04-06-19 Finish 06-06-19		

Client: Whitbread PLC

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES					0.05	33.57		MADE GROUND: Yellow paving slab.
		0.50	2ES					0.45	33.17		MADE GROUND: Brown grey slightly clayey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of brick, concrete and sandstone.
		0.50 - 1.00	3B								
		1.00	4ES	N=22							
		1.20	SPT								Medium dense orange brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		1.20 - 1.65	5D								
		1.20 - 1.90	6B								
		2.00	7ES								
		2.70	SPT	N=23							
		2.70 - 3.15	8D								
		2.70 - 3.20	9B								
		4.00	SPT	N=19							
		4.00 - 4.45	10D								
		4.60	11D					4.60	29.02		
		5.00 - 5.45	12U								Stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
		5.60	13D								
		6.60	14D								
		7.00	SPT	N=44							
		7.00 - 7.45	15D								
		8.00	16D								
		8.20	17ES					8.20	25.42		
		8.50	SPT	N=50							Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		8.50 - 8.95	18D					8.80	24.82		
		9.00	19D								
		9.50	20ES					9.50	24.12		
		10.00	SPT	N=50				10.00	23.62		Very stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
			21D			TCR 53 SCR 79 RQD 27		10.70	22.92		
							NI 80 170				Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation)
		11.50	22D			TCR 66 SCR 8 RQD 0	NI NI 110				
								12.50	21.12		Extremely weak red brown residual SANDSTONE recovered as dense red brown slightly gravelly silty fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Chester Formation)
		13.00	SPT	N=50		TCR 0 SCR 0 RQD 0					10.00 - 10.70 Assumed zone of core loss.
		14.50	SPT	N=50		TCR 73 SCR 41					Weak to medium strong red brown slightly gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close
								{15.00}			Continued next sheet

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 18.00m begl; 50mm slotted pipe with gravel between 18.00m begl and 21.00m begl; Bentonite seal between 21.00m begl to 23.50m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH02

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 04-06-19 Finish 06-06-19		

Client: Whitbread PLC

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
						RQD 24					to closely spaced planar sandy. (Chester Formation) 11.23 - 11.40 Non intact recovered as red brown sand. 11.50 - 12.00 Assumed zone of core loss.
						TCR 100 SCR 43 RQD 26	NI 110 180	16.85	16.77		Extremely weak red brown gravelly destructed SANDSTONE recovered as red brown slightly gravelly silty fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar. (Chester Formation) 13.00 - 14.50 Non intact recovered as subrounded cobbles of granite. 14.90 - 15.30 Non intact recovered as red brown gravelly sand. 15.45 - 15.70 Non intact recovered as red brown gravelly sand. 16.00 - 16.85 Non intact recovered as red brown gravelly sand.
						TCR 93 SCR 93 RQD 37		19.85	13.77		
						TCR 100 SCR 93 RQD 69	NI 110 340	20.75	12.87		Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar sandy. (Chester Formation) 17.50 - 17.70 Assumed zone of core loss. 18.10 - 18.50 Non intact recovered as red brown sandy gravel. 19.52 - 19.57 Non intact recovered as red brown sandy gravel.
								23.50	10.12		Weak to medium strong red brown gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced rough sandy. (Chester Formation)
											Medium strong to strong red brown partially weathered slightly fine to coarse SANDSTONE. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation)
								{30.00}			Borehole completed at 23.50m.

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 18.00m begl; 50mm slotted pipe with gravel between 18.00m begl and 21.00m begl; Bentonite seal between 21.00m begl to 23.50m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH03

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 06-06-19 Finish 07-06-19		

Client: Whitbread PLC

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES					0.05	33.58		MADE GROUND: Grey concrete paving slab.
		0.50	2ES					0.40	33.23		MADE GROUND: Brown grey slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, concrete and sandstone. Sand is fine to coarse.
		0.50 - 1.00	3B								
		1.00	4ES	N=19							
		1.20	SPT								Medium dense to dense orange brown/yellow slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		1.20 - 1.65	5D								
		1.20 - 1.70	6B	N=14							
		2.00	SPT								
		2.00 - 2.45	7ES								
		2.00 - 2.50	8D								
		3.00	9B	N=21							
		3.00 - 3.45	SPT								
		3.00 - 3.50	10D								3.50 Black gravelly fine to coarse sand. Gravel is subangular fine to coarse of coal.
		4.00	11B	N=33							
		4.00 - 4.45	SPT								
		4.00 - 4.50	12D								
		4.70	13B					4.70	28.93		
		5.00	14D	N=26							Firm to stiff brown grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
		5.00 - 5.45	SPT								
			15D								
		6.00	16D								
		6.50	SPT	N=32							
		6.50 - 6.95	17D								
		7.50	18D								
		8.50	SPT	N=50				8.50	25.13		
		8.50 - 8.95	19D								
		9.00	20D					9.00	24.63		Very dense red brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
						TCR 27 SCR 0 RQD 0	NI NI NI	10.50	23.13		Very stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
						TCR 17 SCR 52 RQD 100	180 NI NI	11.50	22.13		Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation)
						TCR 47 SCR 70 RQD 47		12.80	20.83		11.50 - 12.75 Assumed zone of core loss. Extremely weak red brown residual SANDSTONE recovered as dense red brown slightly gravelly silty fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar. (Chester Formation) 12.75 - 12.80 Non intact recovered as red brown sandy gravel.
						TCR 67 SCR 40		{15.00}			

Continued next sheet

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 19.00m begl; 50mm slotted pipe with gravel between 19.00m begl and 25.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site
Premier Inn Deansgate, Manchester

BH03

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 06-06-19 Finish 07-06-19		

Client
Whitbread PLC

Sheet
2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
						RQD 45					Weak to medium strong red brown slightly gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar sandy. (Chester Formation) 13.00 - 13.80 Assumed zone of core loss. 13.80 - 14.01 Non intact recovered as red brown sandy gravel. 14.50 - 15.00 Assumed zone of core loss.
						TCR 93 SCR 91 RQD 58	10 180 340	15.80	17.83		
							NI 90 130	17.60	16.03		Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation) 16.00 - 16.20 Assumed zone of core loss.
						TCR 100 SCR 83 RQD 70	NI 170 410	19.00	14.63		Weak to medium strong red brown gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced rough sandy. (Chester Formation)
						TCR 100 SCR 93 RQD 79					Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to widely spaced planar sandy. (Chester Formation) 19.10 - 19.30 Subvertical fracture 80-90° stepped sandy. 20.35 - 20.45 Band of weak red brown mudstone. 20.70 - 21.00 Non intact recovered as red brown sandy gravel.
								23.50	10.13		Weak to medium strong red brown gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation) 23.80 - 23.89 Band of yellow coarse sandstone.
								24.60	9.03		
								25.00	8.63		Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation)
								{30.00}			Borehole completed at 25.00m.

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 19.00m begl; 50mm slotted pipe with gravel between 19.00m begl and 25.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By
NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
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Site: Premier Inn Deansgate, Manchester

BH04

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 28-05-19 Finish 28-05-19		

Client: Whitbread PLC

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.35	1ES					0.25	34.25		MADE GROUND: Black grey macadam.
		0.80 - 1.20	3B					0.80	33.70		MADE GROUND: Red brown slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse. 0.70 Strata is damp.
		1.00	2ES	N=18							
		1.20	SPT					1.30	33.20		
		1.20 - 1.65	4D								
		1.20 - 1.70	5B	N=7							
		1.50	6ES								
		2.00	SPT					2.50	32.00		MADE GROUND: Red brown slightly clayey sandy gravel with a low cobble content of quartz and brick. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.
		2.00 - 2.45	7D								
		2.00 - 2.50	8B	N=10							
		2.50 - 3.00	9B								
		3.00	SPT								
		3.00 - 3.45	10ES	N=16							MADE GROUND: Loose to medium dense brown red slightly clayey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of brick, concrete and sandstone.
		3.00 - 3.50	11D								
		4.00	12B								
		4.00 - 4.45	SPT								
		4.00	13D	N=12							
		4.00 - 4.50	14ES					5.20	29.30		MADE GROUND: Medium dense orange brown slightly silty gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of brick, concrete and sandstone. 2.60 - 2.70 Band of soft brown slightly gravelly sandy clay. 4.00 - 4.50 Sand and gravel.
		4.70	15B								
		5.00	16ES								
		5.00 - 5.45	SPT								
		5.50	17D	N=13				6.50	28.00		
		6.00	18D					6.70	27.80		4.60 - 4.90 Locally black.
		6.50	19D								
		6.50 - 6.95	SPT								Firm brown mottled orange slightly gravelly slightly sandy CLAY. Gravel is subangular fine to medium of quartz. Sand is medium. (Glacial Till)
		6.50 - 6.70	20D	N=30							
		7.10	21B								
		7.50	22D								Dense orange brown SAND and GRAVEL. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
		7.50 - 7.95	SPT								
		8.50	23D								
		9.00	24D								
			25D								
		9.50	SPT	N=50				9.40	25.10		Very stiff brown slightly gravelly slightly sandy CLAY. Gravel is subangular fine to coarse of sandstone and coal. Sand is fine to coarse. (Glacial Till)
		9.50 - 9.95	26D			TCR 75 SCR 44 RQD 64					
		9.50 - 10.00	27B					10.40	24.10		Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation) 9.50 - 9.87 Assumed zone of core loss. 9.87 - 10.32 Non intact recovered as red brown gravelly sand.
							NI 120 280				
		11.00	SPT	N=50		TCR 100 SCR 90 RQD 59					
		11.00 - 11.45	28D								
						TCR 77 SCR 43 RQD 80					Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation) 11.00 - 11.10 Non intact recovered as red brown gravelly sand. 12.07 - 12.12 Non intact recovered as red brown gravelly sand.
							NI NI NI				
						TCR 100 SCR 100	NI 120 280				
								{15.00}			Continued next sheet

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 10.00m begl; 50mm slotted pipe with gravel between 10.00m begl and 13.00m begl; Bentonite seal between 13.00m begl and 20.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH04

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 28-05-19 Finish 28-05-19		

Client: Whitbread PLC

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
						RQD 79 TCR 100 SCR 100 RQD 47					12.50 - 12.85 Assumed zone of core loss. 13.24 - 13.85 Non intact recovered as red brown gravelly sand.
								17.00	17.50		
						TCR 100 SCR 87 RQD 54	NI 60 140				Weak to medium strong red brown gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-35°) very close to closely spaced rough sandy. (Chester Formation)
								18.40	16.10		
						TCR 100 SCR 93 RQD 86	NI 110 240				Medium strong red brown slightly gravelly unweathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) close to medium spaced planar sandy. (Chester Formation) 18.50 - 18.60 Non intact recovered as red brown gravelly sand.
								20.00	14.50		Borehole completed at 20.00m.
								{30.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 10.00m begl; 50mm slotted pipe with gravel between 10.00m begl and 13.00m begl; Bentonite seal between 13.00m begl and 20.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH05

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 28-05-19 Finish 28-05-19		

Client: Whitbread PLC

Sheet: 1 of 2

Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Stratum Description
0.20	1ES		0.15	33.94	MADE GROUND: Black grey macadam.
0.50 - 1.00	2B		0.45	33.64	MADE GROUND: Brown grey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.
0.50	3ES				
1.00	4ES	N=7			
1.20	SPT				0.45 Landscaping membrane.
1.20 - 1.65	5D				Loose to medium dense orange brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
1.20 - 1.70	6B	N=14			
2.00	SPT				
2.00 - 2.45	7ES				
2.00 - 2.50	8D				
3.00	9B	N=13			
3.00 - 3.45	SPT				
3.00 - 3.50	10D				2.60 - 2.70 Black slightly gravelly fine to medium sand. Gravel is subangular fine to medium of coal.
4.00	11B	N=24			
4.00 - 4.45	SPT				
4.00 - 4.50	12D				
5.00	13B SPT	N=20	5.00	29.09	
5.00 - 5.45	14D				Firm to stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
6.00	SPT	N=10			
6.00 - 6.45	15D				
7.00	SPT	N=50			
7.00 - 7.45	16D				
8.50	SPT 17D	N=21			
			9.00	25.09	
			9.40	24.69	Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation)
10.00	SPT	N=18			
10.00 - 10.45	18D				Weak to medium strong red brown slightly gravelly distinctly weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar sandy. (Chester Formation)
			11.50	22.59	9.46 - 9.51 Non intact recovered as red brown gravelly sand.
					9.82 - 9.91 Non intact recovered as red brown gravelly sand.
					10.00 - 10.50 Assumed zone of core loss.
					10.50 - 11.50 Non intact recovered as red brown gravelly sand.
					Medium strong red brown slightly gravelly partially weathered fine to coarse SANDSTONE. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) medium to
			{15.00}		Continued next sheet

Core	I_f
TCR 100 SCR 40 RQD 55	NI NI 120
TCR 83 SCR 42 RQD 88	
	NI 120 330
TCR 100 SCR 92 RQD 55	

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 12.00m begl; 50mm slotted pipe with gravel between 12.00m begl and 15.00m begl; Bentonite seal between 15.00m begl and 19.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH05

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 28-05-19 Finish 28-05-19		

Client: Whitbread PLC

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
						TCR 90 SCR 81 RQD 75		19.00	15.09		close spaced planar sandy. (Chester Formation) 11.76 - 11.96 Non intact recovered as red brown gravelly sand. 12.10 - 12.18 Non intact recovered as red brown gravel. 13.12 - 13.22 Non intact recovered as red brown gravelly sand. 15.50 - 15.56 Non intact recovered as red brown gravelly sand. 15.56 - 16.00 Locally red brown coarse SANDSTONE. 16.00 - 16.30 Assumed zone of core loss. 16.30 - 16.55 Non intact recovered as red brown gravel. 17.50 - 17.65 Non intact recovered as red brown sandy gravel. 18.00 - 18.05 Non intact recovered as red brown sandy gravel. 18.65 - 18.70 Non intact recovered as red brown sandy gravel.
								{30.00}			Borehole completed at 19.00m.

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 12.00m begl; 50mm slotted pipe with gravel between 12.00m begl and 15.00m begl; Bentonite seal between 15.00m begl and 19.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

BH06

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 06-06-19 Finish 07-06-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Casing (m)	Core	I_f	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES					0.15	33.81		MADE GROUND: Black grey macadam.
		0.20 - 0.40	2B					0.45	33.51		MADE GROUND: Grey brown sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.
		0.50	3ES								
		0.50 - 1.00	4B	N=16							
		1.00	5ES								
		1.20	SPT								
		1.20 - 1.65	6D	N=7				2.10	31.86		MADE GROUND: Loose to medium dense orange brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of brick, concrete and sandstone.
		1.20 - 1.70	7B								
		1.80	8ES								
		2.00	SPT								
		2.00 - 2.45	9D	N=24				3.00	30.96		MADE GROUND: Medium dense orange brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of brick, quartz and sandstone.
		2.10	10ES								
		2.10 - 2.50	11B								
		3.00	SPT	N=11							
		3.00 - 3.45	12D								
		3.00 - 3.50	13B					4.55	29.41		Medium dense orange brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		3.10	14ES								
		4.00	SPT	N=12				5.00	28.96		
		4.00 - 4.45	15D								
		4.00 - 4.50	16B					5.60	28.36		Stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial TIII)
		4.10	19ES								
		4.60	17D								
		5.00	SPT	N=12							
		5.00 - 5.45	18D								
		5.00 - 5.50	21B								Brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. (Glaciofluvial Sheet Deposits)
		5.10	20ES								
		6.00	22D					7.50	26.46		
		6.40	SPT								
		7.00	23D								
		7.50 - 9.00	24B								Firm to stiff grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and granite. Sand is fine to coarse. (Glacial Till)
								9.00	24.96		
		9.20	SPT	N=50							Very dense red brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone quartz and granite. (Residual Chester Formation)
		9.20 - 9.30	25D								
								10.50	23.46		Weak red brown SANDSTONE recovered as dense red brown slightly gravelly silty fine to coarse sand. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Fractures are subhorizontal (0-25°) very close to closely spaced planar. (Chester Formation)
											Borehole completed at 10.50m.
								{15.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample; U - U100.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 4.00m begl; 50mm slotted pipe with gravel between 4.00m begl and 7.00m begl; Bentonite seal between 7.00m begl and 10.50m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:93.75

Logged By: NB

1.1 ENZYGO RC LOG MAN.260.001 LOGS NEW.GPJ CRM.1660.001 SITE 1 MILTON ROAD.GPJ 2/8/19

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	G1
Test Date:	14/02/2019
Report Date:	14/02/2019
File Name:	G1.spt
Test Operator:	CM

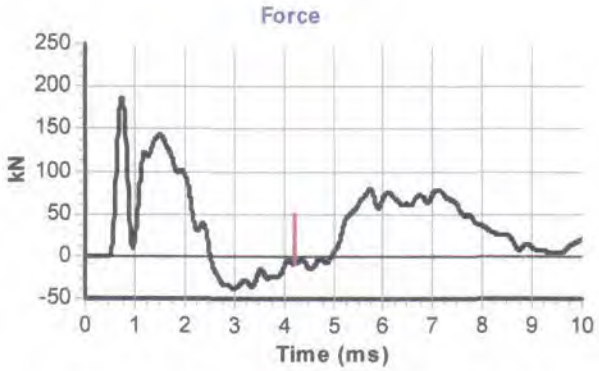
Instrumented Rod Data

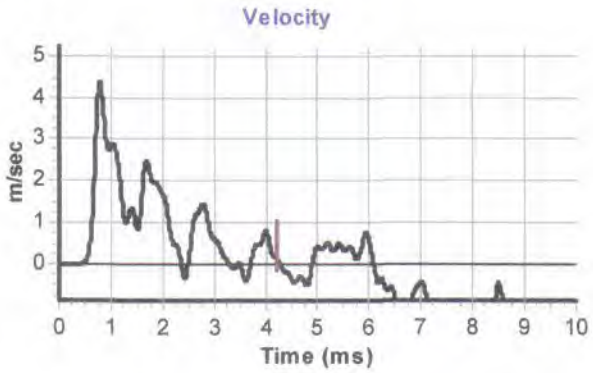
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	7080
Accelerometer No.2:	11609

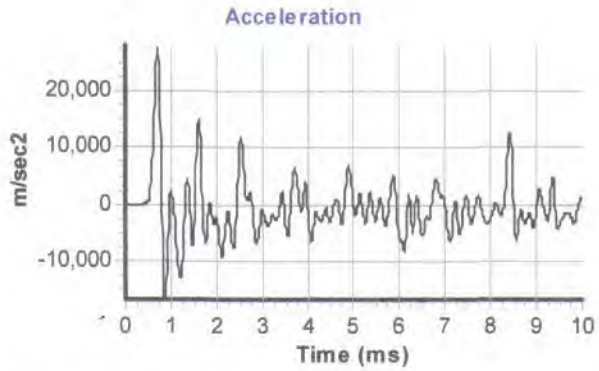
SPT Hammer Information

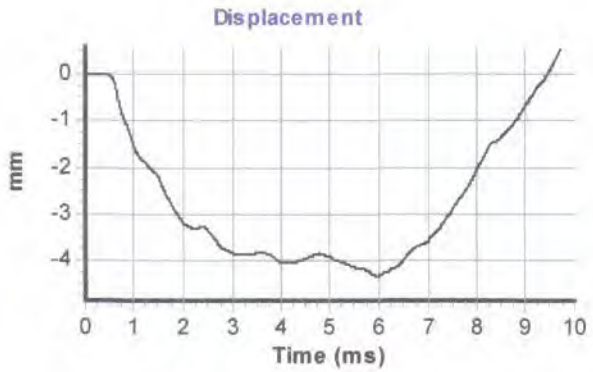
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	337

Energy Ratio E_r (%): 71

Signed: C.MCCLUSKEY
Title: FITTER

The recommended calibration interval is 12 months

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SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	G2
Test Date:	18/04/2018
Report Date:	18/04/2018
File Name:	G2.spt
Test Operator:	SH

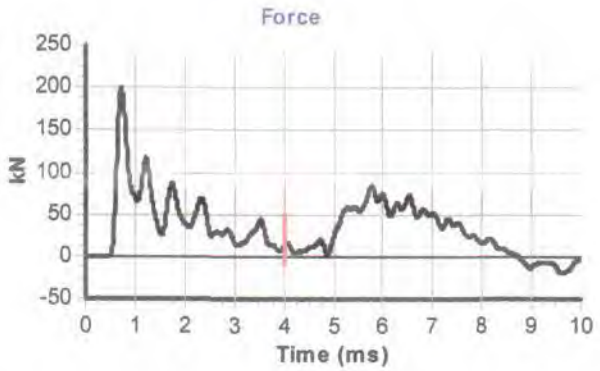
Instrumented Rod Data

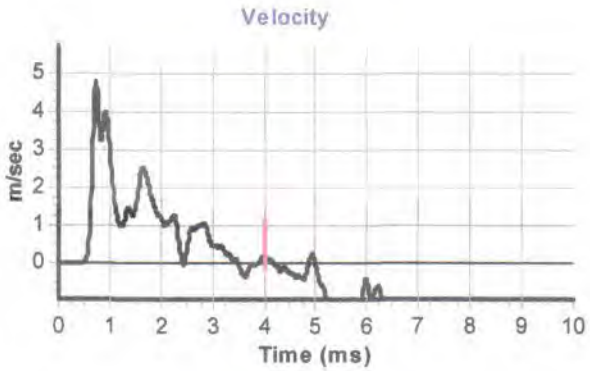
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.3
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7080
Accelerometer No.2:	11609

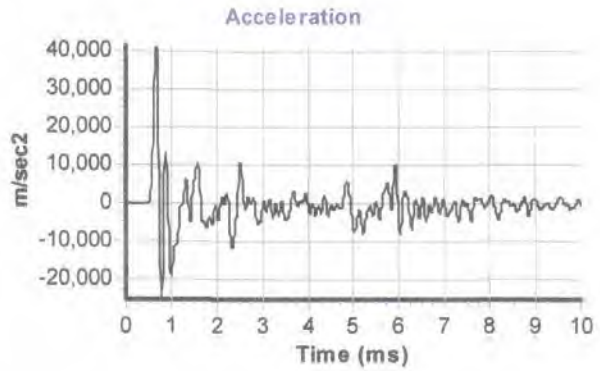
SPT Hammer Information

Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	944
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	338

Energy Ratio E_r (%): **71**

Signed: M.GARDNER
Title: FITTER

The recommended calibration interval is 12 months

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Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS01

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES		0.15	33.48		MADE GROUND: Black macadam.
					0.40	33.23		MADE GROUND: Grey brown slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick. Sand is fine to coarse.
		0.50	2ES					
		0.50 - 0.80	3B					MADE GROUND: Red brown slightly silty sandy gravel. Gravel is subangular to subrounded fine to coarse of brick. Sand is fine to coarse.
					0.80	32.83		
		1.00	4ES					MADE GROUND: Orange brown sandy gravel. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Sand is fine to coarse.
					1.10	32.53		
		1.20	SPT	N=18				Medium dense orange brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
		1.20 - 1.70	5ES 6B					
					1.80	31.83		
		2.00	SPT	N=14				Medium dense orange brown slightly clayey SAND and GRAVEL. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
		2.20	7ES					
		2.20 - 2.70	8B					
		3.00	SPT	N=17				
		3.00 - 4.00	9B					
		4.00	SPT	N=26				
					4.40	29.23		
		4.50	10D					Stiff grey brown slightly gravelly CLAY with a low cobble content of subangular to subrounded sandstone and granite. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Glacial Till)
		5.00	11D		5.00	28.63		Borehole completed at 5.00m.
					{6.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 1.30m begl; 50mm slotted pipe with gravel between 1.30m begl to 4.30m begl; Borehole collapse between 4.30m begl to 5.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS02

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES		0.10	33.94		MADE GROUND: Black macadam.
		0.50	2ES		0.45	33.59		MADE GROUND: Brown grey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam and concrete. Sand is fine to coarse.
		0.70 - 1.00	3B					0.45 Landscaping membrane. Loose orange brown slightly clayey gravelly fine to coarse SAND with a low cobble content of subangular to subrounded granite and sandstone. Gravel is subangular to subrounded fine to coarse of granite, quartz and sandstone. (Glaciofluvial Sheet Deposits)
		1.00	4ES					
		1.20	SPT	N=4				
		1.20 - 1.65	5B					
		2.00	SPT	N=4				
		2.00 - 2.50	6ES 7B					
					3.00	31.04		Borehole completed at 3.00m.
					{6.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 1.00m begl; 50mm slotted pipe with gravel between 1.00m begl to 3.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS03

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES		0.15	34.30		MADE GROUND: Black macadam.
					0.30	34.15		MADE GROUND: Brown grey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam and concrete. Sand is fine to coarse.
		0.50	2ES					
		0.50 - 1.00	3B					MADE GROUND: Loose red brown slightly clayey sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam and concrete. Sand is fine to coarse.
		1.00	4ES					
		1.20	SPT	N=4				
					1.40	33.05		
		1.50	5ES					Loose orange brown slightly clayey gravelly fine to coarse SAND with a low cobble content of subangular to subrounded granite and sandstone. Gravel is subangular to subrounded fine to coarse of granite, quartz and sandstone. (Glaciofluvial Sheet Deposits)
		1.50 - 2.00	6B					
					2.00	32.45		Borehole completed at 2.00m.
					{6.00}			

0 1 2 3 4 5 6

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 1.00m begl; 50mm slotted pipe with gravel between 1.00m begl to 2.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

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Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS04

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES		0.05	33.66		MADE GROUND: Yellow paving slab.
					0.45	33.26		MADE GROUND: Brown grey gravelly fine to coarse sand. Gravel is is subangular to subrounded fine to coarse of brick.
					{6.00}			Borehole completed at 0.45m.

0 1 2 3 4 5 6

General Remarks

1. Hand excavated inspection pit from ground level to 0.45m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Backfilled with arisings and reinstated.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

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Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS04A

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Black macadam.
		0.50	1ES		0.45	33.26		
		0.50 - 0.70	2B					0.45 Landscaping membrane. Medium dense orange brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
		1.00	3ES					
		1.20	SPT	N=18				
		1.20 - 1.70	4B					
					1.50	32.21		
								Medium dense orange brown slightly clayey sandy GRAVEL. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
		2.00	SPT	N=15				
		2.20 - 2.70	5ES 6B					
		3.00	SPT	N=19				
		3.00 - 3.40	7ES 8B					
		4.00	SPT	N=13				
					4.50	29.21		
		4.80 - 5.00	9D					Firm grey brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. Sand is fine to coarse. (Glacial Till)
		5.00	SPT	N=19	5.00	28.71		
								Borehole completed at 5.00m.
					{6.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 1.50m begl; 50mm slotted pipe with gravel between 1.50m begl to 4.50m begl; Borehole collapse between 4.50m begl to 5.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

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Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS05

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.25	1ES		0.20	33.92		MADE GROUND: Black macadam.
		0.25 - 0.40	2B		0.40	33.72		MADE GROUND: Brown grey slightly silty sandy gravel. Gravel is subangular to subrounded fine to coarse of brick, macadam and concrete. Sand is fine to coarse.
		0.50	3ES					
		0.50 - 1.00	4B					MADE GROUND: Loose orange brown gravelly fine to coarse sand with a low cobble content of subangular to subrounded brick. Gravel is subangular to subrounded fine to coarse of brick, quartz and sandstone.
		1.00	5ES					
		1.20	SPT	N=1				
		1.20 - 1.65	6D					1.20 - 1.50 Strata becomes clayey.
		1.70	7ES		1.75	32.37		
		2.00	SPT	N=15				Medium dense orange brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
		2.00 - 2.50	8B					
		2.70	9ES					
		3.00	SPT	N=14				
		3.00 - 3.50	10B					
		3.90 - 4.50	11B					3.70 - 3.80 Black gravelly fine to coarse sand. Gravel is subangular fine to medium of coal.
		4.00	SPT	N=19				
		5.00	SPT	N=12	5.00	29.12		Borehole completed at 5.00m.
			12D		{6.00}			

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.50m begl; Bentonite seal between 0.50m begl to 2.00m begl; 50mm slotted pipe with gravel between 2.00mbegl to 5.00m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

WS06

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client: Whitbread PLC

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	1ES					MADE GROUND: Brown grey slightly clayey gravelly fine to coarse sand with a high cobble content brick. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is ash.
		0.50 0.60 - 0.80	2ES 3B					
					0.80	33.25		
		1.00	4ES					MADE GROUND: Brown grey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of brick, sandstone and quartz.
					1.20	32.85		Borehole completed at 1.20m.
					{6.00}			

0 1 2 3 4 5 6

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Backfilled with arisings and reinstated.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By: NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site
Premier Inn Deansgate, Manchester

WS06A

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client
Whitbread PLC

Sheet
1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.05	33.99		MADE GROUND: Grey concrete paving slab.
								MADE GROUND: Brown grey slightly clayey gravelly fine to coarse sand with a high cobble content brick. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is ash.
					0.80	33.24		MADE GROUND: Brown gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of brick, sandstone and quartz.
					1.35	32.69		Borehole completed at 1.35m.
					{6.00}			

0 1 2 3 4 5 6

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Install details: 50mm plain pipe concrete flush cover from 0.00m begl to 0.20m begl; Bentonite seal between 0.20m begl to 0.80m begl; 50mm slotted pipe with gravel between 0.80mbegl to 1.35m begl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By
NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site
Premier Inn Deansgate, Manchester

WS06B

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 30-05-19 Finish 30-05-19		

Client
Whitbread PLC

Sheet
1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.45	33.52		MADE GROUND: Brown grey slightly clayey gravelly fine to coarse sand with a high cobble content brick. Gravel is subangular to subrounded fine to coarse of brick, macadam, concrete and sandstone. Sand is fine to coarse.
					{6.00}			Borehole completed at 0.45m.

0 1 2 3 4 5 6

General Remarks

1. Hand excavated inspection pit from ground level to 1.20m begl.
2. D - Disturbed Sample; ES - Environmental Sample; B - Bulk Sample.
3. Densities and soil consistencies are based on insitu tests.
4. No visual or olfactory evidence of contamination observed.
5. Groundwater was not observed.
6. SPT - Standard Penetration Test; N - Number of blows.
7. Backfilled with arisings and reinstated.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:37.5

Logged By
NB

1.0 ENZYGO BH LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: DART435
Test Date: 02/05/2019
Report Date: 02/05/2019
File Name: DART435.spt
Test Operator: CM

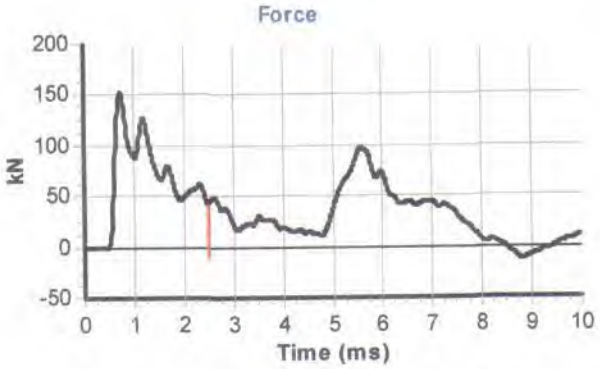
Instrumented Rod Data

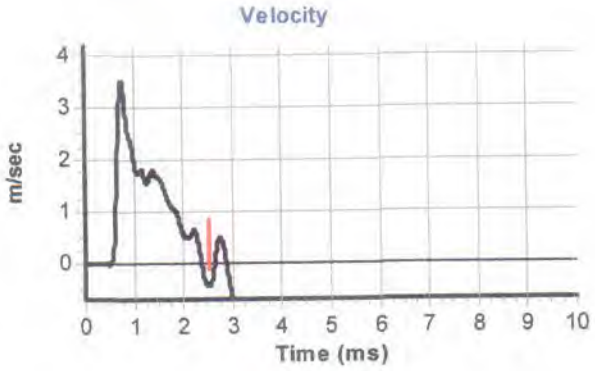
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.5
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	7080
Accelerometer No.2:	11609

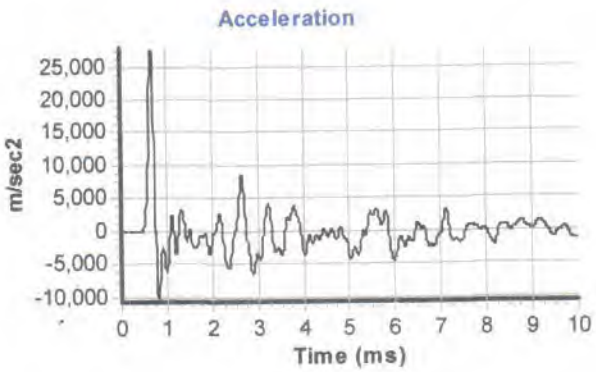
SPT Hammer Information

Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

Comments / Location









Calculations

Area of Rod A (mm2):	970
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	287

Energy Ratio E_r (%): **61**

Signed: S. HOWARTH
Title: FITTER

The recommended calibration interval is 12 months

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Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

SA01 NF

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 03-06-19 Finish 03-06-19		

Client: Whitbread PLC

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.08	33.92		MADE GROUND: Tarmac.
				0.35	33.65		MADE GROUND: Dark grey slightly clayey sandy angular fine to coarse gravel of sandstone, concrete, brick, clinker and coal with a moderate cobble content. Cobbles are angular of brick. Sand is fine to coarse.
				0.50	33.50		MADE GROUND: Yellow brown slightly sandy angular fine to coarse gravel of dolomite. Sand is fine to coarse.
				0.75	33.25		Firm consistency orange brown mottled grey sandy CLAY with some orange brown silty sandy bands. Sand is fine to coarse. (Glacial Till)
				1.35	32.65		Light brown very gravelly coarse SAND. Gravel is subangular to rounded of quartz and sandstone. (Glaciofluvial Sheet Deposits)
				2.50 {2.50}	31.50		Light brown slightly gravelly slightly silty medium SAND. Gravel is subangular to rounded of quartz and sandstone. (Glaciofluvial Sheet Deposits) Trial Pit completed at 2.50m.

0
1
2

General Remarks

Dimensions: 1.55x0.50x2.50
1. Machine excavated inspection pit from ground level to 2.50m begl.
2. No visual or olfactory evidence of contamination observed.
3. Groundwater was not observed.
4. Trial pit was backfilled with arisings after testing.

All dimensions in metres
Scale 1:15.625

Logged By: EL

1.1 ENZYGO TP LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site
Premier Inn Deansgate, Manchester

SA01 SF

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 03-06-19 Finish 03-06-19		

Client
Whitbread PLC

Sheet
1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.08	33.92		MADE GROUND: Tarmac.
				0.25	33.75		MADE GROUND: Dark grey slightly clayey sandy angular fine to coarse gravel of sandstone, concrete, brick, clinker and coal with a low cobble content. Cobbles are angular of brick. Sand is fine to coarse.
				1.40	32.60		MADE GROUND: Dark grey cobbles with some slightly clayey gravelly coarse sand. Cobbles are angular of brick. Gravel is angular fine to coarse of sandstone, concrete, brick, clinker and coal.
				2.50 {2.50}	31.50		Light brown slightly gravelly slightly silty medium SAND. Gravel is subangular to rounded of quartz and sandstone. (Glaciofluvial Sheet Deposits) Trial Pit completed at 2.50m.

0
1
2

General Remarks

Dimensions: 1.55x0.50x2.50
1. Machine excavated inspection pit from ground level to 2.50m begl.
2. No visual or olfactory evidence of contamination observed.
3. Groundwater was not observed.
4. Trial pit was backfilled with arisings after testing.

All dimensions in metres
Scale 1:15.625

Logged By
EL

1.1 ENZYGO TP LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site
Premier Inn Deansgate, Manchester

SA02

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 03-06-19 Finish 03-06-19		

Client
Whitbread PLC

Sheet
1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.18	34.43		MADE GROUND: Tarmac.
				0.55	34.06		MADE GROUND: Brown slightly clayey very gravelly coarse sand with a medium cobble content. Cobbles are angular of brick and concrete. Gravel is angular fine to coarse of sandstone, concrete, brick and limestone.
				1.05	33.56		MADE GROUND: Relicted brick structure (possible old foundation).
				1.40	33.21		Firm consistency orange brown mottled grey slightly sandy CLAY with some orange brown silty sandy bands. Sand is fine to coarse. (Glacial Till)
				2.30	32.31		Orange brown very gravelly medium SAND with a medium cobble content. Cobbles are subrounded of quartz. Gravel is subangular fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
				{2.50}			Trial Pit completed at 2.30m.

0
1
2

General Remarks

Dimensions: 1.55x0.50x2.30
1. Machine excavated inspection pit from ground level to 2.30m begl.
2. No visual or olfactory evidence of contamination observed.
3. Groundwater was not observed.
4. Trial pit was backfilled with arisings after testing.

All dimensions in metres
Scale 1:15.625

Logged By
EL

1.1 ENZYGO TP LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Premier Inn Deansgate, Manchester

SA03

Job No	Dates	Ground Level (m)	Co-Ordinates
MAN.260.001	Start 03-06-19 Finish 03-06-19		

Client: Whitbread PLC

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.14	33.40		MADE GROUND: Tarmac.
				0.40	33.14		MADE GROUND: Light grey slightly sandy gravel. Gravel is angular fine to coarse of limestone.
				0.95	32.59		Orange brown very sandy subangular fine to coarse GRAVEL of quartz and sandstone with a low cobble content. Cobbles are subrounded of quartz. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
				1.80	31.74		Red brown slightly silty gravelly medium SAND. Gravel is subangular fine to coarse of quartz and sandstone. (Glaciofluvial Sheet Deposits)
				2.00	31.54		Red brown very sandy subangular fine to coarse GRAVEL of quartz and sandstone. Sand is fine to coarse. (Glaciofluvial Sheet Deposits)
				{2.50}			Trial Pit completed at 2.00m.

0
1
2

General Remarks

Dimensions: 1.60x0.55x2.00
1. Machine excavated inspection pit from ground level to 2.00m begl.
2. No visual or olfactory evidence of contamination observed.
3. Groundwater was not observed.
4. Trial pit was backfilled with arisings after testing.

All dimensions in metres
Scale 1:15.625

Logged By: EL

1.1 ENZYGO TP LOG MAN.260.001 LOGS NEW.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 2/8/19

Appendix 4 – In-Situ Testing Results

LABORATORY REPORT

4043

Contract Number: PSL19/3377

Report Date: 03 June 2019

Client's Reference: 63524

Client Name: Geocore Site Investigations Ltd
Tralee Close
Kirkleatham Business Park
Redcar
Cleveland
TS10 5SG

For the attention of: Michelle Woodhead

Contract Title: Manchester, M15 5FJ

Date Received: 31/5/2019
Date Commenced: 31/5/2019
Date Completed: 03/6/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

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

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

VERTICAL DEFORMATION TESTS.

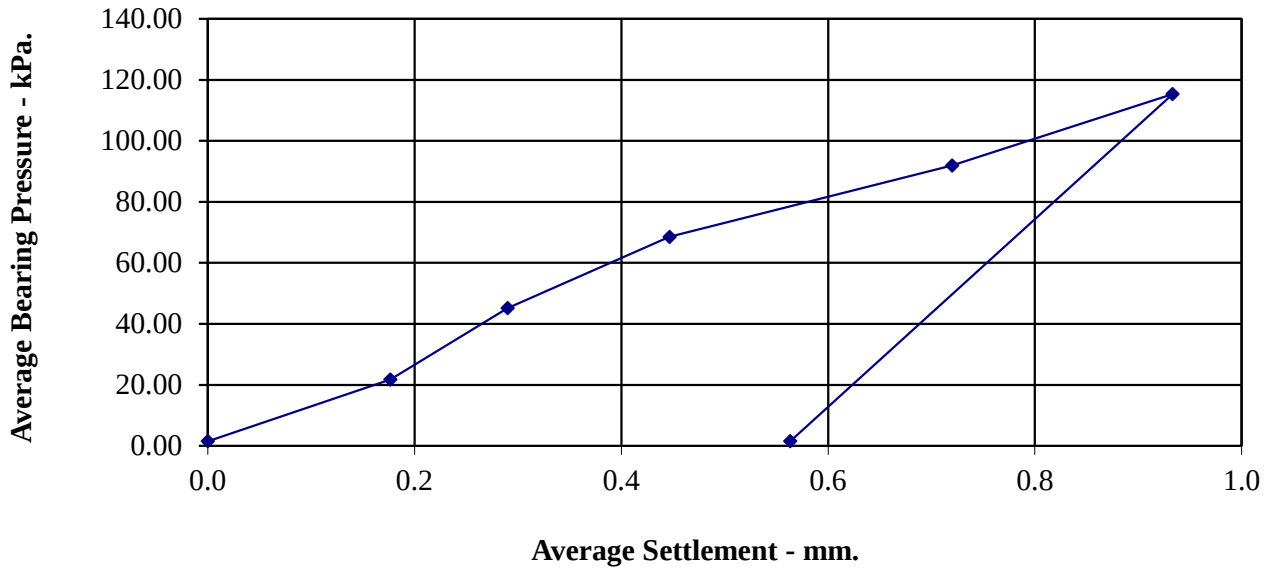
BS 1377 : Part 9 : 1990.

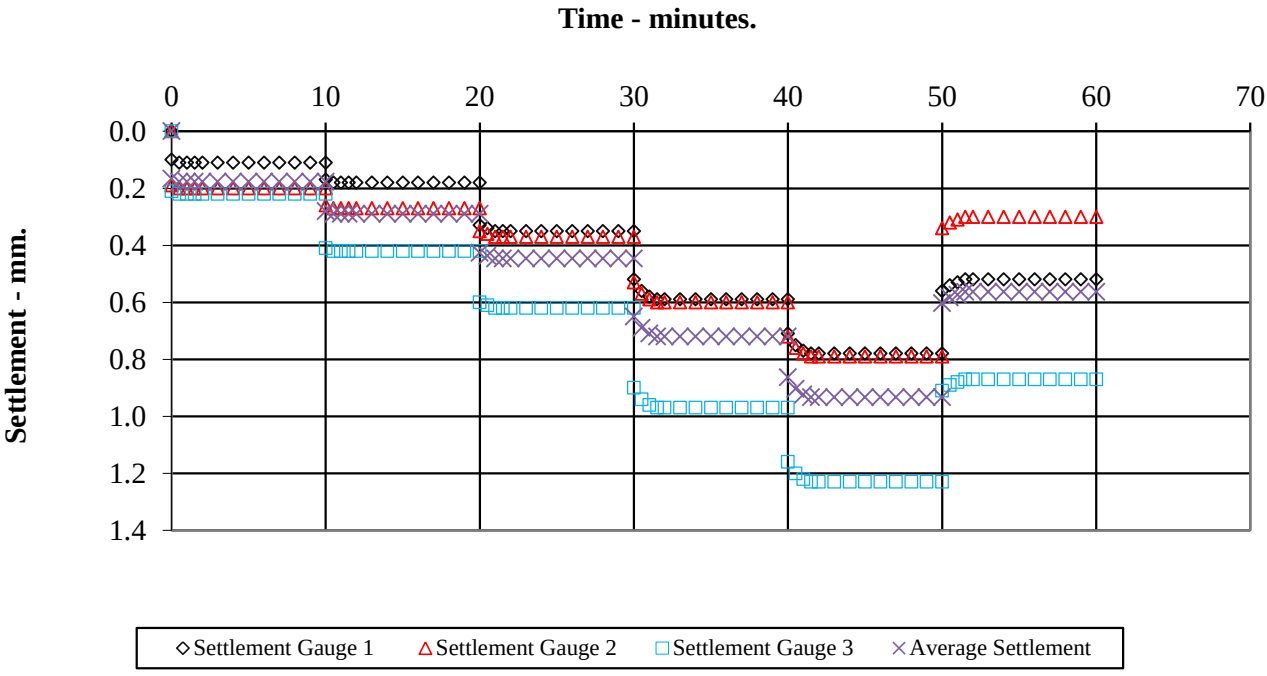
Date of Test: 31-May-19

Test Position: PLT 01 **Depth (m):** 0.60

Plate Area (m2): 0.2922467 **Type of Kentledge:** Wheeled

Maximum Applied Pressure (kPa): 115.35
Maximum Deformation (mm): 0.93
Description: Brown slightly gravelly very sandy CLAY.





Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**31-May-19**	
Test Position	**PLT 01**	
Depth (m)	**0.60**	
Description	**Brown slightly gravelly very sandy CLAY.**	
Maximum Deflection	**0.93**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load at 0.93mm	**115**	**kN/m^2**
Plate diameter	**610**	**mm**
Conversion factor for plate diameter	**0.816**	
K_{762}(modulus of subgrade reaction)	**75.3**	**$kN/m^2/mm$**
CBR Value	**> 17.3**	**%**

VERTICAL DEFORMATION TESTS.

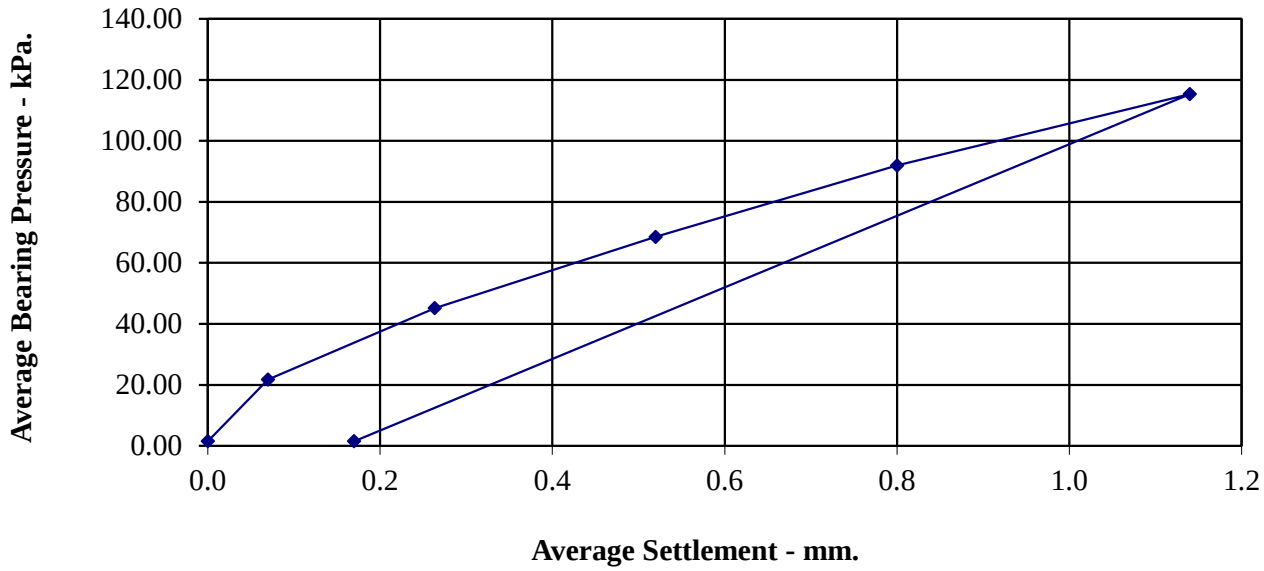
BS 1377 : Part 9 : 1990.

Date of Test: 31-May-19

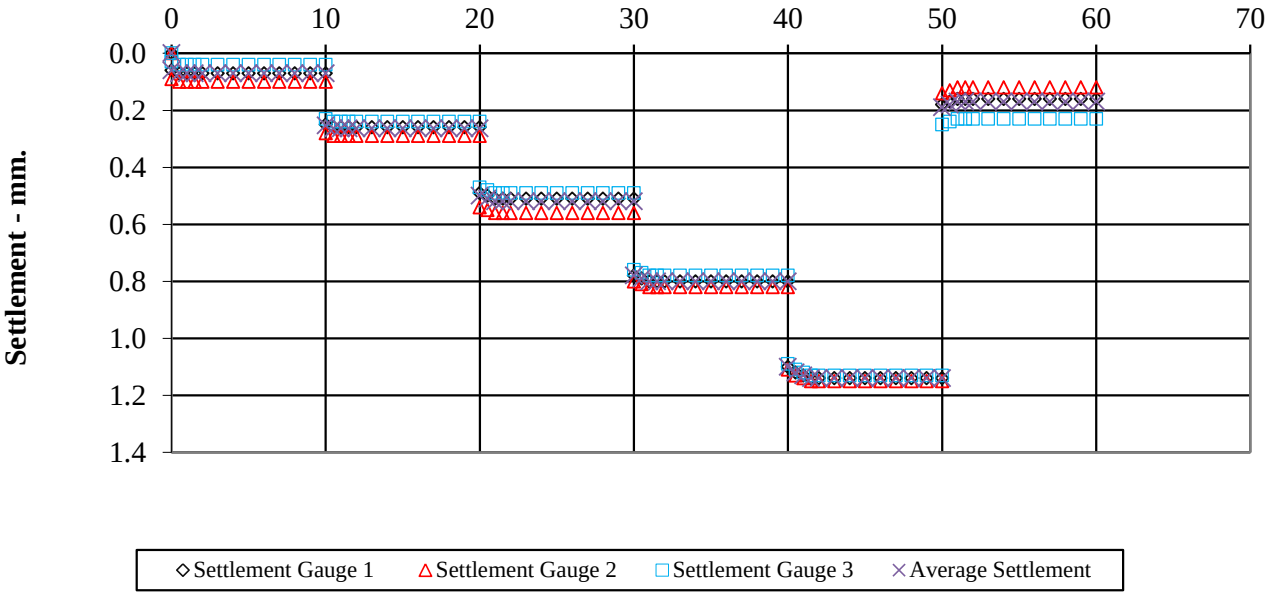
Test Position: PLT 02 **Depth (m):** 0.45

Plate Area (m2): 0.2922467 **Type of Kentledge:** Wheeled

Maximum Applied Pressure (kPa): 115.35
Maximum Deformation (mm): 1.14
Description: Brown gravelly Fill (MADE GROUND)



Time - minutes.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**31-May-19**	
Test Position	**PLT 02**	
Depth (m)	**0.45**	
Description	**Brown gravelly Fill (MADE GROUND)**	
Maximum Deflection	**1.14**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load at 1.14mm	**115**	**kN/m^2**
Plate diameter	**610**	**mm**
Conversion factor for plate diameter	**0.816**	
K_{762}(modulus of subgrade reaction)	**75.3**	**$kN/m^2/mm$**
CBR Value	**> 17.3**	**%**

VERTICAL DEFORMATION TESTS.

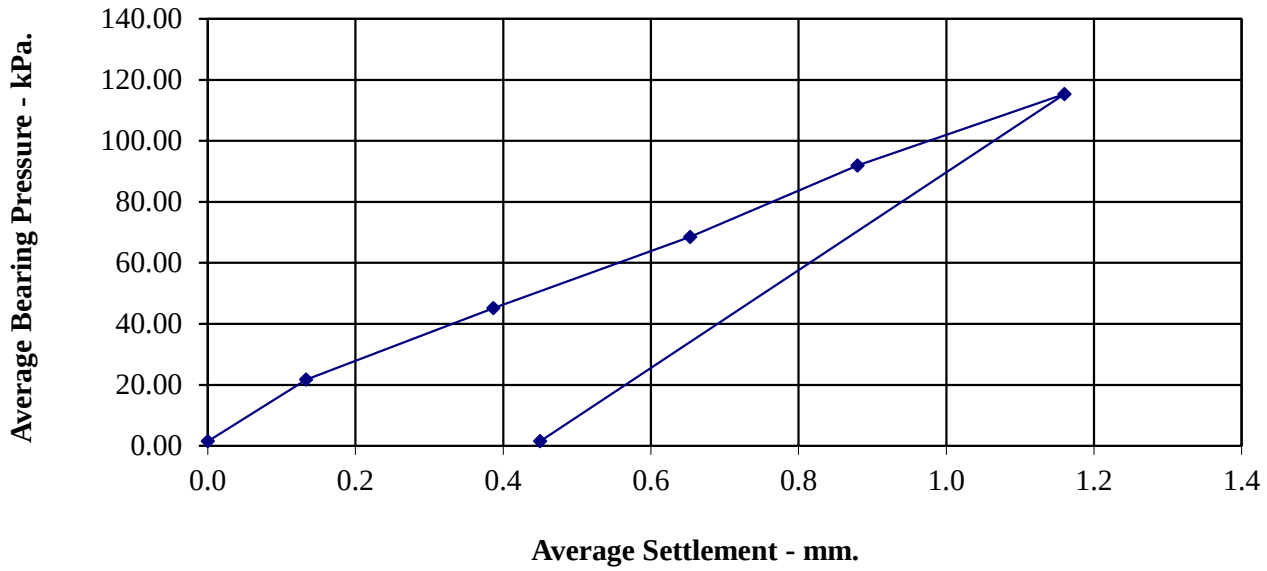
BS 1377 : Part 9 : 1990.

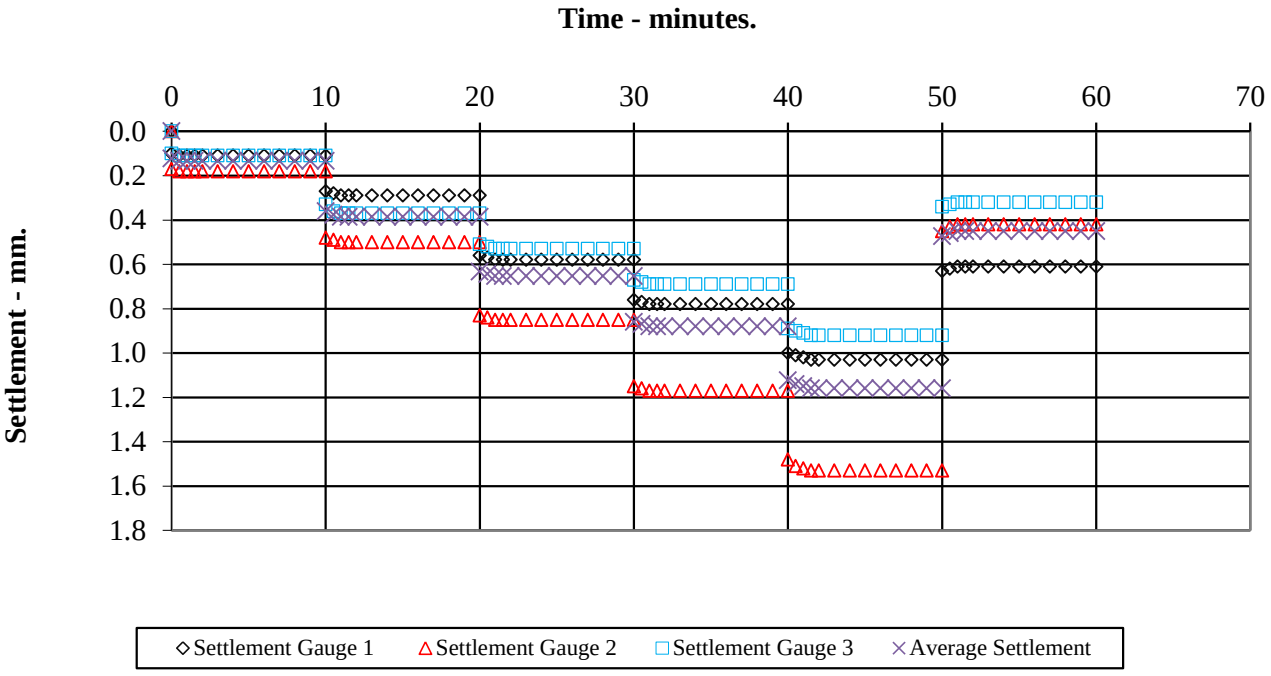
Date of Test: 31-May-19

Test Position: PLT 03 **Depth (m):** 0.60

Plate Area (m2): 0.2922467 **Type of Kentledge:** Wheeled

Maximum Applied Pressure (kPa): 115.35
Maximum Deformation (mm): 1.16
Description: Brown very sandy CLAY.





Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**31-May-19**	
Test Position	**PLT 03**	
Depth (m)	**0.60**	
Description	**Brown very sandy CLAY.**	
Maximum Deflection	**1.16**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load at 1.16mm	**115**	**kN/m^2**
Plate diameter	**610**	**mm**
Conversion factor for plate diameter	**0.816**	
K_{762}(modulus of subgrade reaction)	**75.3**	**$kN/m^2/mm$**
CBR Value	**> 17.3**	**%**

VERTICAL DEFORMATION TESTS.

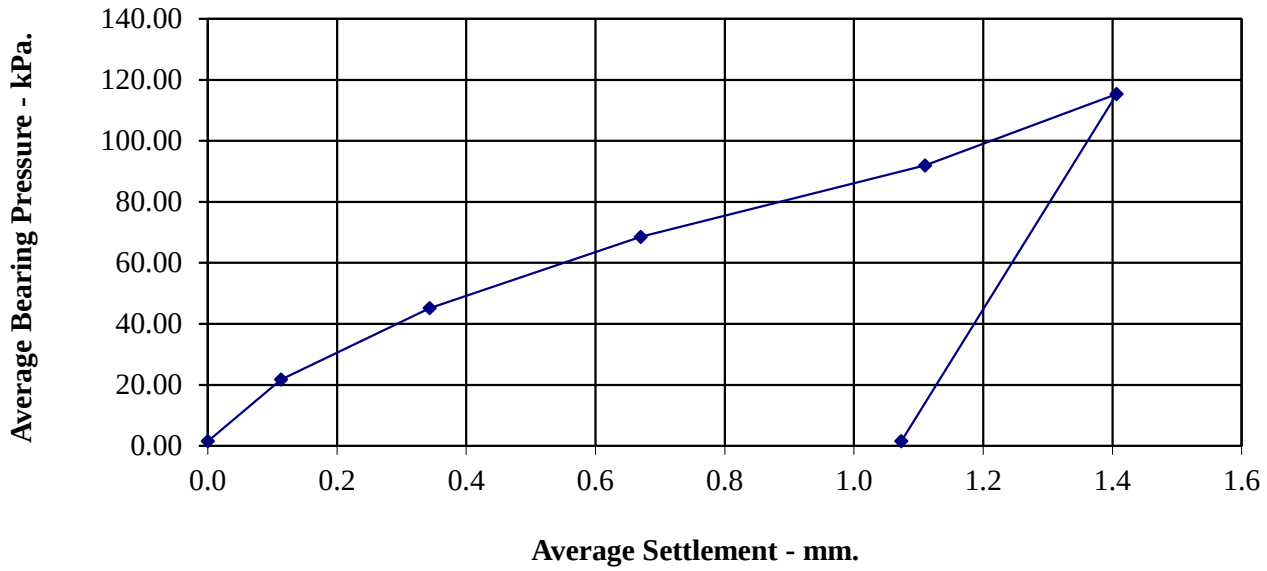
BS 1377 : Part 9 : 1990.

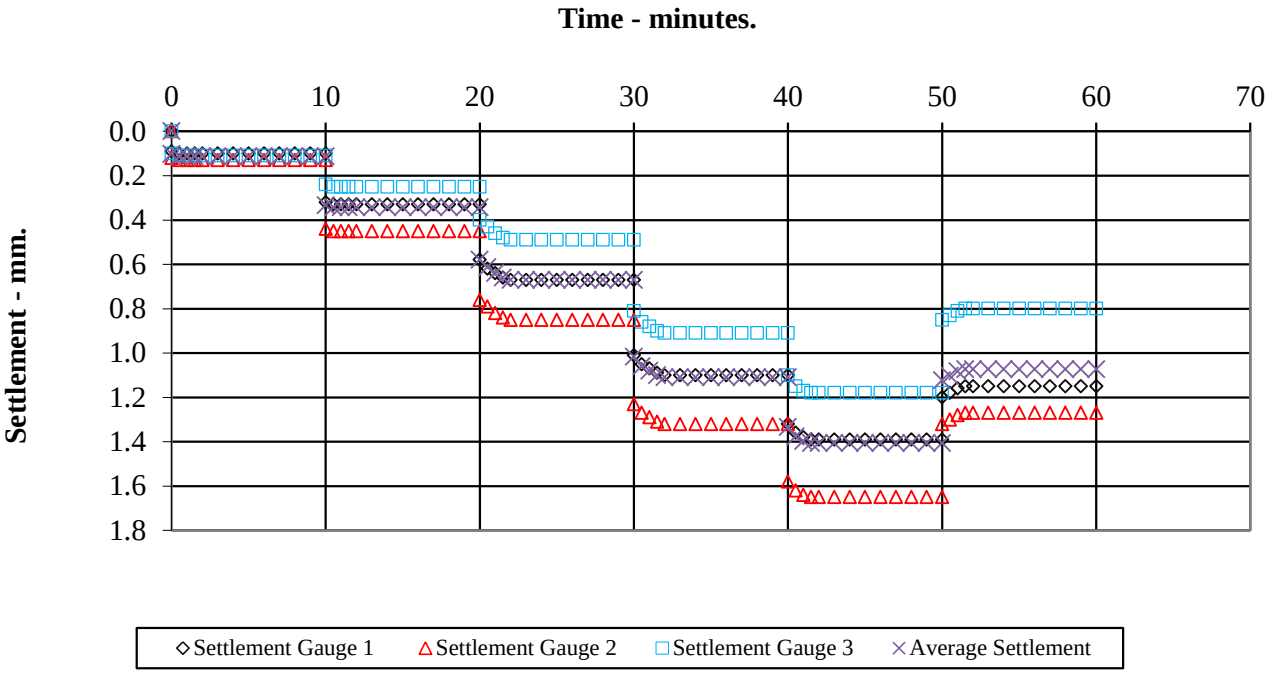
Date of Test: 31-May-19

Test Position: PLT 04 **Depth (m):** 0.60

Plate Area (m2): 0.2922467 **Type of Kentledge:** Wheeled

Maximum Applied Pressure (kPa): 115.35
Maximum Deformation (mm): 1.41
Description: Brown slightly gravelly very sandy CLAY.





Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**31-May-19**	
Test Position	**PLT 04**	
Depth (m)	**0.60**	
Description	**Brown slightly gravelly very sandy CLAY.**	
Maximum Deflection	**1.41**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load at 1.25mm	**103**	**kN/m^2**
Plate diameter	**610**	**mm**
Conversion factor for plate diameter	**0.816**	
K_{762}(modulus of subgrade reaction)	**67.3**	**$kN/m^2/mm$**
CBR Value	**14.2**	**%**

VERTICAL DEFORMATION TESTS.

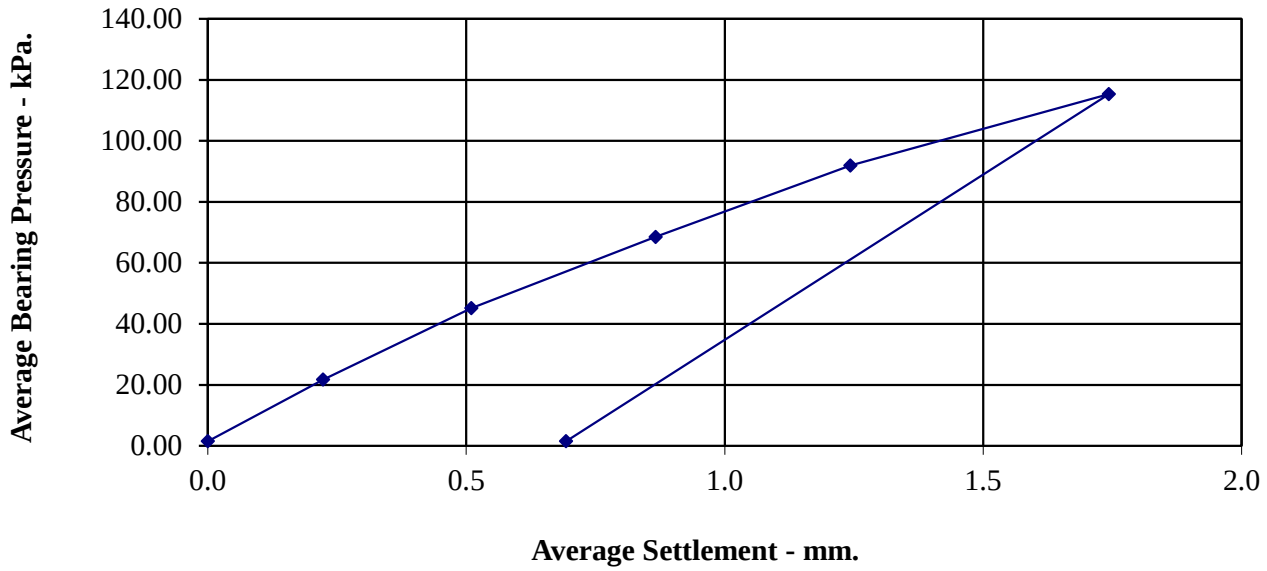
BS 1377 : Part 9 : 1990.

Date of Test: 31-May-19

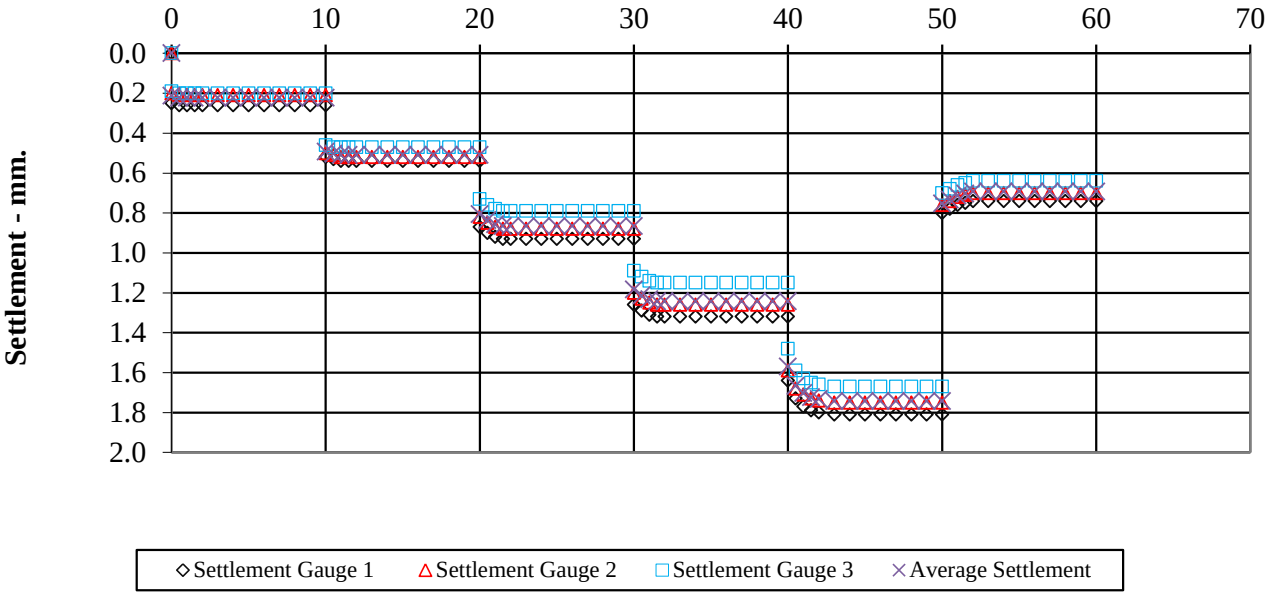
Test Position: PLT 05 **Depth (m):** 0.60

Plate Area (m2): 0.2922467 **Type of Kentledge:** Wheeled

Maximum Applied Pressure (kPa): 115.35
Maximum Deformation (mm): 1.74
Description: Brown slightly gravelly very sandy CLAY.



Time - minutes.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**31-May-19**	
Test Position	**PLT 05**	
Depth (m)	**0.60**	
Description	**Brown slightly gravelly very sandy CLAY.**	
Maximum Deflection	**1.74**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load at 1.25mm	**92**	**kN/m^2**
Plate diameter	**610**	**mm**
Conversion factor for plate diameter	**0.816**	
K_{762}(modulus of subgrade reaction)	**60.3**	**$kN/m^2/mm$**
CBR Value	**11.7**	**%**

Appendix 5 –Monitoring Results

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 01/07/2019
Job No: MAN.260.001
Visit No: 1 **of** 6
Operator: DL
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	N/A										N/A		N/A	N/A	N/A	N/A	9.17	20.08	33.72	24.55	ND	Missing Bung.
BH2	0.1	0.1	0.3	0.3	>500	>500	1.0	1.0	20.2	20.2	ND	ND	0.7	0.6	ND	ND	9.00	20.12	33.62	24.62	ND	Silty.
BH3	0.1	0.1	0.4	0.4	13.4	13.4	ND	ND	17.6	17.7	ND	ND	0.9	0.7	ND	ND	7.88	20.50	33.63	25.75	ND	Silty.
BH4	0.1	0.1	3.0	3.0	11.0	11.0	ND	ND	15.3	15.6	ND	ND	0.9	0.8	ND	ND	5.53	11.73	34.50	28.97	ND	Silty.
BH5	4.2	4.2	2.0	2.0	9.0	9.0	ND	ND	9.5	9.5	ND	ND	0.6	0.5	ND	ND	9.90	15.10	34.09	24.19	ND	Silty.
BH6	0.1	0.1	3.4	2.1	1.0	1.0	ND	ND	18.0	18.6	ND	ND	0.7	0.5	ND	ND	10.13	7.25	33.96	23.83	ND	Silty.
WS1	0.1	0.0	0.3	0.1	8.0	8.0	ND	ND	19.8	20.9	ND	ND	0.1	0.1	ND	ND	N/A	N/A	33.63	N/A	ND	Bung stuck.
WS2	0.4	0.0	4.1	4.0	1.0	1.0	ND	ND	11.5	12.4	ND	ND	0.3	0.3	ND	ND	Dry	3.10	34.04	N/A	ND	Silty.
WS3	ND	ND	1.9	1.9	2.0	2.0	ND	ND	19.5	19.5	ND	ND	0.8	0.7	ND	ND	Dry	2.06	34.45	N/A	ND	Silty.
WS4A	ND	ND	3.0	3.0	3.0	3.0	ND	ND	16.7	17.3	ND	ND	0.9	0.8	ND	ND	Dry	4.58	33.71	N/A	ND	Silty.
WS5	ND	ND	3.4	3.2	3.0	3.0	ND	ND	17.4	18.6	ND	ND	0.3	0.2	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	0.1	ND	1.8	1.7	6.0	6.0	ND	ND	16.2	20.4	ND	ND	0.3	0.2	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**4.2**	**4.2**	**4.1**	**4.0**	**13.4**	**13.4**	**1.0**	**1.0**	**20.2**	**20.9**	**0.0**	**0.0**	**0.9**	**0.8**	**0.0**	**0.0**	**10.13**	**20.5**	**34.5**	**28.97**		
Min	**0.1**	**0.0**	**0.3**	**0.1**	**1.0**	**1.0**	**1.0**	**1.0**	**9.5**	**9.5**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**5.53**	**1.35**	**33.62**	**23.83**		
GSV (l/hr)	**0.0378**		**0.032**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry	X	Moist		Wet		Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight		Cloudy		Overcast	X
Preciptation:	None		Slight	X	Moderate		Heavy	
Barometric pressure (mbar):			Before	1015			After	1016
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before	18			After	18

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 09/07/2019
Job No: MAN.260.001
Visit No: 2 **of** 6
Operator: DL
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	ND	ND	0.3	ND	2.0	2.0	ND	ND	20.1	21.0	ND	ND	0.9	1.0	ND	ND	9.25	20.08	33.72	24.47	ND	Car parked over well.
BH2	ND	ND	0.1	ND	18.0	18.0	ND	ND	19.6	20.9	ND	ND	1.2	1.3	ND	ND	9.03	20.12	33.62	24.59	ND	Rapid recharge.
BH3	ND	ND	0.1	ND	3.0	3.0	ND	ND	19.8	20.7	ND	ND	1.2	1.3	ND	ND	9.26	20.50	33.63	24.37	ND	Rapid recharge.
BH4	0.1	0.1	3.4	3.4	2.0	2.0	ND	ND	15.3	17.8	ND	ND	0.8	1.0	ND	ND	10.15	11.73	34.50	24.35	ND	Rapid recharge.
BH5	ND	ND	0.2	ND	ND	ND	ND	ND	20.8	21.0	ND	ND	1.0	1.1	ND	ND	9.94	15.10	34.09	24.15	ND	Rapid recharge.
BH6	ND	ND	1.3	0.9	3.0	4.0	ND	ND	19.5	19.8	ND	ND	0.8	0.9	ND	ND	4.80	7.25	33.96	29.16	ND	Rapid recharge.
WS1	ND	ND	0.9	0.6	ND	ND	ND	ND	19.3	20.7	ND	ND	0.9	1.2	ND	ND	4.31	4.41	33.63	29.32	ND	Silty.
WS2	ND	ND	1.2	0.9	ND	ND	ND	ND	19.6	20.6	ND	ND	0.9	1.1	ND	ND	Dry	3.10	34.04	N/A	ND	
WS3	ND	ND	1.1	0.5	ND	ND	ND	ND	19.8	20.6	ND	ND	1.0	1.1	ND	ND	Dry	2.06	34.45	N/A	ND	
WS4A	ND	ND	1.1	1.1	ND	ND	ND	ND	19.6	19.6	ND	ND	1.3	1.4	ND	ND	Dry	4.58	33.71	N/A	ND	
WS5	ND	ND	3.1	3.0	ND	ND	ND	ND	18.6	18.6	ND	ND	1.1	1.1	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	ND	ND	2.3	2.2	ND	ND	ND	ND	17.3	17.3	ND	ND	0.9	1.1	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**0.1**	**0.1**	**3.4**	**3.4**	**18.0**	**18.0**	**0.0**	**0.0**	**20.8**	**21.0**	**0.0**	**0.0**	**1.3**	**1.4**	**0.0**	**0.0**	**10.15**	**20.50**	**34.50**	**29.32**		
Min	**0.1**	**0.1**	**0.1**	**0.5**	**2.0**	**2.0**	**0.0**	**0.0**	**15.3**	**17.3**	**0.0**	**0.0**	**0.8**	**0.9**	**0.0**	**0.0**	**4.31**	**1.35**	**33.62**	**24.15**		
GSV (l/hr)	**0.0013**		**0.0476**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry	X	Moist		Wet		Snow	
Wind:	Calm	X	Light		Moderate		Strong	
Cloud cover:	None		Slight		Cloudy		Overcast	X
Preciptation:	None	X	Slight		Moderate		Heavy	
Barometric pressure (mbar):			Before	1017			After	1017
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before	14			After	14

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 12/07/2019
Job No: MAN.260.001
Visit No: 3 **of** 6
Operator: NB
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	ND	ND	0.2	ND	1.0	1.0	ND	ND	20.0	20.0	ND	ND	0.9	0.9	ND	ND	9.35	20.05	33.72	24.37	ND	
BH2	ND	ND	ND	ND	33.0	33.0	ND	ND	20.8	20.8	ND	ND	0.6	0.6	ND	ND	9.03	20.12	33.62	24.59	ND	Install damaged.
BH3	ND	ND	ND	ND	2.0	2.0	ND	ND	20.6	20.6	ND	ND	0.5	0.5	ND	ND	9.25	20.50	33.63	24.38	ND	Install damaged.
BH4	0.1	0.1	2.5	2.1	4.0	4.0	ND	ND	17.1	17.1	ND	ND	0.5	0.5	ND	ND	10.01	11.73	34.50	24.49	ND	
BH5	ND	ND	0.6	0.6	1.0	1.0	ND	ND	18.7	18.7	ND	ND	1.3	1.2	ND	ND	9.44	15.10	34.09	24.65	ND	
BH6	ND	ND	1.2	1.2	4.0	4.0	ND	ND	19.7	19.7	ND	ND	1.1	1.0	ND	ND	4.85	7.25	33.96	29.11	ND	
WS1	ND	ND	1.0	1.0	4.0	4.0	ND	ND	18.9	18.9	ND	ND	0.7	0.7	ND	ND	Dry	4.41	33.63	N/A	ND	
WS2	16	16	2.3	2.1	ND	ND	ND	ND	18.1	18.1	ND	ND	0.8	0.8	ND	ND	Dry	3.10	34.04	N/A	ND	
WS3	0.1	0.1	1.5	1.5	2.0	2.0	ND	ND	19.3	19.3	ND	ND	0.5	0.4	ND	ND	Dry	2.06	34.45	N/A	ND	
WS4A	ND	ND	0.7	0.7	1.0	1.0	ND	ND	20.0	20.0	ND	ND	1.2	1.2	ND	ND	Dry	4.58	33.71	N/A	ND	
WS5	ND	ND	2.3	2.3	ND	ND	ND	ND	17.3	17.3	ND	ND	1.0	0.9	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	ND	ND	2.5	2.3	1.0	1.0	ND	ND	15.3	15.3	ND	ND	0.8	0.8	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**16.0**	**16.0**	**2.5**	**2.3**	**33.0**	**33.0**	**0.0**	**0.0**	**20.8**	**20.8**	**0.0**	**0.0**	**1.3**	**1.2**	**0.0**	**0.0**	**10.01**	**20.5**	**34.5**	**29.11**		
Min	**0.1**	**0.1**	**0.2**	**0.6**	**1.0**	**1.0**	**0.0**	**0.0**	**15.3**	**15.3**	**0.0**	**0.0**	**0.5**	**0.4**	**0.0**	**0.0**	**4.85**	**1.35**	**33.62**	**24.37**		
GSV (l/hr)	**0.208**		**0.0276**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry		Moist		Wet	X	Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight		Cloudy	X	Overcast	X
Preciptation:	None		Slight		Moderate	X	Heavy	
Barometric pressure (mbar):			Before	1011			After	1011
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before	18			After	20

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 16/07/2019
Job No: MAN.260.001
Visit No: 4 **of** 6
Operator: NB
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	0.8	ND	ND	ND	1.0	ND	ND	ND	20.2	20.2	ND	ND	0.3	0.3	ND	ND	9.22	20.05	33.72	24.5	ND	
BH2	0.1	ND	0.1	0.1	125.0	125.0	ND	ND	20.0	20.0	ND	ND	1.8	1.7	ND	ND	8.89	20.12	33.62	24.73	ND	
BH3	0.1	ND	ND	ND	1.0	1.0	ND	ND	20.6	20.6	ND	ND	0.4	0.4	ND	ND	9.26	20.50	33.63	24.37	ND	
BH4	0.1	0.1	2.4	2.4	8.0	8.0	ND	ND	16.1	16.1	ND	ND	0.4	0.4	ND	ND	10.15	11.73	34.50	24.35	ND	
BH5	0.8	0.8	1.4	1.4	4.0	3.0	ND	ND	16.5	16.5	ND	ND	0.9	0.8	ND	ND	9.93	15.10	34.09	24.16	ND	
BH6	ND	ND	3.1	3.1	1.0	1.0	ND	ND	17.4	17.4	ND	ND	0.4	0.3	ND	ND	4.82	7.25	33.96	29.14	ND	
WS1	0.1	ND	0.9	0.8	4.0	1.0	ND	ND	18.7	18.7	ND	ND	0.2	0.2	ND	ND	Dry	4.41	33.63	N/A	ND	
WS2	0.8	ND	3.0	2.8	ND	ND	ND	ND	16.5	16.5	ND	ND	0.5	0.5	ND	ND	Dry	3.10	34.04	N/A	ND	
WS3	0.1	0.1	1.7	1.7	2.0	1.0	ND	ND	19.0	19.0	ND	ND	0.6	0.6	ND	ND	Dry	2.06	34.45	N/A	ND	
WS4A																						Car parked over position >2 hours.
WS5	ND	ND	3.1	3.1	1.0	1.0	ND	ND	16.5	16.5	ND	ND	0.3	0.3	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	0.1	ND	2.5	2.4	2.0	ND	ND	ND	15.3	15.3	ND	ND	ND	ND	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**0.8**	**0.8**	**3.1**	**3.1**	**125.0**	**125.0**	**0.0**	**0.0**	**20.6**	**20.6**	**0.0**	**0.0**	**1.8**	**1.7**	**0.0**	**0.0**	**10.15**	**20.5**	**34.5**	**29.14**		
Min	**0.1**	**0.1**	**0.1**	**0.1**	**1.0**	**1.0**	**0.0**	**0.0**	**15.3**	**15.3**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**4.82**	**1.35**	**33.62**	**24.16**		
GSV (l/hr)	**0.0144**		**0.0527**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry	X	Moist		Wet		Snow	
Wind:	Calm	X	Light		Moderate		Strong	
Cloud cover:	None		Slight	X	Cloudy		Overcast	
Preciptation:	None	X	Slight		Moderate		Heavy	
Barometric pressure (mbar):			Before	1015			After	1015
Pressure trend:			Falling	X	Steady		Rising	
Air Temperature (Deg. C):			Before	23			After	23

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 25/07/2019
Job No: MAN.260.001
Visit No: 5 **of** 6
Operator: NR
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	0.2	ND	0.3	0.1	3.0	2.0	ND	ND	20.8	20.8	ND	ND	0.8	0.4	ND	ND	9.20	20.05	33.72	24.52	ND	
BH2	0.1	0.1	0.2	0.2	32.0	20.0	ND	ND	19.7	19.7	ND	ND	1.8	1.2	ND	ND	9.00	20.12	33.62	24.62	ND	
BH3	0.1	0.1	0.4	0.2	10.0	9.0	ND	ND	18.0	18.2	ND	ND	0.3	0.3	ND	ND	9.22	20.50	33.63	24.41	ND	
BH4	0.1	ND	0.3	0.2	7.0	7.0	ND	ND	15.1	15.1	ND	ND	0.7	0.4	ND	ND	10.14	11.73	34.50	24.36	ND	
BH5	4.0	3.3	2.5	2.4	4.0	3.0	ND	ND	9.0	9.0	ND	ND	0.8	0.2	ND	ND	9.58	15.10	34.09	24.51	ND	
BH6																						Access unavailable.
WS1	0.1	0.1	1.0	1.0	2.0	1.0	ND	ND	18.6	18.6	ND	ND	0.3	0.2	ND	ND	Dry	4.41	33.63	N/A	ND	
WS2	ND	ND	5.4	5.4	3.0	1.0	ND	ND	10.3	10.8	ND	ND	0.5	0.4	ND	ND	Dry	3.10	34.04	N/A	ND	
WS3	ND	ND	ND	ND	1.0	1.0	ND	ND	20.5	20.5	ND	ND	0.5	0.1	ND	ND	Dry	2.06	34.45	N/A	ND	
WS4A	ND	ND	2.8	2.6	2.0	1.0	ND	ND	17.0	17.3	ND	ND	0.4	0.2	ND	ND	Dry	4.58	33.71	N/A	ND	
WS5	ND	ND	3.2	3.2	3.0	1.0	ND	ND	16.0	16.0	ND	ND	0.2	0.1	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	0.1	0.1	3.2	3.2	3.0	3.0	ND	ND	12.8	13.4	ND	ND	0.2	0.1	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**4.0**	**3.3**	**5.4**	**5.4**	**32.0**	**20.0**	**0.0**	**0.0**	**20.8**	**20.8**	**0.0**	**0.0**	**1.8**	**1.2**	**0.0**	**0.0**	**10.14**	**20.5**	**34.5**	**24.62**		
Min	**0.1**	**0.1**	**0.2**	**0.1**	**1.0**	**1.0**	**0.0**	**0.0**	**9.0**	**9.0**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**	**0.0**	**9**	**1.35**	**33.62**	**24.36**		
GSV (l/hr)	**0.072**		**0.0648**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry	X	Moist		Wet		Snow	
Wind:	Calm	X	Light		Moderate		Strong	
Cloud cover:	None	X	Slight		Cloudy		Overcast	
Preciptation:	None	X	Slight		Moderate		Heavy	
Barometric pressure (mbar):			Before	1007			After	1007
Pressure trend:			Falling		Steady	X	Rising	
Air Temperature (Deg. C):			Before	24			After	25

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 30/07/2019
Job No: MAN.260.001
Visit No: 6 **of** 6
Operator: NR
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1	ND	ND	0.3	0.1	20.0	12.0	ND	ND	20.0	20.1	ND	ND	0.9	0.6	ND	ND	9.14	20.05	33.72	24.58	ND	
BH2	ND	ND	0.2	0.2	14.0	5.0	ND	ND	19.7	20.2	ND	ND	0.5	0.4	ND	ND	8.92	20.12	33.62	24.7	ND	
BH3	0.2	0.1	0.3	0.2	3.0	8.0	ND	ND	18.3	18.4	ND	ND	0.7	0.4	ND	ND	9.15	20.50	33.63	24.48	ND	
BH4	ND	ND	3.6	3.2	7.0	5.0	ND	ND	16.1	16.1	ND	ND	0.8	0.7	ND	ND	10.1	11.73	34.50	24.4	ND	
BH5	3.1	2.1	1.9	1.9	4.0	3.0	ND	ND	9.9	10.1	ND	ND	0.4	0.2	ND	ND	9.55	15.10	34.09	24.54	ND	
BH6	0.1	ND	2.5	2.0	5.0	5.0	ND	ND	18.9	19.9	ND	ND	0.5	0.3	ND	ND	4.80	7.25	33.96	29.16	ND	
WS1	0.2	ND	1.1	1.1	ND	ND	ND	ND	19.0	19.0	ND	ND	0.2	0.1	ND	ND	Dry	4.41	33.63	N/A	ND	
WS2	0.1	ND	0.8	0.8	ND	ND	ND	ND	20.2	20.2	ND	ND	0.5	0.4	ND	ND	Dry	3.10	34.04	N/A	ND	
WS3	ND	ND	2.1	1.6	ND	ND	ND	ND	20.0	20.1	ND	ND	0.7	0.5	ND	ND	Dry	2.06	34.45	N/A	ND	
WS4A	0.2	ND	1.5	0.9	3.0	1.0	ND	ND	19.6	19.9	ND	ND	0.7	0.4	ND	ND	Dry	4.58	33.71	N/A	ND	
WS5	ND	ND	3.1	2.5	ND	ND	ND	ND	17.1	17.1	ND	ND	0.3	0.1	ND	ND	Dry	4.93	34.12	N/A	ND	
WS6A	ND	ND	2.3	2.3	5.0	2.0	ND	ND	16.1	16.2	ND	ND	0.5	0.1	ND	ND	Dry	1.35	34.04	N/A	ND	
Max	**3.1**	**2.1**	**3.6**	**3.2**	**20.0**	**12.0**	**0.0**	**0.0**	**20.2**	**20.2**	**0.0**	**0.0**	**0.9**	**0.7**	**0.0**	**0.0**	**10.1**	**20.5**	**34.5**	**29.16**		
Min	**0.1**	**0.1**	**0.2**	**0.1**	**3.0**	**1.0**	**0.0**	**0.0**	**9.9**	**10.1**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**	**0.0**	**4.8**	**1.35**	**33.62**	**24.40**		
GSV (l/hr)	**0.0279**		**0.0224**																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry		Moist		Wet	X	Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight		Cloudy		Overcast	X
Preciptation:	None		Slight	X	Moderate		Heavy	
Barometric pressure (mbar):			Before	1005			After	1005
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before	20			After	21

Appendix 6 – Geotechnical Laboratory Results

LABORATORY REPORT

4043

Contract Number: PSL19/3802

Report Date: 03 July 2019

Client's Reference: 63524

Client Name: Geocore Site Investigations Ltd
Tralee Close
Kirkleatham Business Park
Redcar
Cleveland
TS10 5SG

For the attention of: Eddie Lodge

Contract Title: Premier Inn Deansgate

Date Received: 21/6/2019
Date Commenced: 21/6/2019
Date Completed: 3/7/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

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

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH01	6	B	1.20		Brown gravelly silty SAND.
BH01	9	D	2.00		Brown gravelly silty SAND.
BH01	15	U	5.00		Stiff brown gravelly very sandy CLAY.
BH01	20	D	8.00		Brown gravelly very sandy CLAY.
BH01	22	D	9.50		Reddish brown very gravelly silty SAND.
BH02	6	B	1.20		Brown very gravelly silty SAND.
BH02	8	D	2.70		Brown very gravelly silty SAND.
BH02	12	U	5.00		Very stiff brown gravelly very sandy CLAY.
BH02	15	D	7.00		Brown very sandy CLAY.
BH03	3	B	0.50		Brown very sandy silty GRAVEL.
BH03	5	D	1.20		Brown very gravelly silty SAND.
BH03	16	D	6.00		Brown slightly gravelly sandy CLAY.
BH03	20	D	9.00		Brown slightly gravelly sandy CLAY.
BH04	5	B	1.20		MADE GROUND brown clayey silty sand & gravel.
BH04	12	B	3.00		Brown very gravelly silty SAND.
BH04	19	D	6.00		Brown slightly gravelly sandy CLAY.
BH04	24	D	8.50		Brown slightly gravelly sandy CLAY.
BH04	27	B	9.50		Reddish brown very sandy slightly silty GRAVEL with many cobbles.
BH05	8	D	2.00		Brown very gravelly silty SAND.

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH05	11	B	3.00		Brown very sandy silty GRAVEL.
BH05	15	D	6.00		Brown gravelly very sandy CLAY.
BH06	4	B	0.50		MADE GROWN brown very gravelly very sandy clay.
BH06	13	B	3.00		Brown very gravelly silty SAND.
BH06	22	D	6.00		Brown slightly gravelly very sandy CLAY.
BH06	24	B	7.50		Reddish brown slightly gravelly clayey very silty SAND.
WS01	3	B	0.50		MADE GROUND brown very sandy silty gravel.
WS01	6	B	1.20		Brown very sandy silty GRAVEL.
WS01	8	B	2.20		Brown very sandy silty GRAVEL.
WS02	3	B	0.70		Brown slightly gravelly very sandy CLAY.
WS02	7	B	2.00		Brown slightly gravelly sandy CLAY.
WS03	3	B	0.50		MADE GROUND brown very sandy clayey silty gravel with cobbles.
WS03	6	B	1.50		Brown gravelly silty SAND.
WS04A	4	B	1.20		Brown very sandy slightly clayey silty GRAVEL.
WS04A	6	B	2.20		Brown very sandy slightly silty GRAVEL.
WS05	4	B	0.50		Brown very sandy slightly silty GRAVEL.
WS05	8	B	2.00		Brown very gravelly silty SAND.
WS06	3	B	0.60		MADE GROUND brown very sandy slightly clayey silty gravel with cobbles.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH01	9	D	2.00		4.4							
BH01	15	U	5.00		12			31	16	15	77	Low plasticity CL.
BH01	20	D	8.00		19			34	17	17	81	Low plasticity CL.
BH01	22	D	9.50		15							
BH02	8	D	2.70		7.5							
BH02	12	U	5.00		12			33	17	16	81	Low plasticity CL.
BH02	15	D	7.00		13			35	18	17	100	Intermediate plasticity CI.
BH03	5	D	1.20		6.1							
BH03	16	D	6.00		11			39	19	20	94	Intermediate plasticity CI.
BH03	20	D	9.00		12			37	18	19	90	Intermediate plasticity CI.
BH04	19	D	6.00		12			38	19	19	91	Intermediate plasticity CI.
BH04	24	D	8.50		13			40	21	19	94	Intermediate plasticity CI.
BH05	8	D	2.00		7.8							
BH05	15	D	6.00		7.6			32	16	16	81	Low plasticity CL.
BH06	4	B	0.50		9.8							
BH06	13	B	3.00		4.1							
BH06	22	D	6.00		12			35	17	18	85	Intermediate plasticity CI.
BH06	24	B	7.50		9.1							
WS01	3	B	0.50		16							

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

UKAS TESTING 4043

PSL Professional Soils Laboratory

Premier Inn Deansgate

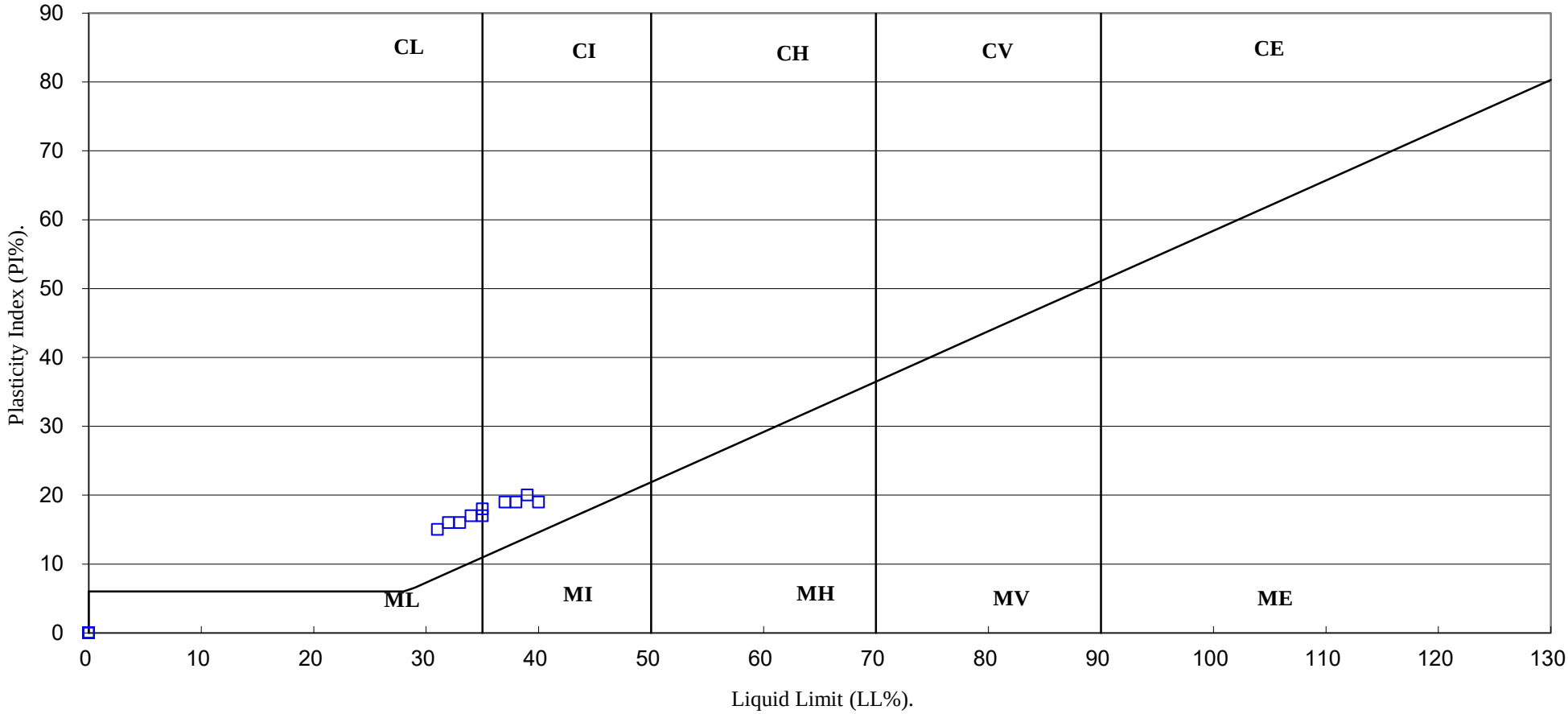
Contract No:

PSL19/3802

Client Ref:

63524

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:**
			PSL19/3802
			Client Ref:
			63524

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS01	6	B	1.20		12							
WS01	8	B	2.20		12							
WS02	3	B	0.70		16							
WS02	7	B	2.00		21							
WS03	3	B	0.50		12							
WS03	6	B	1.50		6.1							
WS04A	4	B	1.20		12							
WS04A	6	B	2.20		8.8							
WS05	4	B	0.50		9.4							
WS05	8	B	2.00		7.0							
WS06	3	B	0.60		13							

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

UKAS TESTING 4043

PSL Professional Soils Laboratory

Premier Inn Deansgate

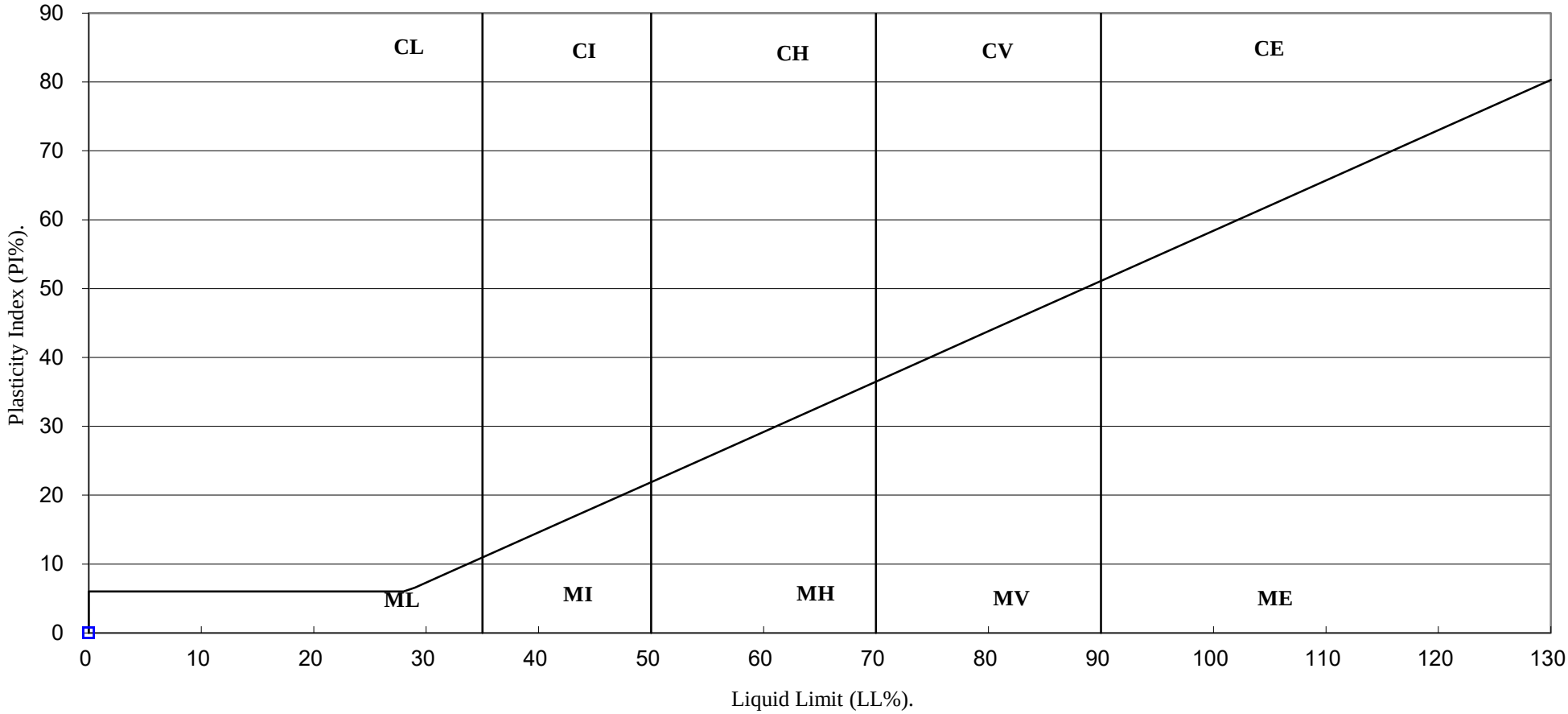
Contract No:

PSL19/3802

Client Ref:

63524

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:**
			PSL19/3802
			Client Ref:
			63524

PARTICLE SIZE DISTRIBUTION TEST

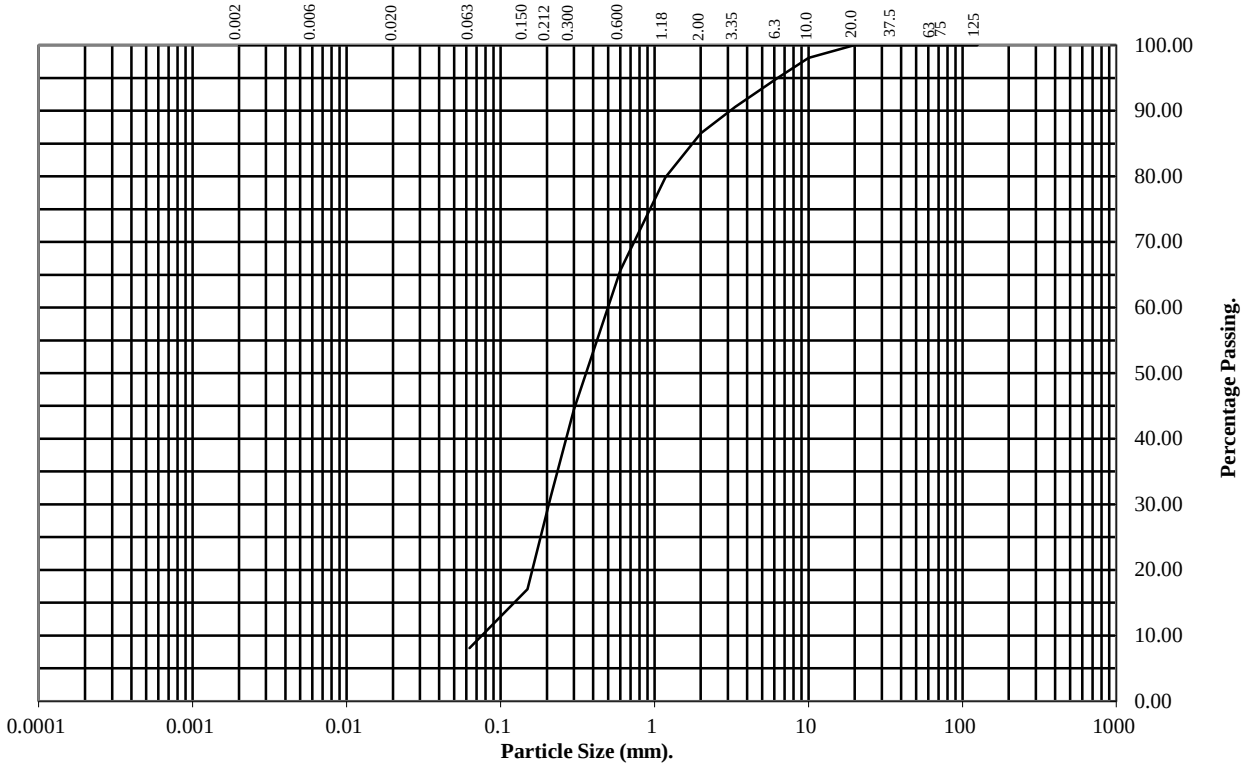
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH01** **Top Depth (m):** **1.20**

Sample Number: **6** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	95
3.35	91
2	87
1.18	80
0.6	66
0.3	44
0.212	31
0.15	17
0.063	8

Soil Fraction	Total Percentage
Cobbles	0
Gravel	13
Sand	79
Silt/Clay	8

Remarks:

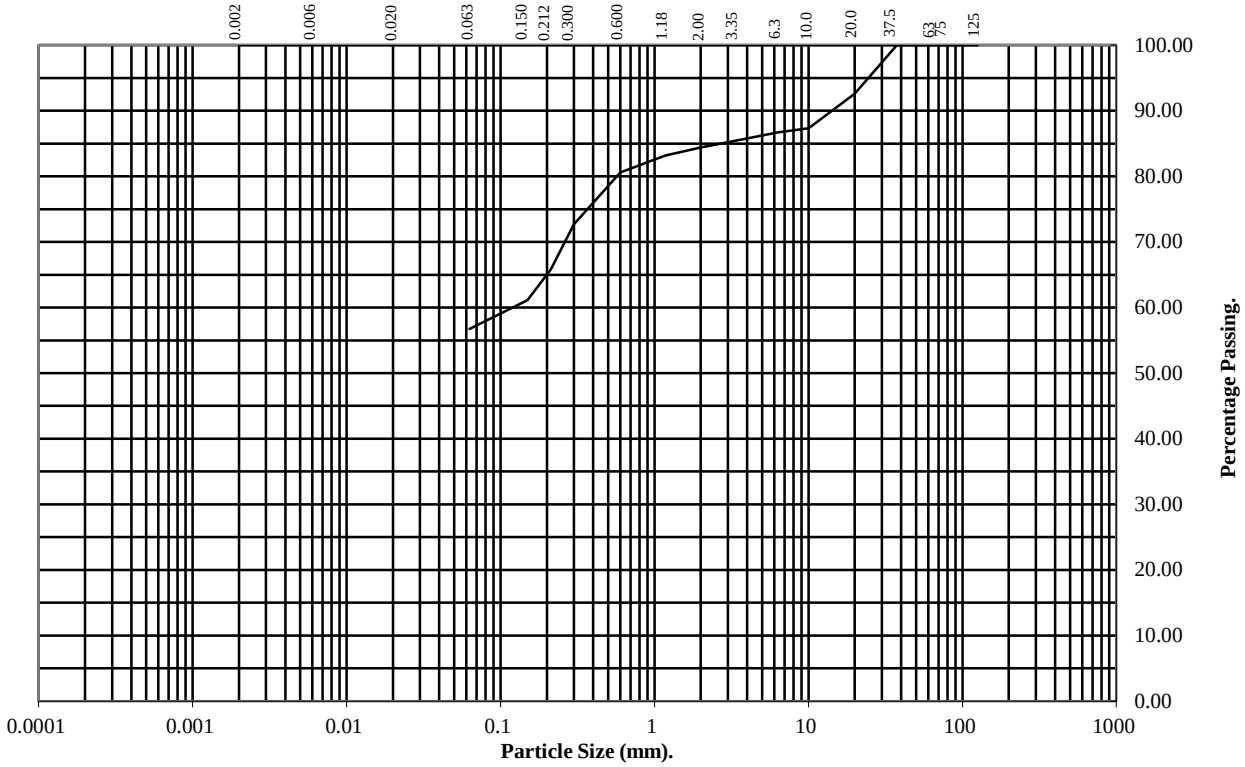
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**BH01**	**Top Depth (m):**	**5.00**
Sample Number:	**15**	**Base Depth(m):**	
Sample Type:	**U**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	87
6.3	87
3.35	85
2	84
1.18	83
0.6	81
0.3	73
0.212	66
0.15	61
0.063	57

Soil Fraction	Total Percentage
Cobbles	0
Gravel	16
Sand	27
Silt/Clay	57

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

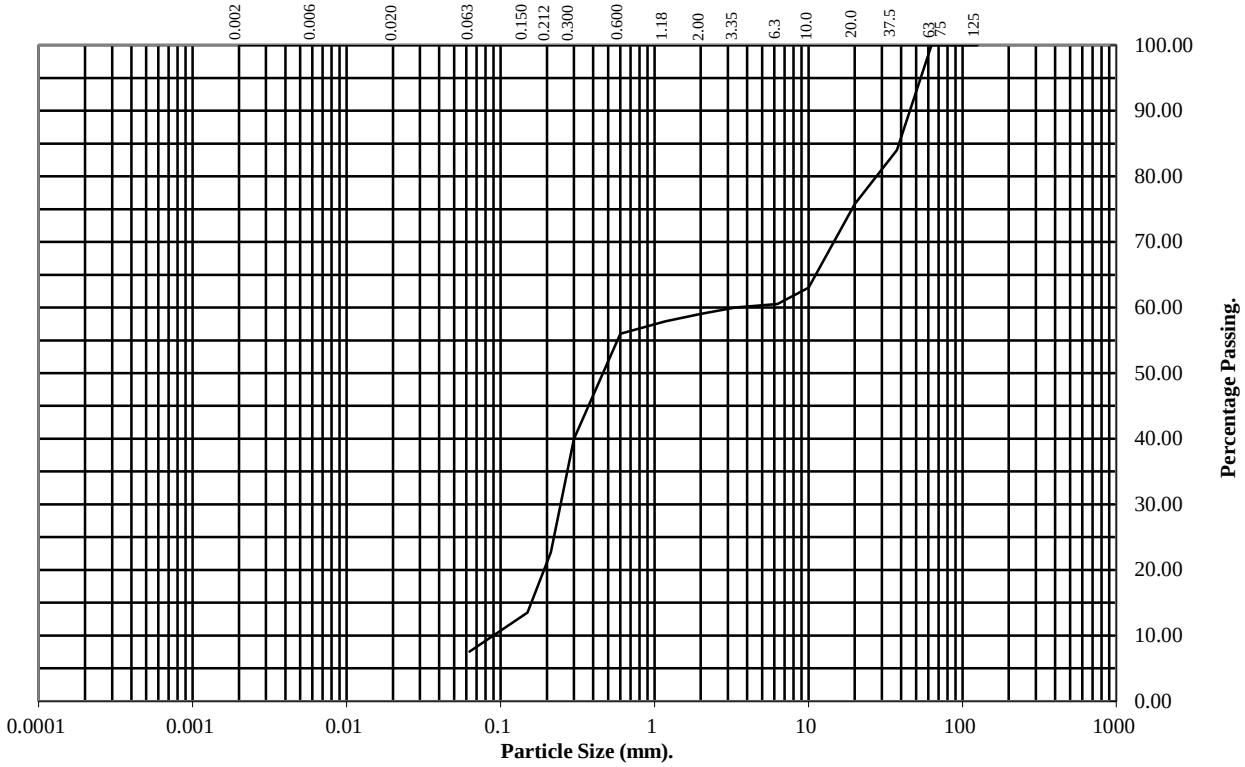
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH01** **Top Depth (m):** **9.50**

Sample Number: **22** **Base Depth(m):**

Sample Type: **D**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	84
20	76
10	63
6.3	61
3.35	60
2	59
1.18	58
0.6	56
0.3	40
0.212	23
0.15	14
0.063	8

Soil Fraction	Total Percentage
Cobbles	0
Gravel	41
Sand	51
Silt/Clay	8

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

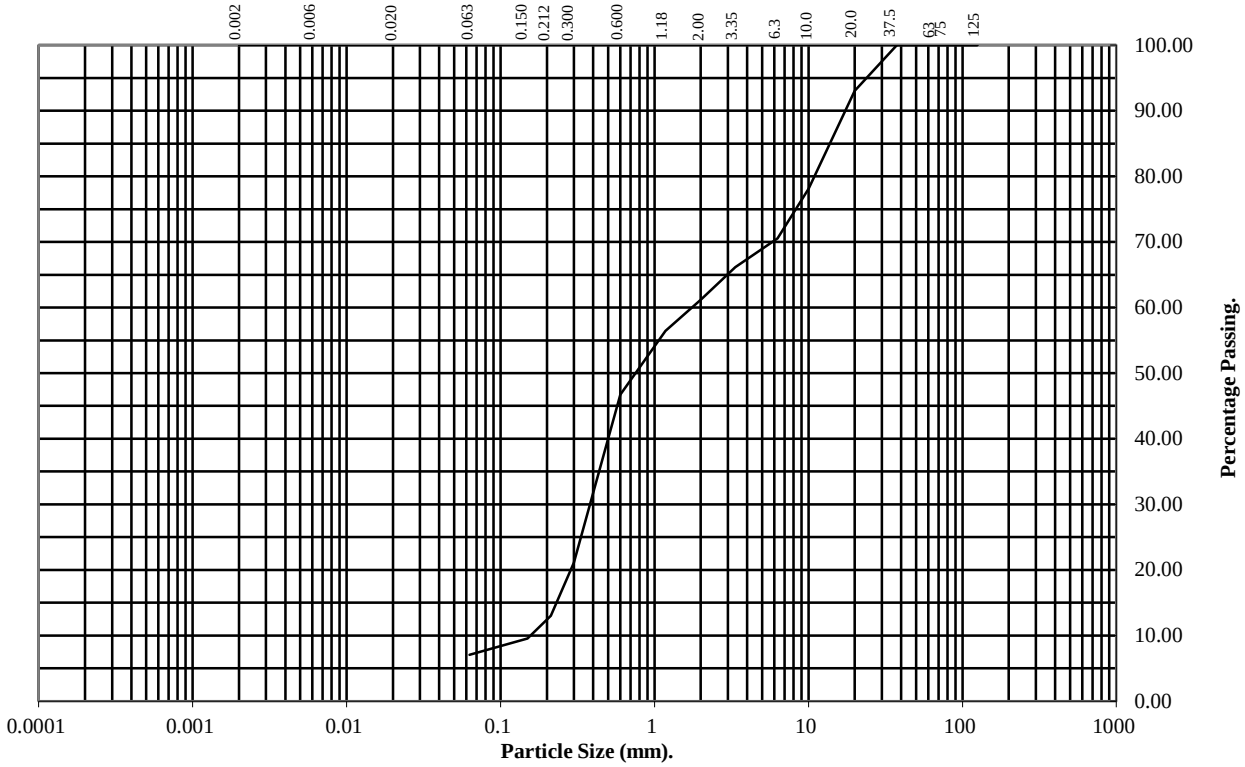
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH02** **Top Depth (m):** **1.20**

Sample Number: **6** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	78
6.3	71
3.35	66
2	61
1.18	56
0.6	47
0.3	21
0.212	13
0.15	10
0.063	7

Soil Fraction	Total Percentage
Cobbles	0
Gravel	39
Sand	54
Silt/Clay	7

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

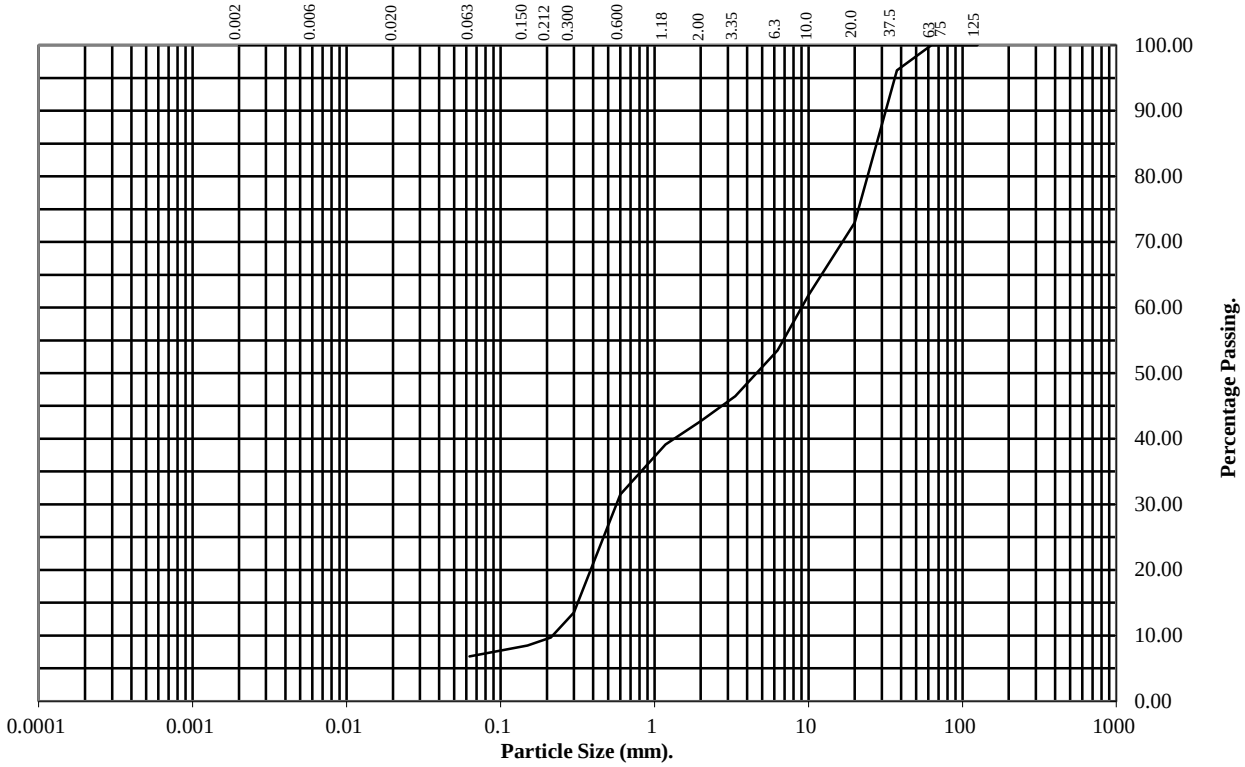
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH03** **Top Depth (m):** **0.50**

Sample Number: **3** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	96
20	73
10	62
6.3	53
3.35	46
2	43
1.18	39
0.6	32
0.3	14
0.212	10
0.15	8
0.063	7

Soil Fraction	Total Percentage
Cobbles	0
Gravel	57
Sand	36
Silt/Clay	7

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:** PSL19/3802 **Client Ref:** 63524

PARTICLE SIZE DISTRIBUTION TEST

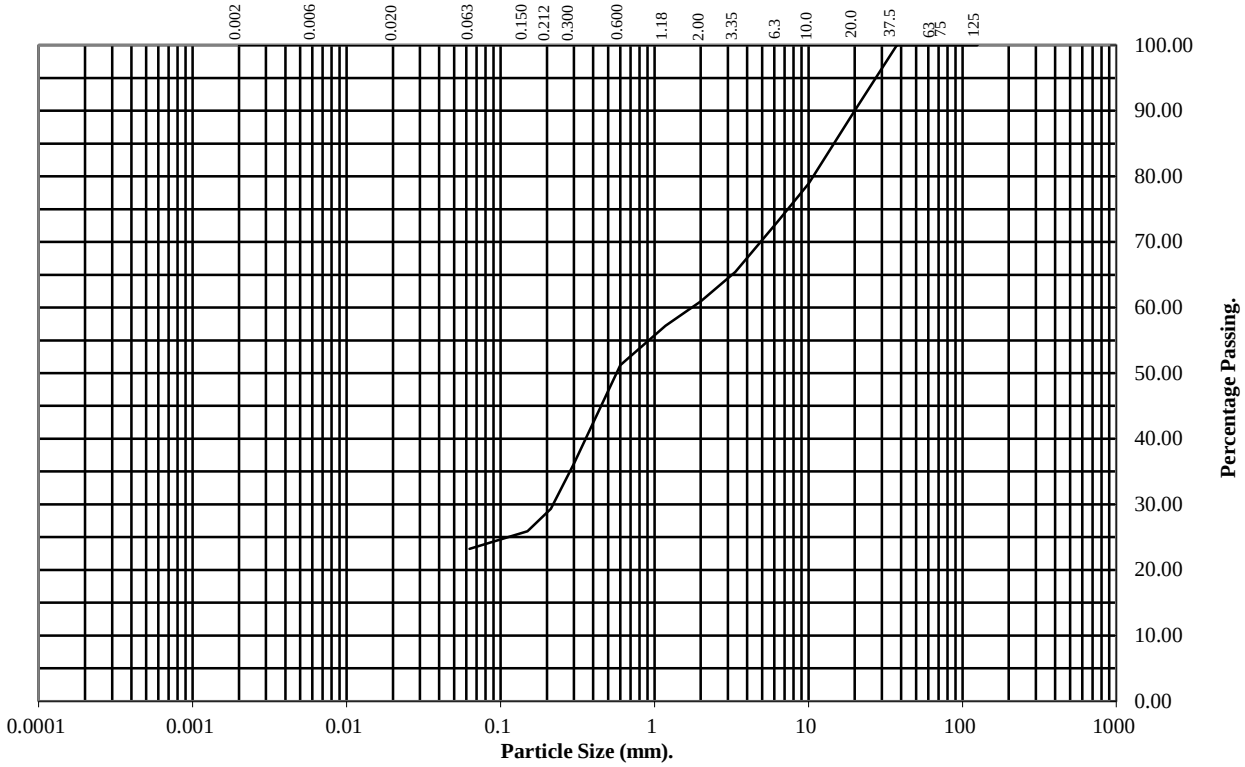
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH04** **Top Depth (m):** **1.20**

Sample Number: **5** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	90
10	79
6.3	73
3.35	65
2	61
1.18	57
0.6	51
0.3	36
0.212	29
0.15	26
0.063	23

Soil Fraction	Total Percentage
Cobbles	0
Gravel	39
Sand	38
Silt/Clay	23

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

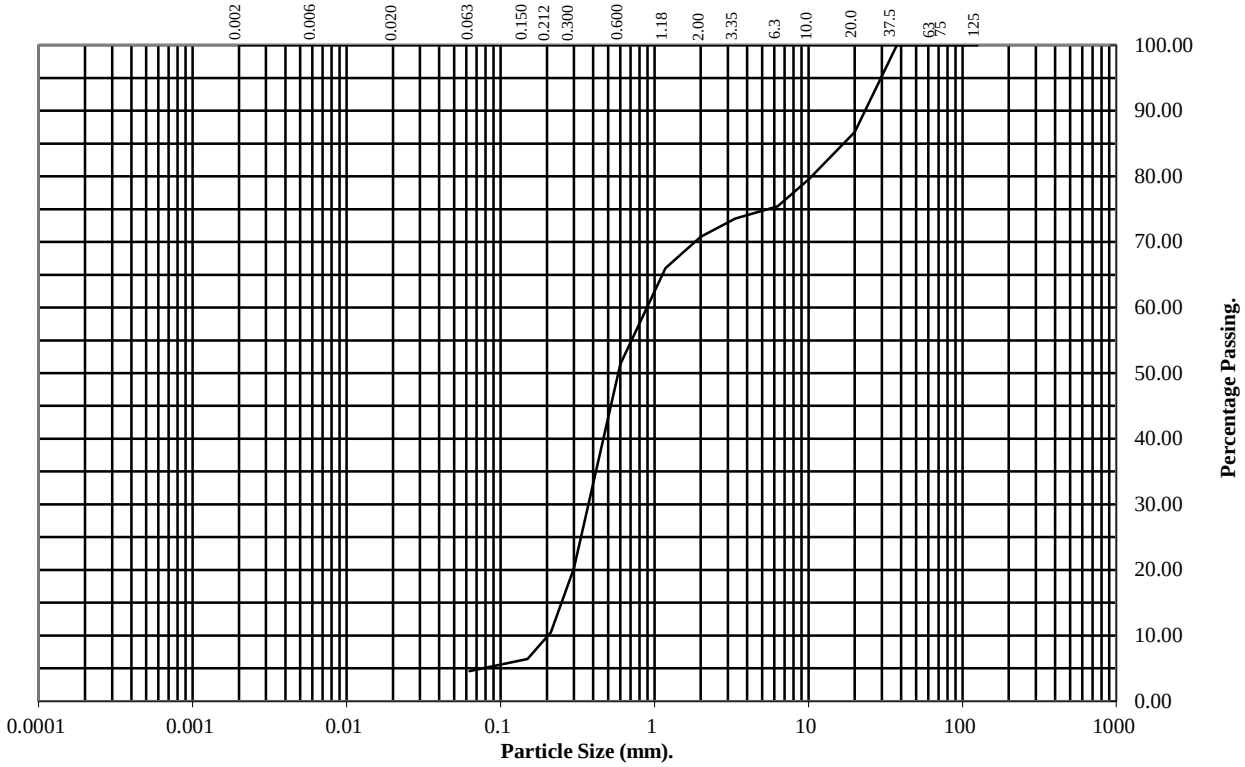
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH04** **Top Depth (m):** **3.00**

Sample Number: **12** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	87
10	80
6.3	75
3.35	74
2	71
1.18	66
0.6	51
0.3	20
0.212	10
0.15	6
0.063	5

Soil Fraction	Total Percentage
Cobbles	0
Gravel	29
Sand	66
Silt/Clay	5

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

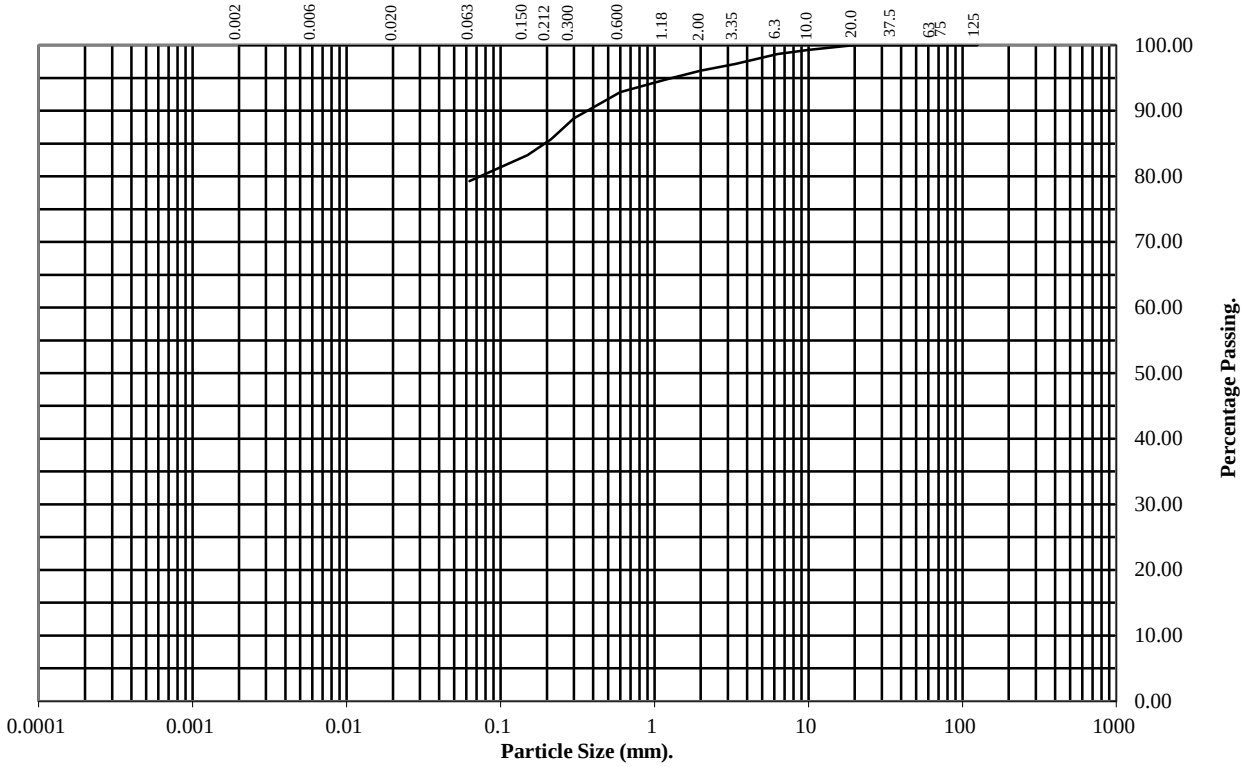
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH04** **Top Depth (m):** **6.00**

Sample Number: **19** **Base Depth(m):**

Sample Type: **D**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	99
3.35	97
2	96
1.18	95
0.6	93
0.3	89
0.212	86
0.15	83
0.063	79

Soil Fraction	Total Percentage
Cobbles	0
Gravel	4
Sand	17
Silt/Clay	79

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

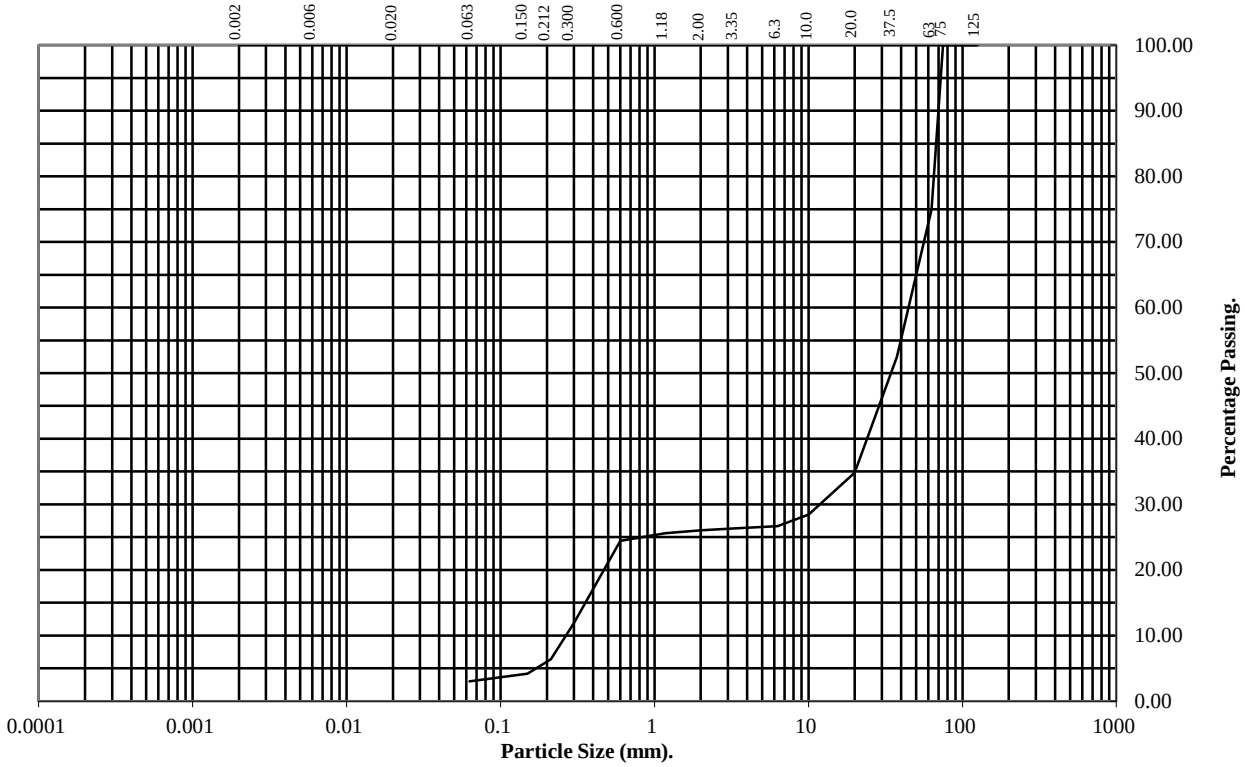
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH04** **Top Depth (m):** **9.50**

Sample Number: **27** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	75
37.5	53
20	35
10	28
6.3	27
3.35	26
2	26
1.18	26
0.6	24
0.3	12
0.212	6
0.15	4
0.063	3

Soil Fraction	Total Percentage
Cobbles	25
Gravel	49
Sand	23
Silt/Clay	3

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

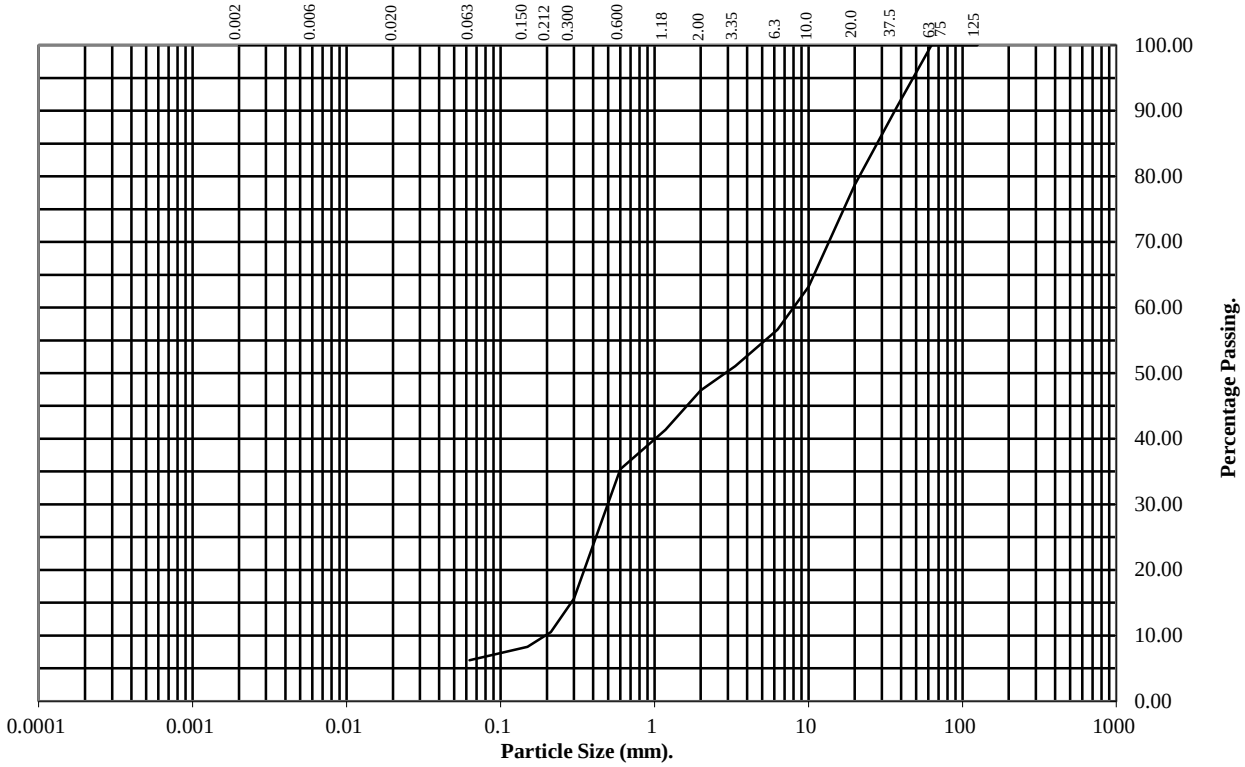
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH05** **Top Depth (m):** **3.00**

Sample Number: **11** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	91
20	79
10	63
6.3	57
3.35	51
2	47
1.18	41
0.6	35
0.3	16
0.212	11
0.15	8
0.063	6

Soil Fraction	Total Percentage
Cobbles	0
Gravel	53
Sand	41
Silt/Clay	6

Remarks:

See Summary of Soil Descriptions

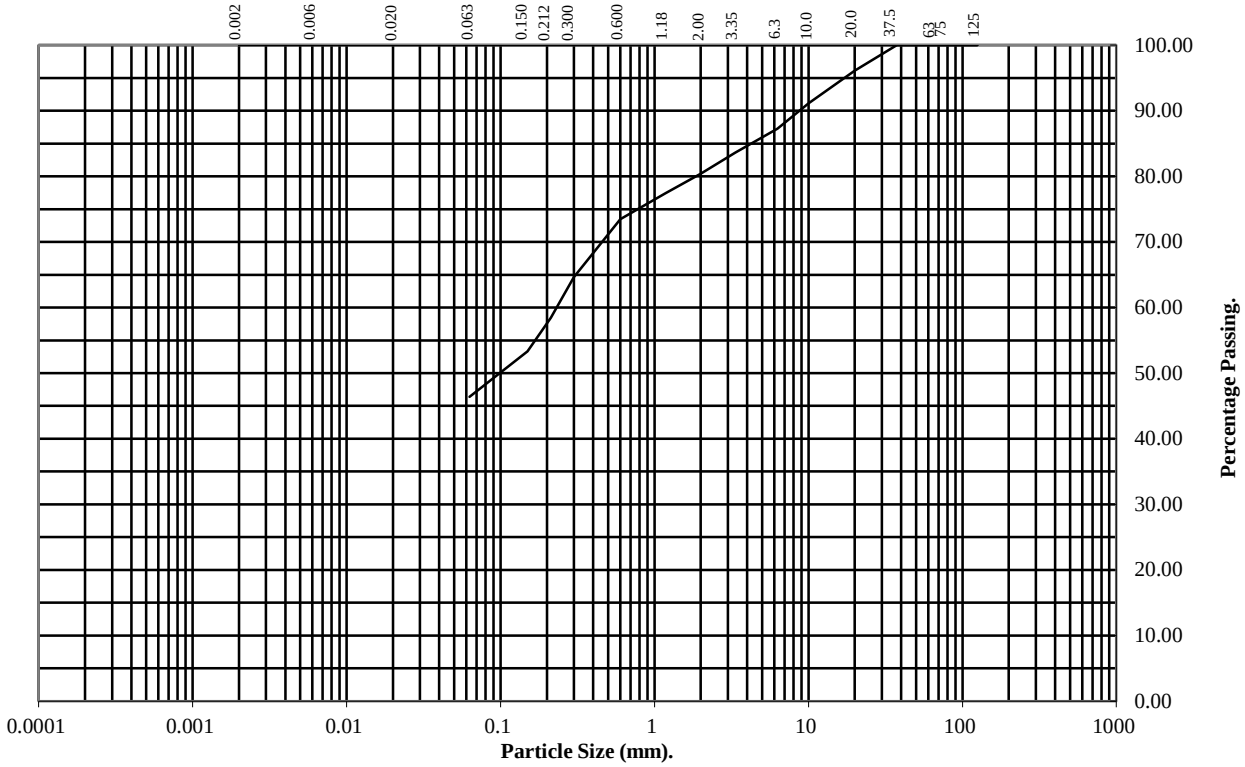
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:** **PSL19/3802** **Client Ref:** **63524**

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**BH06**	**Top Depth (m):**	**0.50**
Sample Number:	**4**	**Base Depth(m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	96
10	91
6.3	87
3.35	84
2	80
1.18	77
0.6	73
0.3	65
0.212	58
0.15	53
0.063	46

Soil Fraction	Total Percentage
Cobbles	0
Gravel	20
Sand	34
Silt/Clay	46

Remarks:

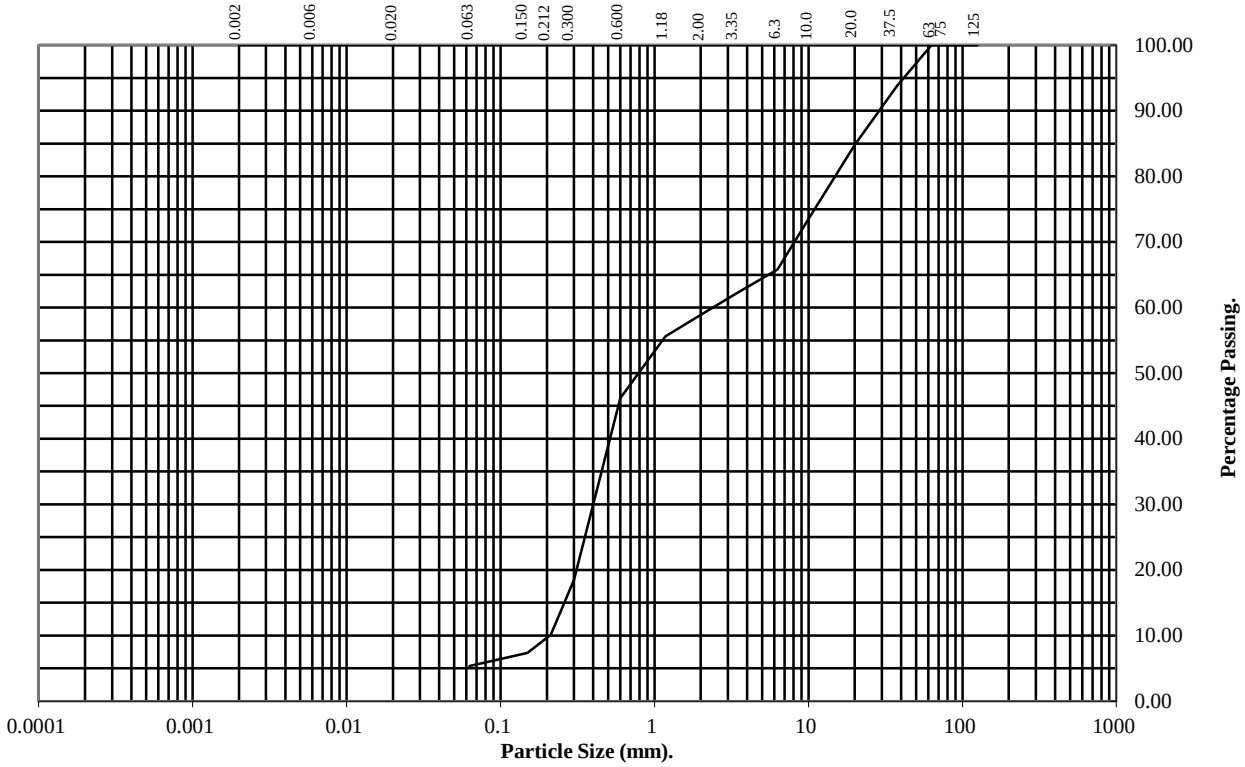
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**BH06**	**Top Depth (m):**	**3.00**
Sample Number:	**13**	**Base Depth(m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	94
20	85
10	74
6.3	66
3.35	62
2	59
1.18	56
0.6	46
0.3	18
0.212	10
0.15	7
0.063	5

Soil Fraction	Total Percentage
Cobbles	0
Gravel	41
Sand	54
Silt/Clay	5

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

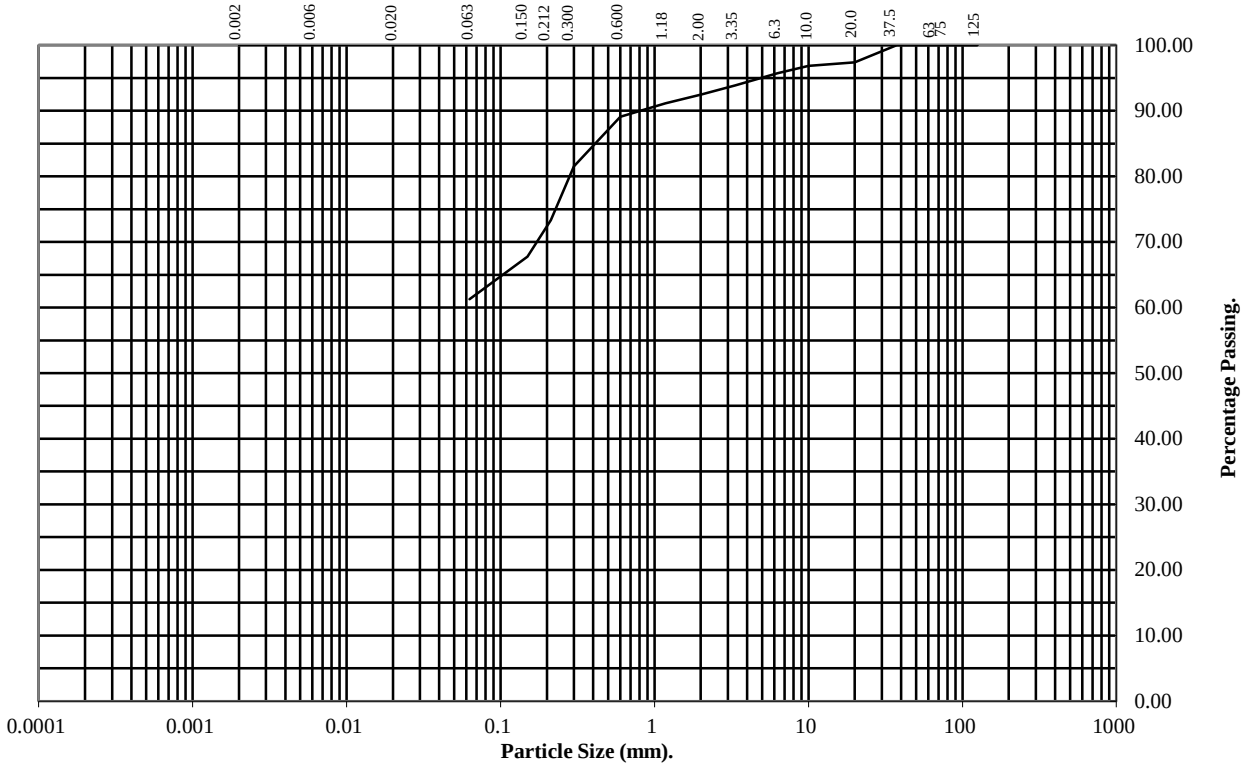
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH06** **Top Depth (m):** **6.00**

Sample Number: **22** **Base Depth(m):**

Sample Type: **D**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	97
10	97
6.3	96
3.35	94
2	92
1.18	91
0.6	89
0.3	82
0.212	73
0.15	68
0.063	61

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	31
Silt/Clay	61

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

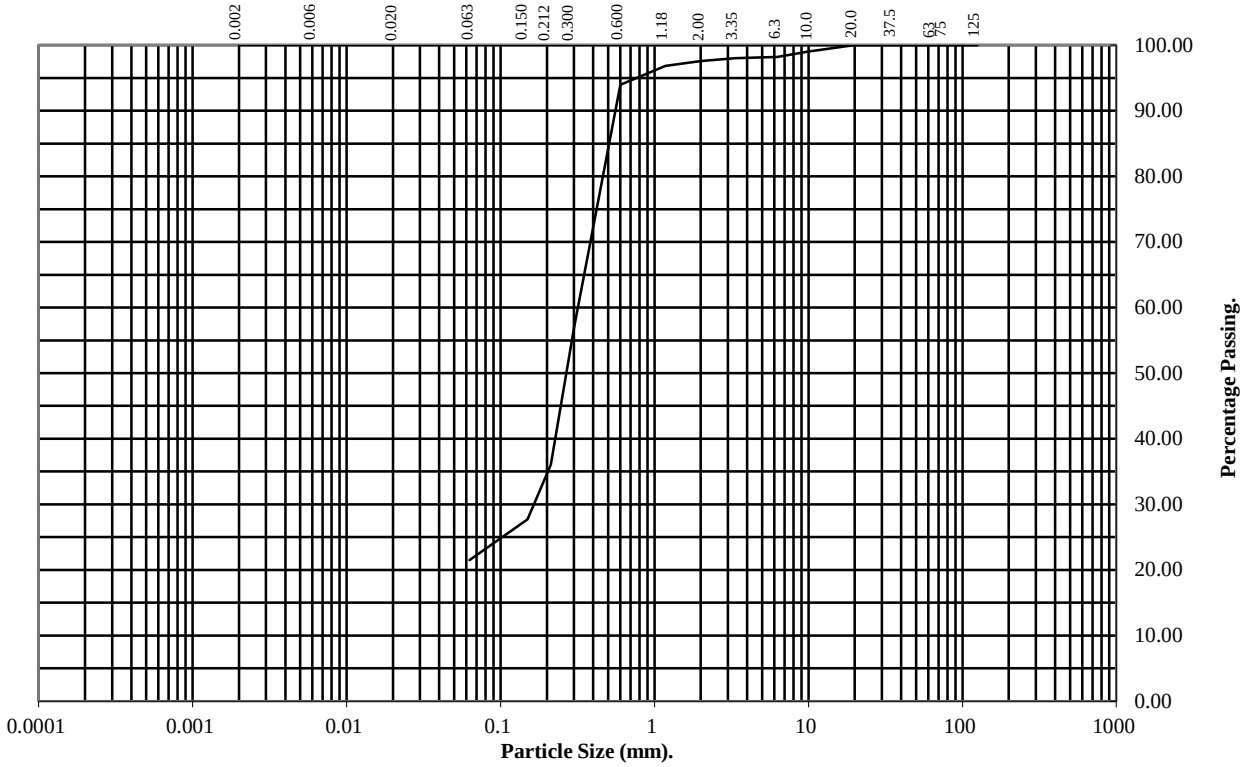
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH06** **Top Depth (m):** **7.50**

Sample Number: **24** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	98
3.35	98
2	98
1.18	97
0.6	94
0.3	57
0.212	36
0.15	28
0.063	22

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	76
Silt/Clay	22

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

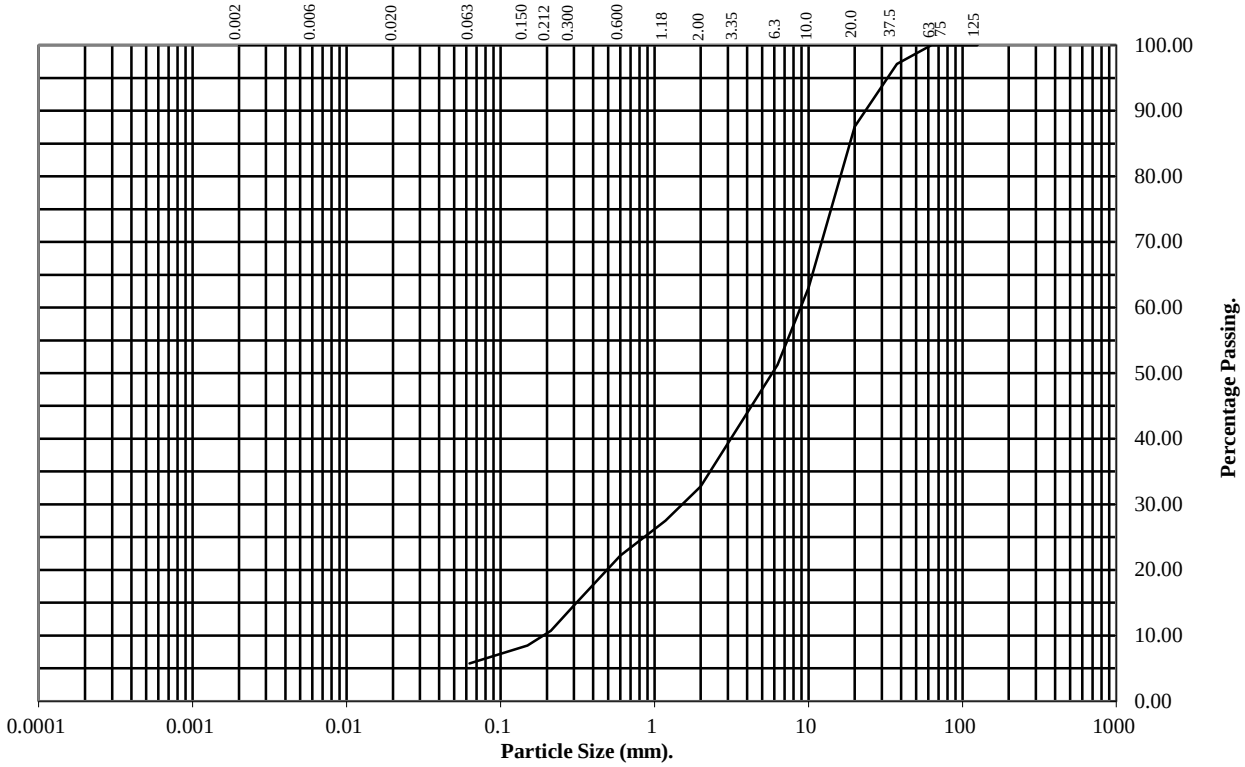
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS01** **Top Depth (m):** **0.50**

Sample Number: **3** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	97
20	88
10	63
6.3	51
3.35	41
2	33
1.18	28
0.6	22
0.3	15
0.212	11
0.15	8
0.063	6

Soil Fraction	Total Percentage
Cobbles	0
Gravel	67
Sand	27
Silt/Clay	6

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

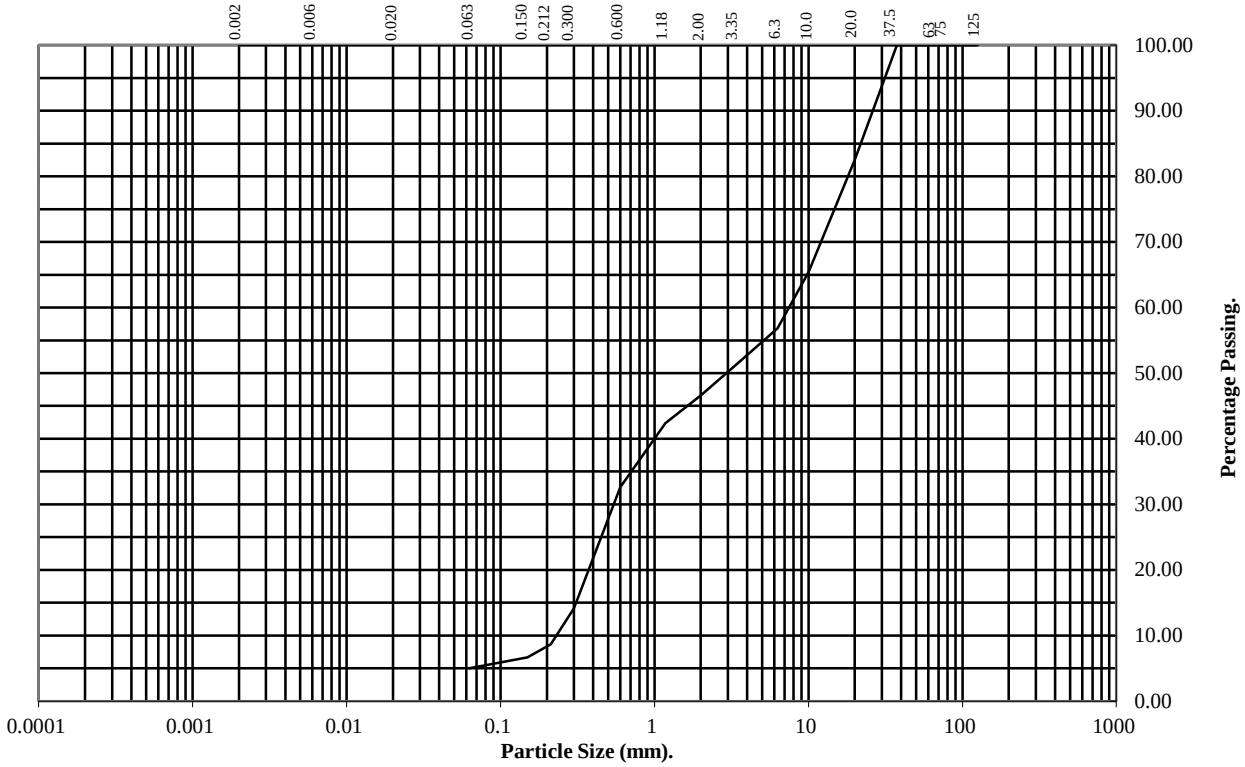
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS01** **Top Depth (m):** **2.20**

Sample Number: **8** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	83
10	65
6.3	57
3.35	51
2	47
1.18	42
0.6	33
0.3	14
0.212	9
0.15	7
0.063	5

Soil Fraction	Total Percentage
Cobbles	0
Gravel	53
Sand	42
Silt/Clay	5

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

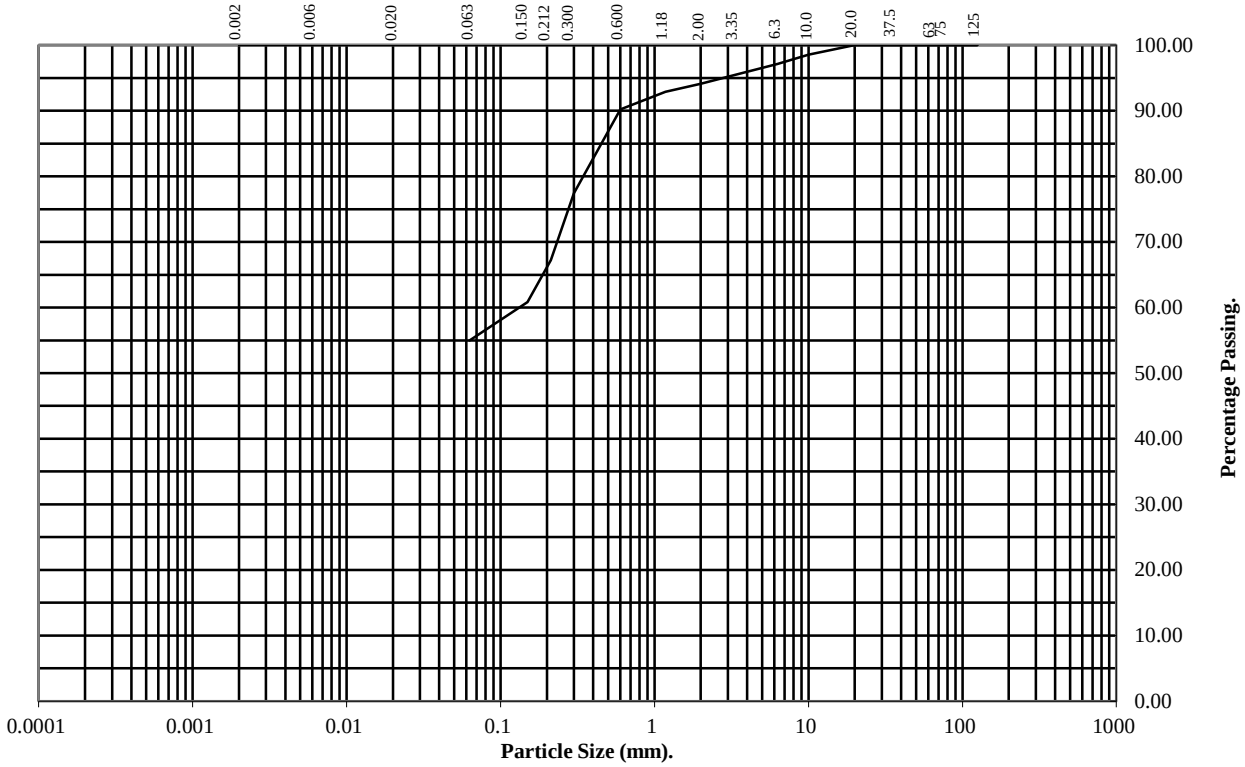
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS02** **Top Depth (m):** **0.70**

Sample Number: **3** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	97
3.35	95
2	94
1.18	93
0.6	90
0.3	77
0.212	67
0.15	61
0.063	55

Soil Fraction	Total Percentage
Cobbles	0
Gravel	6
Sand	39
Silt/Clay	55

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

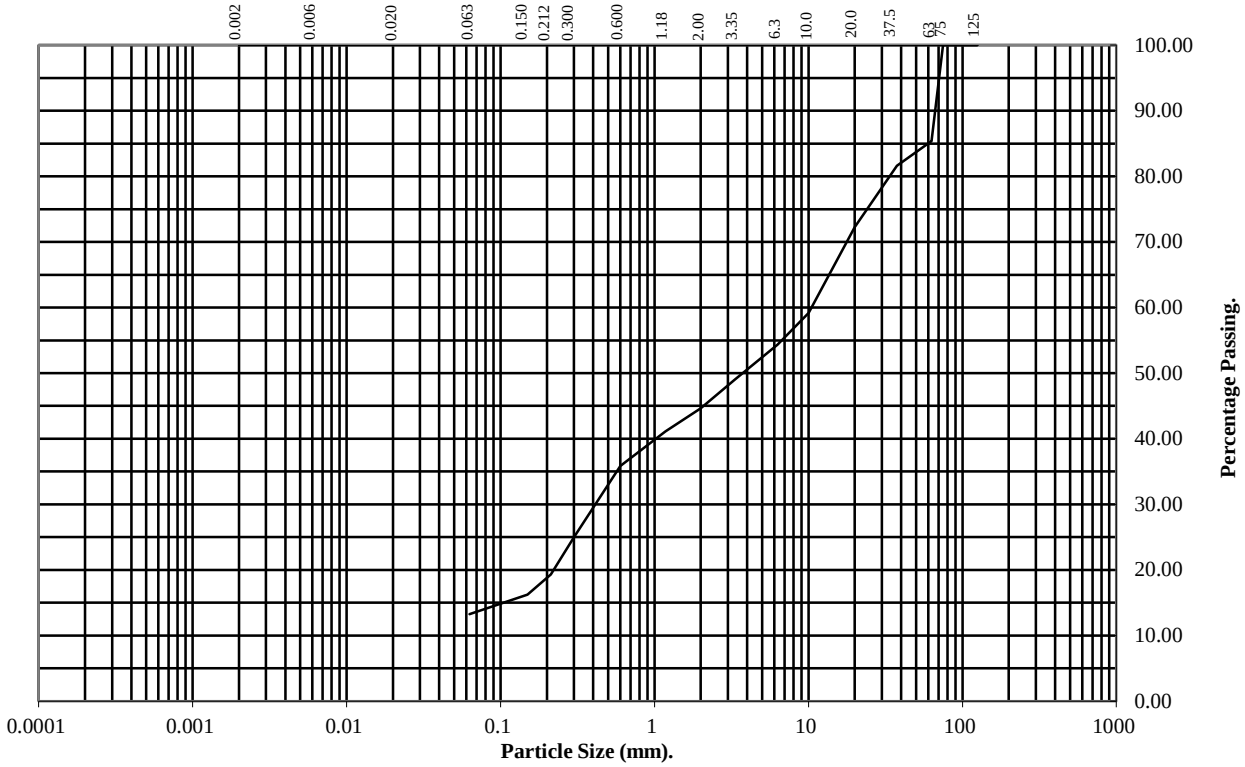
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS03** **Top Depth (m):** **0.50**

Sample Number: **3** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	85
37.5	82
20	72
10	59
6.3	54
3.35	49
2	45
1.18	41
0.6	36
0.3	25
0.212	19
0.15	16
0.063	13

Soil Fraction	Total Percentage
Cobbles	15
Gravel	40
Sand	32
Silt/Clay	13

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

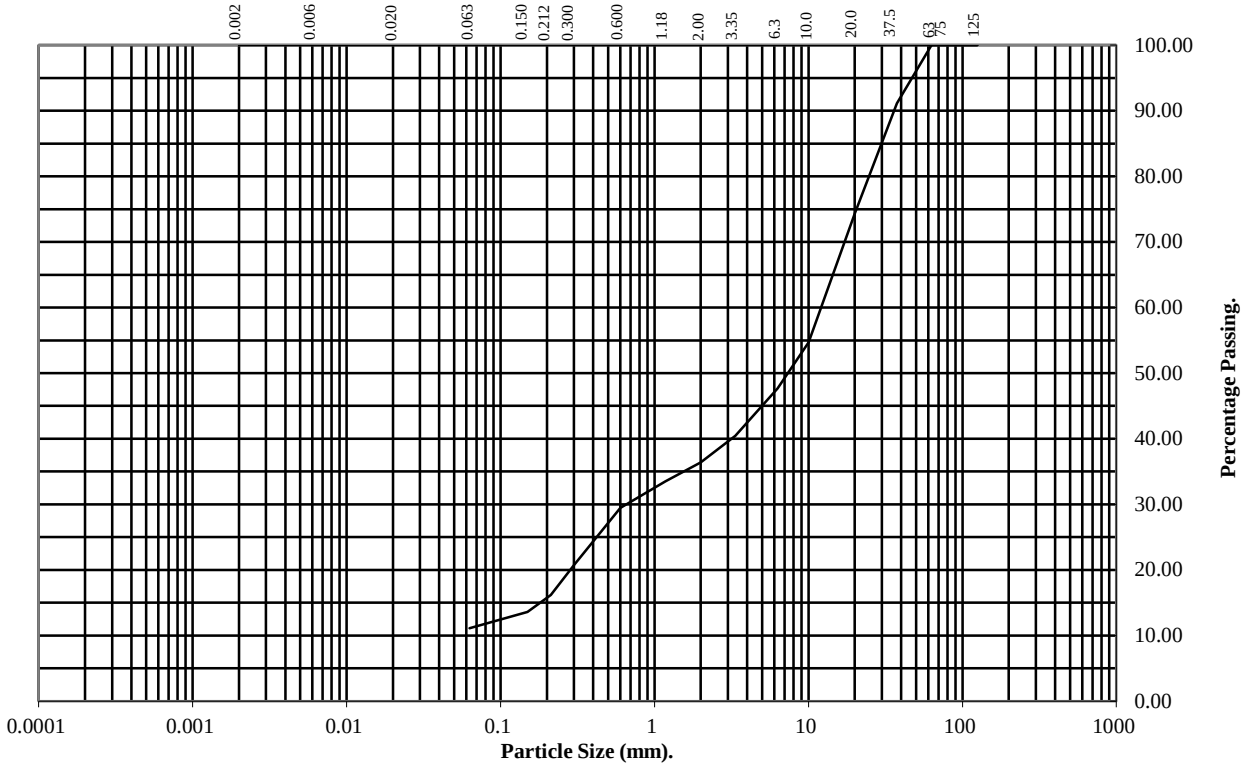
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS04A** **Top Depth (m):** **1.20**

Sample Number: **4** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	91
20	74
10	55
6.3	48
3.35	40
2	36
1.18	34
0.6	29
0.3	21
0.212	16
0.15	14
0.063	11

Soil Fraction	Total Percentage
Cobbles	0
Gravel	64
Sand	25
Silt/Clay	11

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

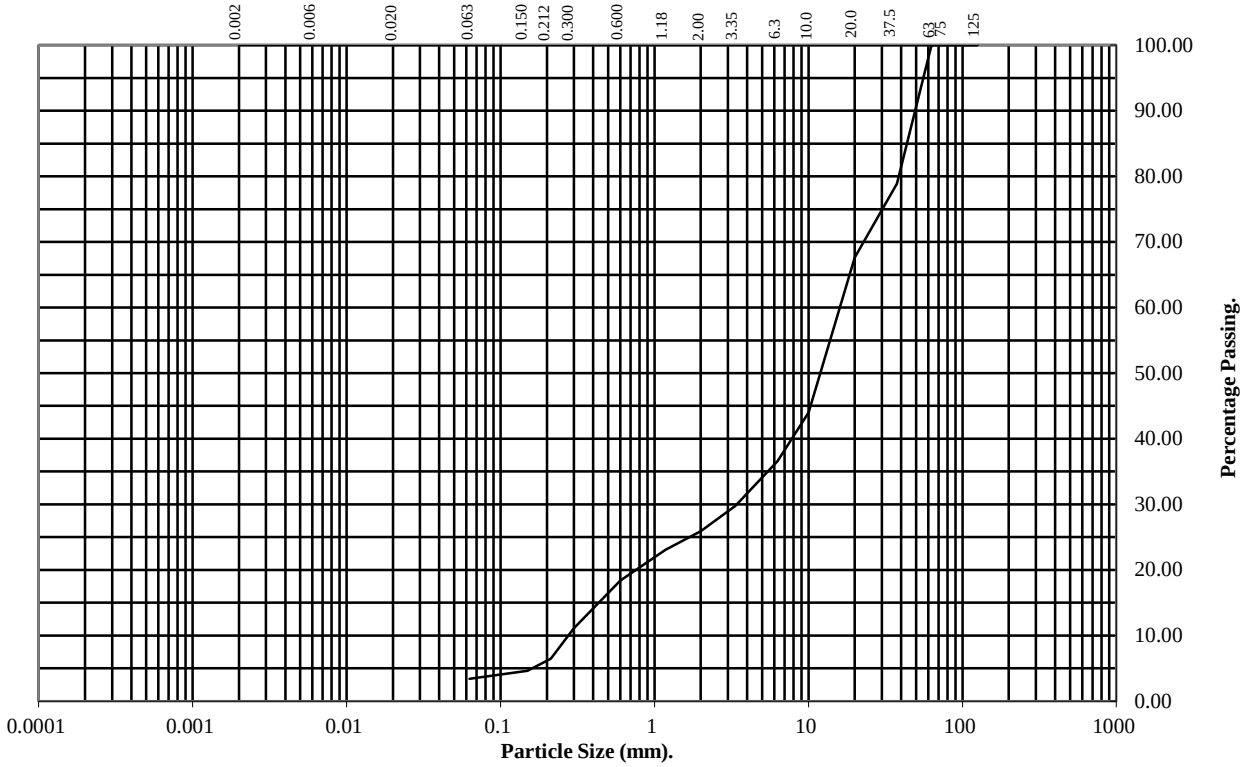
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS04A** **Top Depth (m):** **2.20**

Sample Number: **6** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	79
20	68
10	44
6.3	37
3.35	30
2	26
1.18	23
0.6	18
0.3	11
0.212	6
0.15	5
0.063	3

Soil Fraction	Total Percentage
Cobbles	0
Gravel	74
Sand	23
Silt/Clay	3

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

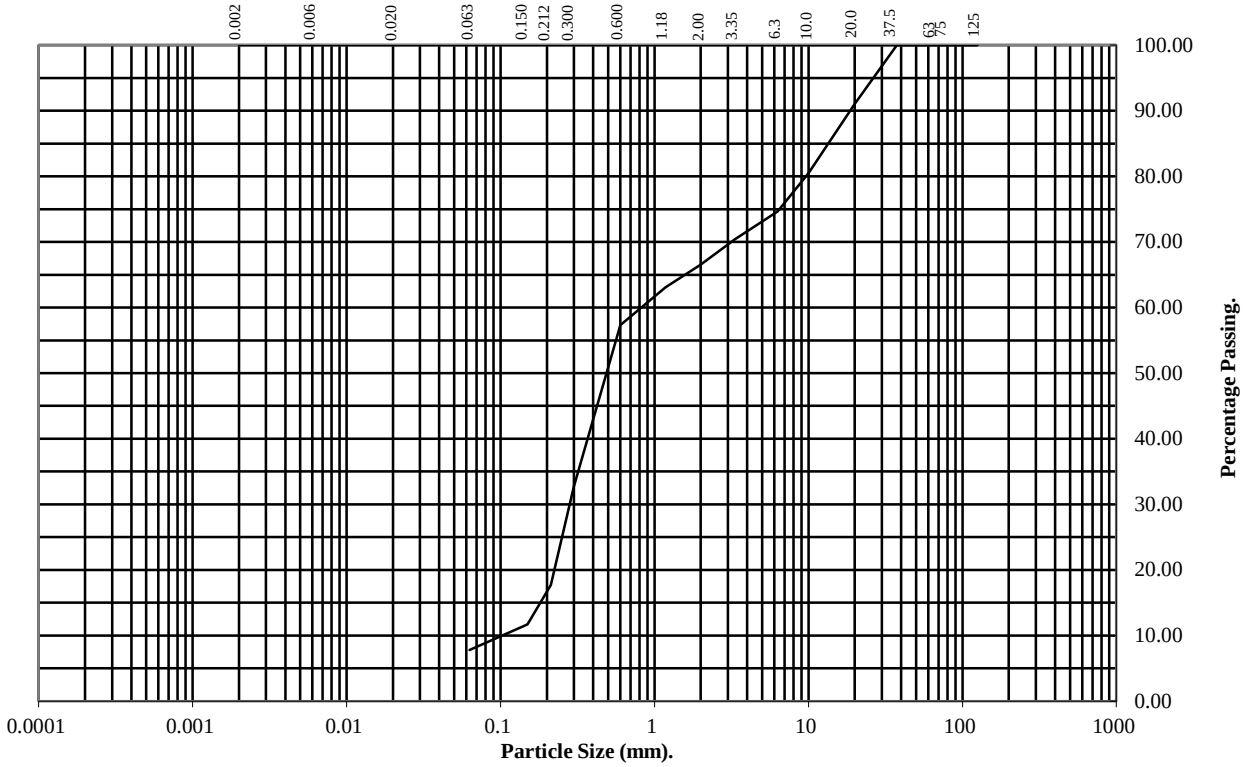
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS05** **Top Depth (m):** **2.00**

Sample Number: **8** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	91
10	80
6.3	75
3.35	70
2	67
1.18	63
0.6	57
0.3	33
0.212	18
0.15	12
0.063	8

Soil Fraction	Total Percentage
Cobbles	0
Gravel	33
Sand	59
Silt/Clay	8

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

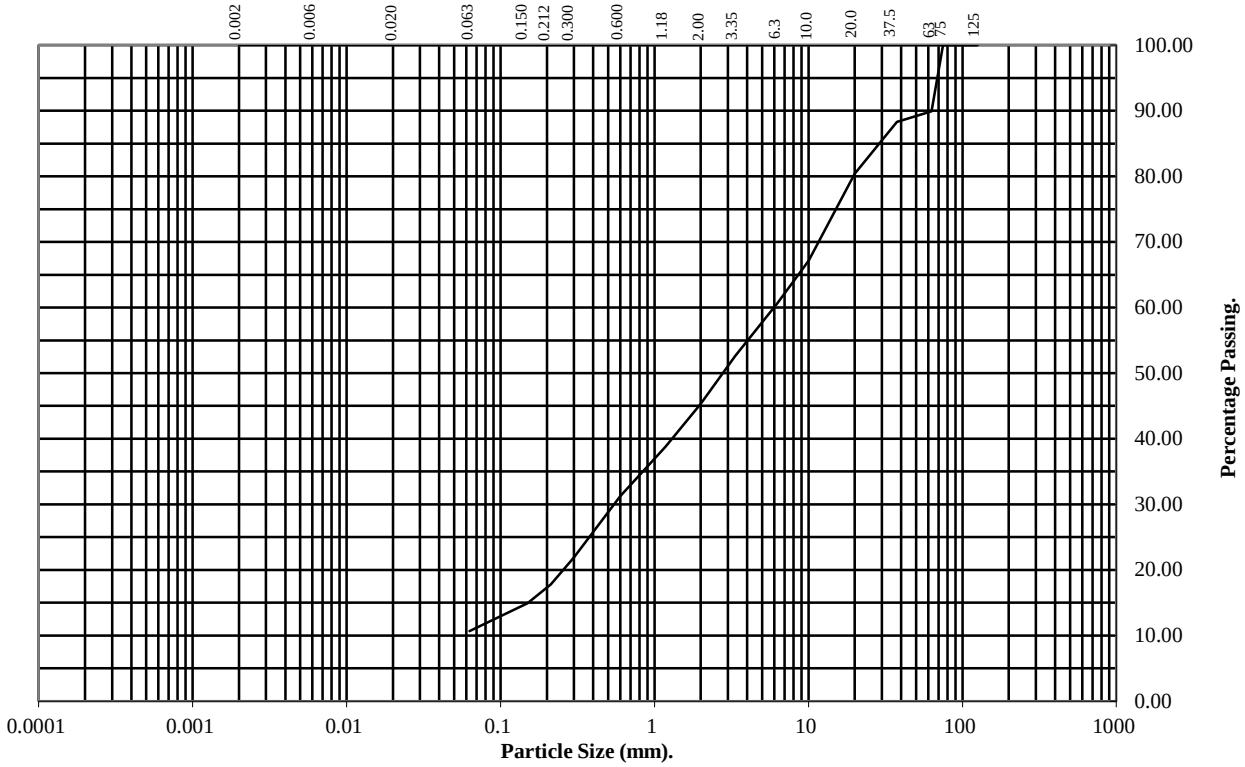
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **WS06** **Top Depth (m):** **0.60**

Sample Number: **3** **Base Depth(m):**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	90
37.5	88
20	80
10	67
6.3	61
3.35	53
2	45
1.18	39
0.6	31
0.3	22
0.212	18
0.15	15
0.063	11

Soil Fraction	Total Percentage
Cobbles	10
Gravel	45
Sand	34
Silt/Clay	11

Remarks:

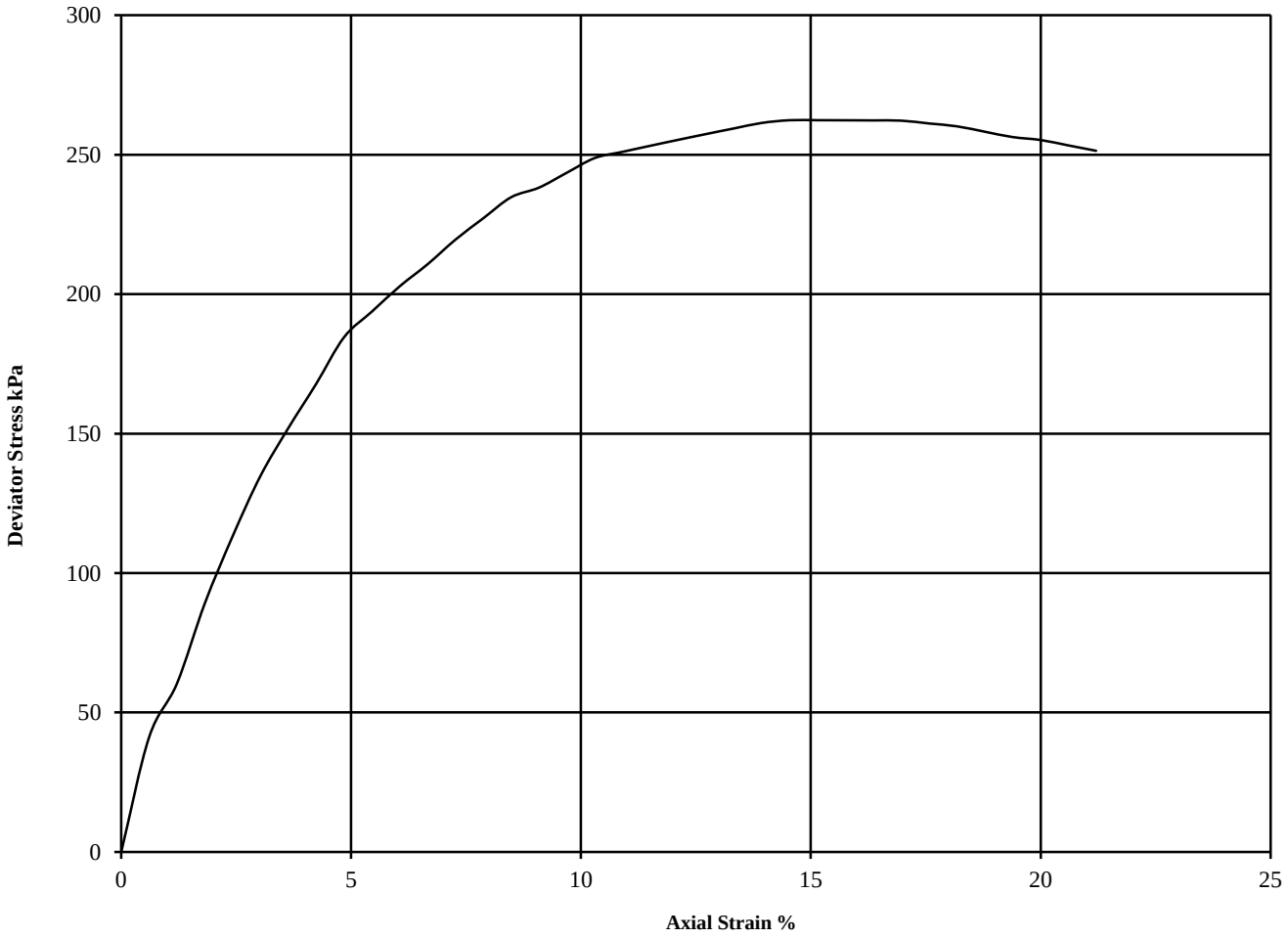
See Summary of Soil Descriptions

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH01**	**Top Depth (m):**	**5.00**
Sample Number:	**15**	**Base Depth (m):**	
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		170	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	12	2.20	1.96	100	262	131	15.1	Plastic	See summary of soil descriptions

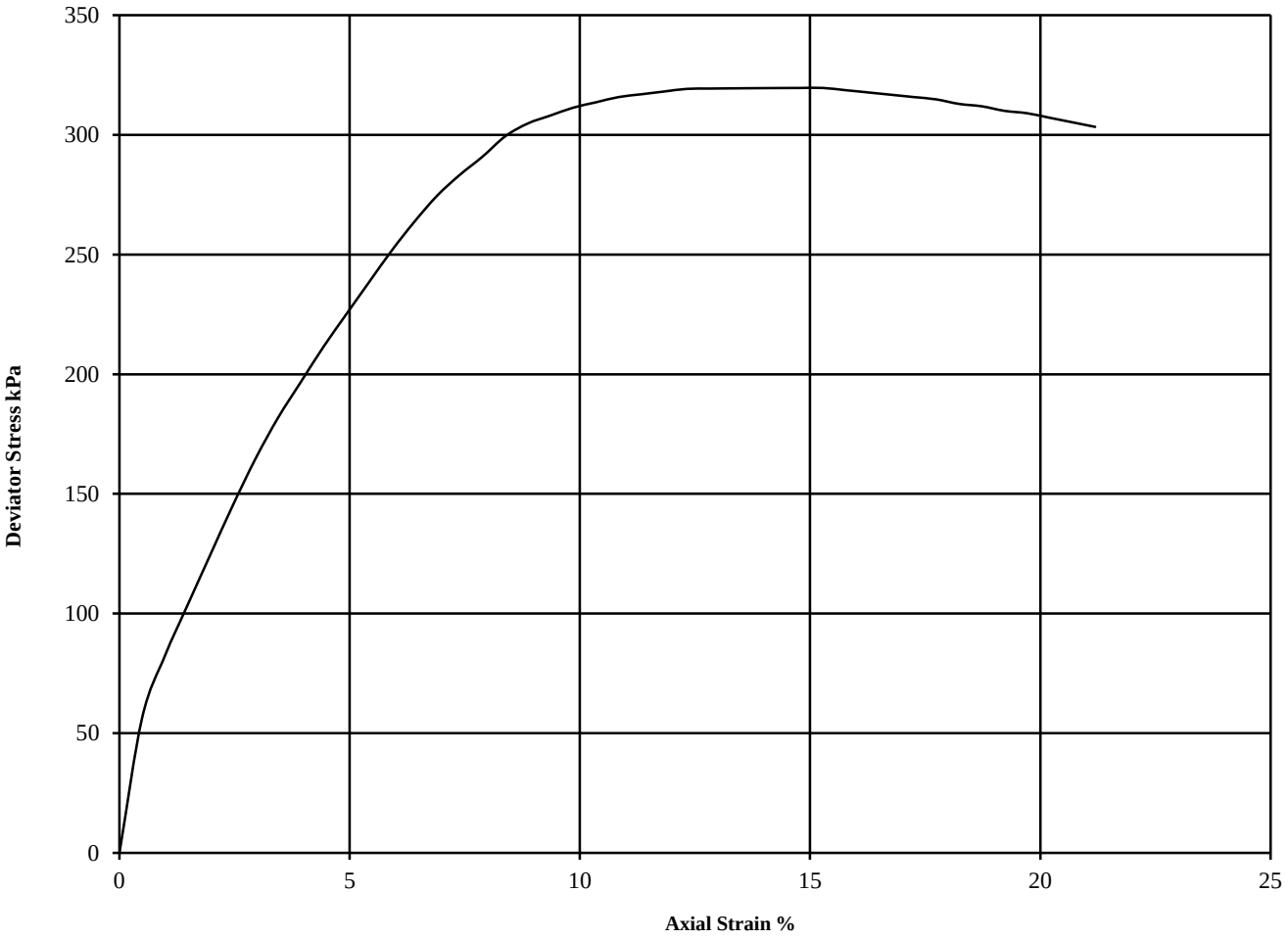
4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:** **PSL19/3802** **Client Ref:** **63524**

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH02**	**Top Depth (m):**	**5.00**
Sample Number:	**12**	**Base Depth (m):**	
Sample Type	**U**		



Diameter (mm):		103	Height (mm):		209	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34
1	12	2.20	1.98	100	320	160	15.3	Plastic	See summary of soil descriptions

4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:** PSL19/3802 **Client Ref:** 63524

ONE DIMENSIONAL CONSOLIDATION TEST

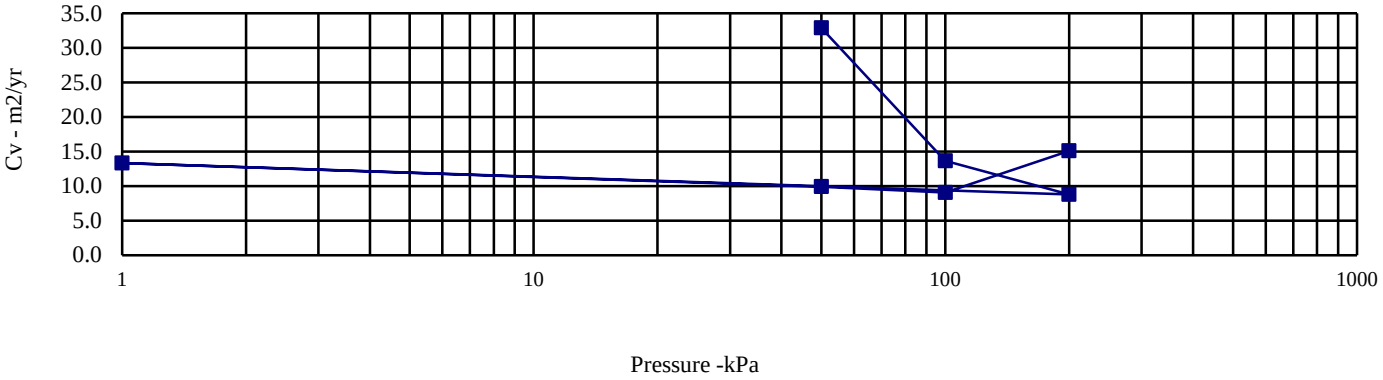
BS 1377: Part 5: 1990: Clause 3

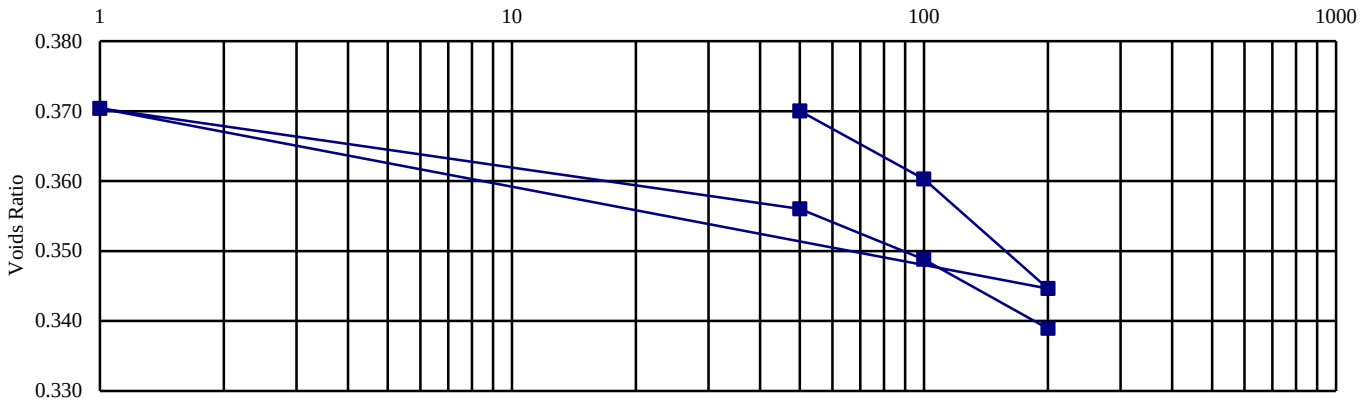
Hole Number: **BH01** **Top Depth (m):** **5.00**

Sample Number: **15** **Base Depth (m) :**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	14						
Bulk Density (Mg/m3):	2.17	0	50	0.249	32.871	Method used to	
Dry Density (Mg/m3):	1.91	50	100	0.142	13.650	determine CV:	T90
Voids Ratio:	0.387	100	200	0.115	8.796	Nominal temperature	
Degree of saturation:	93.9	200	1	0.096	13.302	during test ' C:	20
Height (mm):	19.94	1	50	0.213	9.915	Remarks:	
Diameter (mm)	75.033	50	100	0.107	9.061	See summary of soil descriptions	
Particle Density (Mg/m3): Assumed	2.65	100	200	0.073	15.093		





UKAS TESTING 4043	PSL Professional Soils Laboratory	**Premier Inn Deansgate**	**Contract No:** PSL19/3802 **Client Ref:** 63524

ONE DIMENSIONAL CONSOLIDATION TEST

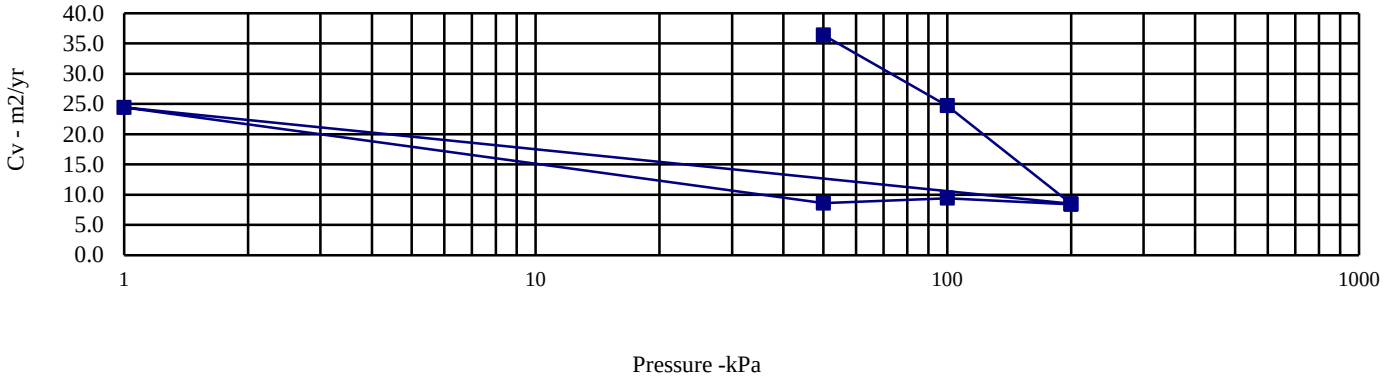
BS 1377: Part 5: 1990: Clause 3

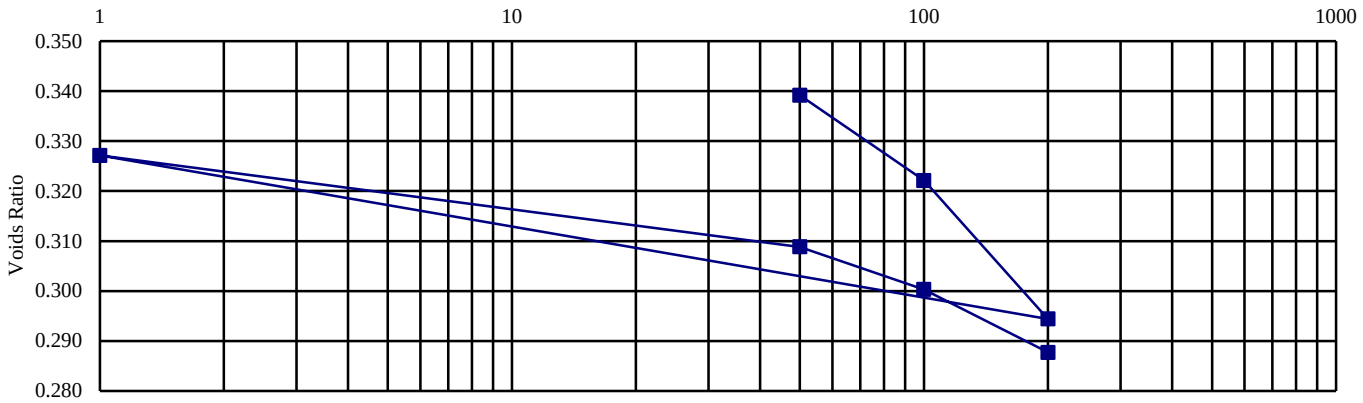
Hole Number: **BH02** **Top Depth (m):** **5.00**

Sample Number: **12** **Base Depth (m) :**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	14						
Bulk Density (Mg/m3):	2.21	0	50	0.411	36.396	Method used to	
Dry Density (Mg/m3):	1.94	50	100	0.255	24.701	determine CV:	T90
Voids Ratio:	0.367	100	200	0.209	8.487	Nominal temperature	
Degree of saturation:	99.5	200	1	0.127	24.430	during test ' C:	20
Height (mm):	19.95	1	50	0.281	8.595	Remarks:	
Diameter (mm)	75.035	50	100	0.130	9.406	See summary of soil descriptions	
Particle Density (Mg/m3): Assumed	2.65	100	200	0.097	8.378		





UKAS TESTING 4043

PSL Professional Soils Laboratory

Premier Inn Deansgate

Contract No: **PSL19/3802**

Client Ref: **63524**

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		Area	D_e^2	D_e	Failure Load (P)		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
BH01	11.70		A	U	85	29	2465	3138.54	56.02	-	0.53	0.17	1.053	0.18	Valid	
BH01	13.10		A	U	85	41	3485	4437.24	66.61	-	1.66	0.37	1.138	0.43	Valid	
BH02	14.50		A	U	80	35	2800	3565.07	59.71	-	0.55	0.15	1.083	0.17	Valid	
BH02	16.00		I	U	74	37	2738	3486.13	59.04	-	0.45	0.13	1.078	0.14	Valid	
BH02	17.50		A	U	85	53	4505	5735.94	75.74	-	0.69	0.12	1.205	0.15	Valid	
BH02	20.50		A	U	85	48	4080	5194.82	72.08	-	1.01	0.19	1.179	0.23	Valid	
BH03	14.50		I	U	68	60	4080	5194.82	72.08	-	0.51	0.10	1.179	0.12	Valid	
BH03	16.00		A	U	85	32	2720	3463.21	58.85	-	1.47	0.42	1.076	0.46	Valid	
BH03	19.00		A	U	85	44	3740	4761.92	69.01	-	1.30	0.27	1.156	0.32	Valid	
BH04	12.50		A	U	100	40	4000	5092.96	71.36	-	2.27	0.45	1.174	0.52	Valid	
BH04	15.50		A	U	100	47	4700	5984.23	77.36	-	1.28	0.21	1.217	0.26	Valid	
BH04	17.00		A	U	100	64	6400	8148.73	90.27	-	3.69	0.45	1.305	0.59	Valid	
BH04	18.50		A	U	100	41	4100	5220.28	72.25	-	1.39	0.27	1.180	0.31	Valid	
BH05	11.50		A	U	85	38	3230	4112.56	64.13	-	1.28	0.31	1.119	0.35	Valid	
BH05	13.50		A	U	85	41	3485	4437.24	66.61	-	0.87	0.20	1.138	0.22	Valid	
BH05	16.50		A	U	80	36	2880	3666.93	60.56	-	0.55	0.15	1.090	0.16	Valid	

Note All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

UKAS TESTING 4043

PSL Professional Soils Laboratory

Premier Inn Deansgate

Contract No:

PSL19/3802

Client Ref:

63524

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		D_e^2	D_e	Failure Load		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
BH01	11.70		D	U	-	85	7225	85.00	-	0.69	0.096	1.270	0.12	Valid	
BH01	13.10		D	U	-	85	7225	85.00	-	1.78	0.246	1.270	0.31	Valid	
BH02	14.50		D	U	-	80	6400	80.00	-	0.30	0.047	1.236	0.06	Valid	
BH02	17.50		D	U	-	85	7225	85.00	-	0.52	0.072	1.270	0.09	Valid	
BH02	20.50		D	U	-	85	7225	85.00	-	0.98	0.136	1.270	0.17	Valid	
BH03	16.00		D	U	-	85	7225	85.00	-	0.96	0.133	1.270	0.17	Valid	
BH03	19.00		D	U	-	85	7225	85.00	-	1.11	0.154	1.270	0.20	Valid	
BH04	12.50		D	U	-	100	10000	100.00	-	2.77	0.277	1.366	0.38	Valid	
BH04	15.50		D	U	-	100	10000	100.00	-	1.60	0.160	1.366	0.22	Valid	
BH04	17.00		D	U	-	100	10000	100.00	-	2.89	0.289	1.366	0.39	Valid	
BH04	18.50		D	U	-	100	10000	100.00	-	1.07	0.107	1.366	0.15	Valid	
BH05	11.50		D	U	-	85	7225	85.00	-	0.98	0.136	1.270	0.17	Valid	
BH05	13.50		D	U	-	85	7225	85.00	-	0.69	0.096	1.270	0.12	Valid	
BH05	16.50		D	U	-	80	6400	80.00	-	0.70	0.109	1.236	0.14	Valid	

Note All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

UKAS TESTING 4043

PSL Professional Soils Laboratory

Premier Inn Deansgate

Contract No:

PSL19/3802

Client Ref:

63524

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
BH01		C	13.10		85	127	1.5	1622	2.25	14	1.98	43.8	7.7	Brittle	02/07/19	
BH01		C	14.80		75	150	2.0	1615	2.44	14	2.13	26.2	5.9	Brittle	02/07/19	
BH02		C	17.00		80	160	2.0	1946	2.42	13	2.15	22.9	4.6	Brittle	02/07/19	
BH02		C	21.50		85	170	2.0	2156	2.23	10	2.03	36.9	6.5	Brittle	02/07/19	
BH03		C	11.50		80	120	1.5	1424	2.36	15	2.06	20.8	4.1	Brittle	02/07/19	
BH03		C	13.00		80	120	1.5	1471	2.44	15	2.13	29.2	5.8	Brittle	02/07/19	
BH03		C	22.00		85	170	2.0	2254	2.34	13	2.07	60.2	10.6	Brittle	02/07/19	
BH04		C	12.50		100	200	2.0	3524	2.24	12	2.01	88.5	11.3	Brittle	02/07/19	
BH04		C	14.00		100	200	2.0	3456	2.20	11	1.98	51.8	6.6	Brittle	02/07/19	
BH04		C	19.10		100	150	1.5	2521	2.14	10	1.94	47.2	6.0	Brittle	02/07/19	
BH05		C	11.50		85	170	2.0	2132	2.21	13	1.96	38.5	6.8	Brittle	02/07/19	
BH05		C	13.00		85	170	2.0	2222	2.30	13	2.04	36.3	6.4	Brittle	02/07/19	
BH05		C	16.00		80	160	2.0	2080	2.59	10	2.35	76.2	15.2	Brittle	02/07/19	

PSL
Professional Soils Laboratory

Premier Inn Deansgate

Contract No:
PSL19/3802
Client Ref:
63524

Certificate of Analysis

Certificate Number 19-12412

08-Jul-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-12412

Client Reference PSL19/3802

Order No (not supplied)

Contract Title Premier Inn Deansgate

Description 30 Soil samples.

Date Received 02-Jul-19

Date Started 02-Jul-19

Date Completed 08-Jul-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 19-12412
Client Ref PSL19/3802
Contract Title Premier Inn Deansgate

	Lab No	1525203	1525204	1525205	1525206	1525207	1525208	1525209	1525210	1525211	1525212	1525213
	Sample ID	BH01	BH01	BH01	BH01	BH02	BH02	BH02	BH02	BH03	BH03	BH03
	Depth	0.20	1.20	3.00	9.50	0.50	2.70	5.60	11.50	0.50	2.00	6.00
	Other ID	2	6	12	22	3	9	13	22	3	9	16
	Sample Type	B	B	B	D	B	B	D	D	B	B	D
	Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
	Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**									
Metals												
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics												
pH	DETSC 2008#			11.1	8.0	8.0	8.2	7.5	7.1	8.1	7.8	7.7	7.4	8.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	13	9.7	5.3	11	2.7	3.7	6.5	8.7	3.7	4.9	4.5
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	130	36	41	19	27	77	93	29	18	50	73
Sulphur as S, Total	DETSC 2320	0.01	%	0.07	0.02	0.01	< 0.01	< 0.01	0.01	0.23	0.01	< 0.01	0.02	0.09
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.14	0.02	0.02	0.01	0.01	0.04	0.02	0.02	0.01	0.02	0.04

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 19-12412
Client Ref PSL19/3802
Contract Title Premier Inn Deansgate

			Lab No	1525214	1525215	1525216	1525217	1525218	1525219	1525220	1525221	1525222	1525223	1525224
			Sample ID	BH04	BH04	BH04	BH04	BH05	BH05	BH05	BH06	BH06	BH06	WS01
			Depth	1.20	3.00	6.50	9.50	1.20	3.00	6.00	0.50	3.00	6.00	0.50
			Other ID	5	12	21	27	6	11	15	4	13	22	3
			Sample Type	B	B	B	B	B	B	D	B	B	D	B
			Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**											
Metals														
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	10	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics														
pH	DETSC 2008#			8.1	7.7	8.2	8.5	8.2	7.3	8.3	8.3	7.7	8.2	8.2
Chloride Aqueous Extract	DETSC 2055	1	mg/l	6.4	4.3	11	5.3	5.8	5.7	6.1	9.8	8.8	4.8	12
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	2.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.7	< 1.0	< 1.0	1.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	220	130	90	17	29	20	76	150	31	58	370
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.02	0.01	< 0.01	0.02	< 0.01	0.09	0.02	0.01	0.15	0.09
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.07	0.04	0.03	0.01	0.05	0.01	0.04	0.04	0.05	0.05	0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 19-12412
Client Ref PSL19/3802
Contract Title Premier Inn Deansgate

	Lab No	1525225	1525226	1525227	1525228	1525229	1525230	1525231	1525232
	Sample ID	WS01	WS01	WS02	WS03	WS04A	WS05	WS05	WS06
	Depth	1.20	2.20	0.70	0.50	1.20	0.50	2.00	0.60
	Other ID	6	8	3	3	4	4	8	3
	Sample Type	B	B	B	B	B	B	B	B
	Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
	Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics									
pH	DETSC 2008#			8.2	8.3	7.1	8.4	7.9	8.1	8.2	9.2
Chloride Aqueous Extract	DETSC 2055	1	mg/l	3.4	5.3	4.2	6.8	4.1	7.0	3.3	6.4
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	43	52	38	40	12	18	18	110
Sulphur as S, Total	DETSC 2320	0.01	%	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.02	< 0.01	0.14
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.18	0.02	0.02	0.04	0.02	0.02	0.01	0.07

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 19-12412
Client Ref PSL19/3802
Contract Premier Inn Deansgate

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1525203	BH01 0.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525204	BH01 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525205	BH01 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525206	BH01 9.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525207	BH02 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525208	BH02 2.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525209	BH02 5.60 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525210	BH02 11.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525211	BH03 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525212	BH03 2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525213	BH03 6.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525214	BH04 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

Information in Support of the Analytical Results

Our Ref 19-12412
Client Ref PSL19/3802
Contract Premier Inn Deansgate

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1525215	BH04 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525216	BH04 6.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525217	BH04 9.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525218	BH05 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525219	BH05 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525220	BH05 6.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525221	BH06 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525222	BH06 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525223	BH06 6.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525224	WS01 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525225	WS01 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525226	WS01 2.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

Information in Support of the Analytical Results

Our Ref 19-12412
Client Ref PSL19/3802
Contract Premier Inn Deansgate

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1525227	WS02 0.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525228	WS03 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525229	WS04A 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525230	WS05 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525231	WS05 2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1525232	WS06 0.60 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix 7 – Chemical Laboratory Results

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/05585
Issue Number: 1 **Date:** 21 June, 2019

Client: Enzygo Ltd (Manchester)
First Floor,
3 Hardman Square,
Manchester,
M3 3EB

Project Manager: Nick Brook
Project Name: Not specified
Project Ref: MAN.260.001
Order No: MAN.260.001
Date Samples Received: 05/06/19
Date Instructions Received: 11/06/19
Date Analysis Completed: 21/06/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 19/05585 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
% Stones >10mm$_A$	20.8	13.0	2.1	41.6	12.3	0.1	26.3	% w/w	0.1	A-T-044
pH$_D$[M#]	8.63	7.87	7.79	8.16	8.41	8.30	9.74	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$[M#]	<0.01	0.02	0.13	0.02	0.04	<0.01	0.16	g/l	0.01	A-T-026s
Cyanide (total)$_A$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	<5	<5	<5	<5	<5	<5	mg/kg	5	A-T-S2-s
Arsenic$_D$[M#]	3	3	4	2	3	3	4	mg/kg	1	A-T-024s
Boron (water soluble)$_D$[M#]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D$[M#]	0.6	0.6	0.9	<0.5	1.0	<0.5	<0.5	mg/kg	0.5	A-T-024s
Copper$_D$[M#]	12	8	23	6	25	3	23	mg/kg	1	A-T-024s
Chromium$_D$[M#]	10	10	21	6	12	5	9	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Chromium (trivalent)	10	10	21	6	12	5	9	mg/kg	1	Calc
Lead$_D$[M#]	7	6	20	5	26	4	21	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	10	10	19	10	13	7	9	mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D$[M#]	24	25	66	21	68	13	35	mg/kg	5	A-T-024s
EPH Total (>C10-C40)$_A$[#]	28	13	1580	20	1880	14	354	mg/kg	10	A-T-007s
Leachate Prep BS EN 12457-2 (10:1)$_A$	*	-	-	-	-	*	*			A-T-001
pH (leachable)$_A$[#]	7.52	-	-	-	-	7.39	8.99	pH	0.01	A-T-031w
Hardness Total (leachable)$_A$	20	-	-	-	-	50	83	mg/l Ca CO3	2	A-T-049w
Ammoniacal nitrogen as N (leachable)$_A$	<0.02	-	-	-	-	<0.02	<0.02	mg/l	0.02	A-T-033w
Sulphate (leachable)$_A$[#]	7.15	-	-	-	-	5.11	32.08	mg/l	1	A-T-026w
Sulphide (leachable)$_A$	<0.1	-	-	-	-	<0.1	<0.1	mg/l	0.1	A-T-S2-w
DOC (leachable)$_A$[#]	7.7	-	-	-	-	1.9	1.8	mg/l	0.2	A-T-032w
Arsenic (leachable)$_A$[#]	1	-	-	-	-	1	5	µg/l	1	A-T-025w
Boron (leachable)$_A$[#]	20	-	-	-	-	37	47	µg/l	10	A-T-025w
Cadmium (leachable)$_A$[#]	<1	-	-	-	-	<1	<1	µg/l	1	A-T-025w
Copper (leachable)$_A$[#]	6	-	-	-	-	2	3	µg/l	1	A-T-025w
Chromium (leachable)$_A$[#]	<1	-	-	-	-	<1	7	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_A$	<0.05	-	-	-	-	<0.05	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	<0.05	-	-	-	-	<0.05	<0.05	mg/l	0.05	Calc

Envirolab Job Number: 19/05585 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
Lead (leachable)$_A^{\#}$	4	-	-	-	-	9	<1	µg/l	1	A-T-025w
Mercury (leachable)$_A^{\#}$	<0.1	-	-	-	-	<0.1	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable)$_A^{\#}$	2	-	-	-	-	<1	<1	µg/l	1	A-T-025w
Selenium (leachable)$_A^{\#}$	<1	-	-	-	-	<1	<1	µg/l	1	A-T-025w
Zinc (leachable)$_A^{\#}$	6	-	-	-	-	2	2	µg/l	1	A-T-025w
EPH Total (>C10-C40) (leachable)$_A$	<80	-	-	-	-	<80	89	µg/l	80	A-T-007w

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_D$#	NAD	-	NAD	-	NAD	-	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	-	N/A	-	N/A			

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	3.42	<0.01	0.78	<0.01	0.12	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.20	<0.01	0.10	<0.01	0.03	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	3.59	<0.02	1.37	<0.02	0.23	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	5.12	<0.04	4.55	<0.04	0.64	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	5.17	<0.04	5.24	<0.04	0.70	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	6.44	<0.05	6.44	<0.05	0.84	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	2.23	<0.05	2.55	<0.05	0.32	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	2.21	<0.07	2.30	<0.07	0.31	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	5.43	<0.06	4.83	<0.06	0.72	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	0.58	<0.04	0.61	<0.04	0.08	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	15.3	<0.08	10.5	<0.08	1.38	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	2.16	<0.01	0.56	<0.01	0.13	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	2.70	<0.03	2.92	<0.03	0.38	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	4.52	<0.03	0.15	<0.03	0.10	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	14.7	<0.03	5.36	<0.03	1.07	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	13	<0.07	10.6	<0.07	1.31	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	<0.08	86.8	<0.08	58.9	<0.08	8.36	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
PAH 16MS (leachable)										
Acenaphthene (leachable)$_A$	0.18	-	-	-	-	0.25	1.22	µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_A$	<0.02	-	-	-	-	<0.02	0.02	µg/l	0.02	A-T-019w
Anthracene (leachable)$_A$	0.05	-	-	-	-	0.05	0.16	µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_A$	<0.02	-	-	-	-	<0.02	0.04	µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_A$	<0.02	-	-	-	-	<0.02	0.04	µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	<0.02	-	-	-	-	<0.02	0.04	µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	<0.02	-	-	-	-	<0.02	<0.02	µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	<0.02	-	-	-	-	<0.02	<0.02	µg/l	0.02	A-T-019w
Chrysene (leachable)$_A$	<0.02	-	-	-	-	<0.02	0.05	µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	<0.02	-	-	-	-	<0.02	<0.02	µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_A$	0.11	-	-	-	-	0.09	0.18	µg/l	0.02	A-T-019w
Fluorene (leachable)$_A$	0.12	-	-	-	-	0.11	0.40	µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	<0.02	-	-	-	-	<0.02	0.02	µg/l	0.02	A-T-019w
Naphthalene (leachable) $_A$	0.38	-	-	-	-	0.20	4.15	µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_A$	0.22	-	-	-	-	0.19	0.49	µg/l	0.02	A-T-019w
Pyrene (leachable)$_A$	0.08	-	-	-	-	0.06	0.14	µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_A$	1.14	-	-	-	-	0.95	6.95	µg/l	0.02	A-T-019w

Envirolab Job Number: 19/05585 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
SVOC										
Hexachlorobenzene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Diethyl phthalate$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Dimethyl phthalate$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Dibenzofuran$_A$	<100	-	1390	-	285	-	<100	µg/kg	100	A-T-052s
Carbazole$_A$	<100	-	880	-	375	-	<100	µg/kg	100	A-T-052s
Butylbenzyl phthalate$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate$_A$	<500	-	<500	-	<500	-	<500	µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
4-Nitrophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
3+4-Methylphenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
4-Chloro-3-methylphenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2-Nitrophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2-Methylphenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2-Chlorophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,6-Dinitrotoluene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,4-Dinitrotoluene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,4-Dimethylphenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,4-Dichlorophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,4,6-Trichlorophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2,4,5-Trichlorophenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2-Chloronaphthalene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
2-Methylnaphthalene$_A$	<100	-	1480	-	111	-	<100	µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Phenol$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Pentachlorophenol (SVOC)$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
n-Dioctylphthalate$_A$	<500	-	<500	-	<500	-	<500	µg/kg	500	A-T-052s
n-Dibutylphthalate$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Nitrobenzene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Isophorone$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Hexachloroethane$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s

Envirolab Job Number: 19/05585 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
Hexachlorocyclopentadiene$_A$	<100	-	<100	-	<100	-	<100	µg/kg	100	A-T-052s
Perylene$_A$	<100	-	918	-	2010	-	153	µg/kg	100	A-T-052s

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
VOC										
Dichlorodifluoromethane$_A$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Chloromethane$_A$	<10	-	<10	-	<10	-	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Bromomethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Chloroethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Carbon Disulphide$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Dichloromethane$_A$	<5	-	<5	-	<5	-	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Bromochloromethane$_A^{\#}$	<5	-	<5	-	<5	-	<5	µg/kg	5	A-T-006s
Chloroform$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^{\#}$	<2	-	<2	-	<2	-	<2	µg/kg	2	A-T-006s
Benzene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Trichloroethene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Dibromomethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Bromodichloromethane$_A^{\#}$	<10	-	<10	-	<10	-	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Toluene$_A^{\#}$	<1	-	1	-	<1	-	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Tetrachloroethene$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Dibromochloromethane$_A^{\#}$	<3	-	<3	-	<3	-	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^{\#}$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
Chlorobenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_A$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Ethylbenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
m & p Xylene$_A^\#$	<1	-	2	-	<1	-	<1	µg/kg	1	A-T-006s
o-Xylene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Styrene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Bromoform$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Isopropylbenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_A$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
Bromobenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
n-Propylbenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
2-Chlorotoluene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_A^\#$	<1	-	2	-	<1	-	<1	µg/kg	1	A-T-006s
4-Chlorotoluene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
tert-Butylbenzene$_A^\#$	<2	-	<2	-	<2	-	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_A^\#$	<1	-	3	-	<1	-	<1	µg/kg	1	A-T-006s
sec-Butylbenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_A$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
n-Butylbenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_A$	<2	-	<2	-	<2	-	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_A$	<3	-	<3	-	<3	-	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene$_A^\#$	<1	-	<1	-	<1	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_A$	<3	-	<3	-	<3	-	<3	µg/kg	3	A-T-006s

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/4	19/05585/6	19/05585/8	19/05585/14	19/05585/15	19/05585/16	19/05585/17	Units	Limit of Detection	Method ref
Client Sample No	2									
Client Sample ID	BH03	BH03	BH06	BH06	BH01	BH01	BH02			
Depth to Top	0.50	2.00	0.50	5.10	0.50	1.00	0.20			
Depth To Bottom										
Date Sampled	06-Jun-19	06-Jun-19	06-Jun-19	07-Jun-19	05-Jun-19	04-Jun-19	04-Jun-19			
Sample Type	Soil - ES	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	6AE	4AE	4AE	4A	4AE			
TPH CWG										
Ali >C5-C6$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	-	-	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	-	-	3	-	2	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	-	-	15	-	9	-	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	-	-	18	-	11	-	3	mg/kg	1	A-T-055s
Ali >C21-C35$_A$	-	-	116	-	124	-	40	mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	-	152	-	146	-	44	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	-	-	3	-	2	-	2	mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	-	-	21	-	3	-	3	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	-	-	78	-	20	-	6	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	-	-	186	-	79	-	16	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	-	-	530	-	426	-	72	mg/kg	1	A-T-055s
Total Aromatics$_A$	-	-	818	-	530	-	99	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	-	-	970	-	676	-	143	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/18							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH02									
Depth to Top	8.20									
Depth To Bottom										
Date Sampled	04-Jun-19									
Sample Type	Soil									
Sample Matrix Code	4A									
% Stones >10mm$_A$	22.8							% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.49							pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.02							g/l	0.01	A-T-026s
Cyanide (total)$_A$$^{M\#}$	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2							mg/kg	0.2	A-T-050s
Sulphide$_A$	<5							mg/kg	5	A-T-S2-s
Arsenic$_D$$^{M\#}$	<1							mg/kg	1	A-T-024s
Boron (water soluble)$_D$$^{M\#}$	<1.0							mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	<0.5							mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	3							mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	5							mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1							mg/kg	1	A-T-040s
Chromium (trivalent)	5							mg/kg	1	Calc
Lead$_D$$^{M\#}$	5							mg/kg	1	A-T-024s
Mercury$_D$	<0.17							mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	7							mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1							mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	11							mg/kg	5	A-T-024s
EPH Total (>C10-C40)$_A$$^{\#}$	14							mg/kg	10	A-T-007s

Envirolab Job Number: 19/05585

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05585/18							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH02									
Depth to Top	8.20									
Depth To Bottom										
Date Sampled	04-Jun-19									
Sample Type	Soil									
Sample Matrix Code	4A									
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02							mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08							mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08							mg/kg	0.01	A-T-019s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client: Enzygo Ltd (Manchester) , First Floor, 3 Hardman Square, Manchester, M3 3EB

Project No: 19/05585

Date Received: 11/06/2019 (am)

Cool Box Temperatures (°C): 6.7 - 14.8

Project:

Clients Project No: MAN.260.001

Lab Sample ID	19/05585/15	19/05585/16	19/05585/17	19/05585/18
Client Sample No				
Client Sample ID/Depth	BH01 0.50m	BH01 1.00m	BH02 0.20m	BH02 8.20m
Date Sampled	05/06/19	04/06/19	04/06/19	04/06/19
Deviation Code				
F	✓	✓	✓	✓

Key
F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

HOLDING TIME EXCEEDANCES

Lab Sample ID	19/05585/15	19/05585/16	19/05585/17	19/05585/18
Client Sample No				
Client Sample ID/Depth	BH01 0.50m	BH01 1.00m	BH02 0.20m	BH02 8.20m
Date Sampled	05/06/19	04/06/19	04/06/19	04/06/19
Sulphide	✓	✓	✓	✓

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/05398
Issue Number: 1 **Date:** 21 June, 2019

Client:
Enzygo Ltd (Manchester)
First Floor,
3 Hardman Square,
Manchester,
M3 3EB

Project Manager: Nick Brook
Project Name: Not specified
Project Ref: MAN.260.001
Order No: MAN.260.001
Date Samples Received: 29/05/19
Date Instructions Received: 05/06/19
Date Analysis Completed: 21/06/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Georgia King
Admin & Client Services Supervisor

UKAS TESTING 1247

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
% Stones >10mm$_A$	28.7	32.6	24.1	27.3	35.7	11.5	40.3	% w/w	0.1	A-T-044
pH$_D$[M#]	7.91	8.03	8.81	7.67	9.24	8.11	8.22	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$[M#]	<0.01	0.01	0.15	0.04	0.08	0.02	0.01	g/l	0.01	A-T-026s
Cyanide (total)$_A$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	<5	<5	<5	<5	<5	<5	mg/kg	5	A-T-S2-s
Arsenic$_D$[M#]	4	1	4	2	1	2	4	mg/kg	1	A-T-024s
Boron (water soluble)$_D$[M#]	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D$[M#]	<0.5	<0.5	0.5	<0.5	0.6	<0.5	<0.5	mg/kg	0.5	A-T-024s
Copper$_D$[M#]	6	6	34	5	17	10	13	mg/kg	1	A-T-024s
Chromium$_D$[M#]	7	7	17	7	9	14	11	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Chromium (trivalent)	7	7	17	7	9	14	11	mg/kg	1	Calc
Lead$_D$[M#]	5	4	101	4	35	9	33	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	0.28	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	7	7	12	9	7	11	11	mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D$[M#]	21	19	133	21	71	28	30	mg/kg	5	A-T-024s
EPH Total (>C10-C40)$_A$[#]	18	11	959	17	1320	248	185	mg/kg	10	A-T-007s
Leachate Prep BS EN 12457-2 (10:1)$_A$	-	*	-	-	-	-	*			A-T-001
pH (leachable)$_A$[#]	-	7.44	-	-	-	-	7.51	pH	0.01	A-T-031w
Hardness Total (leachable)$_A$	-	35	-	-	-	-	16	mg/l Ca CO3	2	A-T-049w
Ammoniacal nitrogen as N (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	mg/l	0.02	A-T-033w
Sulphate (leachable)$_A$[#]	-	<1.00	-	-	-	-	<1.00	mg/l	1	A-T-026w
Sulphide (leachable)$_A$	-	<0.1	-	-	-	-	<0.1	mg/l	0.1	A-T-S2-w
DOC (leachable)$_A$[#]	-	2.9	-	-	-	-	3.8	mg/l	0.2	A-T-032w
Arsenic (leachable)$_A$[#]	-	<1	-	-	-	-	<1	µg/l	1	A-T-025w
Boron (leachable)$_A$[#]	-	14	-	-	-	-	11	µg/l	10	A-T-025w
Cadmium (leachable)$_A$[#]	-	<1	-	-	-	-	<1	µg/l	1	A-T-025w
Copper (leachable)$_A$[#]	-	1	-	-	-	-	3	µg/l	1	A-T-025w
Chromium (leachable)$_A$[#]	-	<1	-	-	-	-	<1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_A$	-	<0.05	-	-	-	-	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	-	<0.05	-	-	-	-	<0.05	mg/l	0.05	Calc

Envirolab Job Number: 19/05398 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
Lead (leachable)$_A^{\#}$	-	<1	-	-	-	-	2	µg/l	1	A-T-025w
Mercury (leachable)$_A^{\#}$	-	<0.1	-	-	-	-	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable)$_A^{\#}$	-	<1	-	-	-	-	2	µg/l	1	A-T-025w
Selenium (leachable)$_A^{\#}$	-	<1	-	-	-	-	<1	µg/l	1	A-T-025w
Zinc (leachable)$_A^{\#}$	-	4	-	-	-	-	5	µg/l	1	A-T-025w
EPH Total (>C10-C40) (leachable)$_A$	-	<80	-	-	-	-	<80	µg/l	80	A-T-007w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_D$#	NAD	-	NAD	-	NAD	-	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	-	N/A	-	N/A			

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	0.10	<0.01	0.26	0.01	0.19	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.02	<0.01	0.08	<0.01	0.03	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	0.18	<0.02	0.71	0.03	0.26	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	0.70	<0.04	1.76	0.06	1.25	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	0.80	<0.04	1.69	0.04	1.25	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	0.92	<0.05	1.89	<0.05	1.48	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	0.46	<0.05	0.82	<0.05	0.61	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	0.33	<0.07	0.70	<0.07	0.52	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	0.76	<0.06	1.85	0.06	1.31	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	0.10	<0.04	0.22	<0.04	0.16	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	1.56	<0.08	4.10	0.15	2.70	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	0.07	<0.01	0.42	0.02	0.13	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	0.50	<0.03	0.90	<0.03	0.67	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	0.24	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.04	<0.03	0.77	<0.03	3.22	0.16	1.23	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	1.44	<0.07	4.16	0.13	2.66	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	<0.08	8.71	<0.08	23	0.66	14.4	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
PAH 16MS (leachable)										
Acenaphthene (leachable)$_A$	-	0.20	-	-	-	-	0.60	µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_A$	-	<0.02	-	-	-	-	0.04	µg/l	0.02	A-T-019w
Anthracene (leachable)$_A$	-	0.06	-	-	-	-	0.23	µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Chrysene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_A$	-	0.06	-	-	-	-	0.22	µg/l	0.02	A-T-019w
Fluorene (leachable)$_A$	-	0.12	-	-	-	-	0.43	µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	-	<0.02	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Naphthalene (leachable) $_A$	-	0.29	-	-	-	-	0.23	µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_A$	-	0.23	-	-	-	-	0.94	µg/l	0.02	A-T-019w
Pyrene (leachable)$_A$	-	0.04	-	-	-	-	0.20	µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_A$	-	1.00	-	-	-	-	2.89	µg/l	0.02	A-T-019w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/2	19/05398/4	19/05398/6	19/05398/9	19/05398/10	19/05398/12	19/05398/16	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH05	BH05	WS01	WS01	WS02	WS02	WS03			
Depth to Top	0.50	2.00	0.50	2.20	0.20	1.00	1.00			
Depth To Bottom										
Date Sampled	30-May-19	31-May-19	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4AB	4A	4AB	4A	4AB			
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	-	<1	-	<5	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	-	<1	-	<5	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	-	<1	-	<5	-	1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	-	<1	-	<5	-	3	mg/kg	1	A-T-055s
Ali >C21-C35$_A$	2	-	19	-	349	-	23	mg/kg	1	A-T-055s
Total Aliphatics$_A$	2	-	19	-	354	-	27	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	-	<1	-	6	-	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	-	<1	-	<5	-	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1	-	<1	-	8	-	16	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	-	<1	-	21	-	125	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	5	-	10	-	290	-	260	mg/kg	1	A-T-055s
Total Aromatics$_A$	5	-	14	-	324	-	401	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	8	-	33	-	678	-	428	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	-	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
% Stones >10mm$_A$	<0.1	47.1	10.8	<0.1	21.8	20.5	24.1	% w/w	0.1	A-T-044
pH$_D$[M#]	8.33	10.63	8.77	8.89	8.34	8.42	8.27	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$[M#]	<0.01	0.04	<0.01	0.02	0.02	0.08	0.07	g/l	0.01	A-T-026s
Cyanide (total)$_A$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	<5	<5	<5	<5	<5	<5	mg/kg	5	A-T-S2-s
Arsenic$_D$[M#]	<1	2	2	1	2	3	<1	mg/kg	1	A-T-024s
Boron (water soluble)$_D$[M#]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D$[M#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	mg/kg	0.5	A-T-024s
Copper$_D$[M#]	2	14	4	12	5	17	5	mg/kg	1	A-T-024s
Chromium$_D$[M#]	3	12	5	9	5	10	8	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Chromium (trivalent)	3	12	5	9	5	10	8	mg/kg	1	Calc
Lead$_D$[M#]	6	44	4	26	5	53	5	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	0.20	<0.17	0.33	<0.17	0.27	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	2	10	6	9	7	11	13	mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1	<1	<1	<1	<1	2	mg/kg	1	A-T-024s
Zinc$_D$[M#]	9	42	18	36	20	56	22	mg/kg	5	A-T-024s
EPH Total (>C10-C40)$_A$[#]	<10	946	143	14	<10	192	4370	mg/kg	10	A-T-007s
Leachate Prep BS EN 12457-2 (10:1)$_A$	-	-	-	-	-	-	*			A-T-001
pH (leachable)$_A$[#]	-	-	-	-	-	-	7.40	pH	0.01	A-T-031w
Hardness Total (leachable)$_A$	-	-	-	-	-	-	22	mg/l Ca CO3	2	A-T-049w
Ammoniacal nitrogen as N (leachable)$_A$	-	-	-	-	-	-	<0.02	mg/l	0.02	A-T-033w
Sulphate (leachable)$_A$[#]	-	-	-	-	-	-	25.73	mg/l	1	A-T-026w
Sulphide (leachable)$_A$	-	-	-	-	-	-	<0.1	mg/l	0.1	A-T-S2-w
DOC (leachable)$_A$[#]	-	-	-	-	-	-	1.3	mg/l	0.2	A-T-032w
Arsenic (leachable)$_A$[#]	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Boron (leachable)$_A$[#]	-	-	-	-	-	-	41	µg/l	10	A-T-025w
Cadmium (leachable)$_A$[#]	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Copper (leachable)$_A$[#]	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Chromium (leachable)$_A$[#]	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_A$	-	-	-	-	-	-	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	-	-	-	-	-	-	<0.05	mg/l	0.05	Calc

Envirolab Job Number: 19/05398 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
Lead (leachable)$_A^{\#}$	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Mercury (leachable)$_A^{\#}$	-	-	-	-	-	-	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable)$_A^{\#}$	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Selenium (leachable)$_A^{\#}$	-	-	-	-	-	-	<1	µg/l	1	A-T-025w
Zinc (leachable)$_A^{\#}$	-	-	-	-	-	-	2	µg/l	1	A-T-025w
EPH Total (>C10-C40) (leachable)$_A$	-	-	-	-	-	-	<80	µg/l	80	A-T-007w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_{D}^{\#}$	-	NAD	-	Amosite	-	NAD	NAD			A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	-	Loose Fibres	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	-	N/A	-	N/A	-	N/A	N/A			
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_{D}$	-	-	-	<0.001	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	0.15	<0.01	0.36	<0.01	0.12	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	0.05	<0.01	0.05	<0.01	0.02	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	0.40	<0.02	0.67	<0.02	0.18	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	2.41	<0.04	2.92	<0.04	0.54	<0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	2.79	<0.04	3.50	<0.04	0.51	<0.04	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	3.22	<0.05	4.09	<0.05	0.63	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	1.66	<0.05	2.18	<0.05	0.27	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	1.23	<0.07	1.49	<0.07	0.21	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	2.45	<0.06	3.01	<0.06	0.59	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	0.41	<0.04	0.48	<0.04	0.07	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	4.66	<0.08	6.07	<0.08	1.35	<0.08	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.10	<0.01	0.30	<0.01	0.10	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	1.83	<0.03	2.40	<0.03	0.29	<0.03	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	0.21	<0.03	0.10	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	1.35	<0.03	2.67	<0.03	1.05	<0.03	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	4.61	<0.07	5.72	<0.07	1.23	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	27.3	<0.08	36.1	<0.08	7.26	<0.08	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
PAH 16MS (leachable)										
Acenaphthene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Anthracene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Chrysene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Fluorene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Naphthalene (leachable) $_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Pyrene (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_A$	-	-	-	-	-	-	<0.02	µg/l	0.02	A-T-019w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/17	19/05398/18	19/05398/22	19/05398/23	19/05398/27	19/05398/29	19/05398/33	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS03	WS04	WS04A	WS05	WS05	BH04	BH04			
Depth to Top	1.50	0.20	3.00	0.25	2.70	1.00	4.70			
Depth To Bottom										
Date Sampled	30-May-19	30-May-19	30-May-19	30-May-19	30-May-19	28-May-19	28-May-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	4AB	4A	4AB	4AB	4AB	4			
TPH CWG										
Ali >C5-C6$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	-	<1	-	<5	-	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	-	<1	-	<5	-	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	-	2	-	<5	-	-	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	-	6	-	10	-	-	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A$	-	143	-	756	-	-	2	mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	152	-	766	-	-	2	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	-	<1	-	<5	-	-	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	-	<1	-	<5	-	-	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	-	5	-	12	-	-	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	-	35	-	47	-	-	<1	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	-	312	-	674	-	-	4	mg/kg	1	A-T-055s
Total Aromatics$_A$	-	353	-	732	-	-	4	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	-	505	-	1500	-	-	6	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	-	<0.01	-	<0.01	-	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
% Stones >10mm$_A$	15.2	22.3						% w/w	0.1	A-T-044
pH$_D$[M#]	8.40	8.23						pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$[M#]	0.04	0.02						g/l	0.01	A-T-026s
Cyanide (total)$_A$[M#]	<1	<1						mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2						mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	<5						mg/kg	5	A-T-S2-s
Arsenic$_D$[M#]	4	5						mg/kg	1	A-T-024s
Boron (water soluble)$_D$[M#]	<1.0	<1.0						mg/kg	1	A-T-027s
Cadmium$_D$[M#]	0.7	<0.5						mg/kg	0.5	A-T-024s
Copper$_D$[M#]	28	27						mg/kg	1	A-T-024s
Chromium$_D$[M#]	20	9						mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1						mg/kg	1	A-T-040s
Chromium (trivalent)	20	9						mg/kg	1	Calc
Lead$_D$[M#]	124	186						mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17						mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	19	12						mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1						mg/kg	1	A-T-024s
Zinc$_D$[M#]	92	38						mg/kg	5	A-T-024s
EPH Total (>C10-C40)$_A$[#]	2210	30						mg/kg	10	A-T-007s
Leachate Prep BS EN 12457-2 (10:1)$_A$	-	*								A-T-001
pH (leachable)$_A$[#]	-	7.42						pH	0.01	A-T-031w
Hardness Total (leachable)$_A$	-	40						mg/l Ca CO3	2	A-T-049w
Ammoniacal nitrogen as N (leachable)$_A$	-	<0.02						mg/l	0.02	A-T-033w
Sulphate (leachable)$_A$[#]	-	4.01						mg/l	1	A-T-026w
Sulphide (leachable)$_A$	-	<0.1						mg/l	0.1	A-T-S2-w
DOC (leachable)$_A$[#]	-	1.5						mg/l	0.2	A-T-032w
Arsenic (leachable)$_A$[#]	-	2						µg/l	1	A-T-025w
Boron (leachable)$_A$[#]	-	18						µg/l	10	A-T-025w
Cadmium (leachable)$_A$[#]	-	<1						µg/l	1	A-T-025w
Copper (leachable)$_A$[#]	-	3						µg/l	1	A-T-025w
Chromium (leachable)$_A$[#]	-	2						µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_A$	-	<0.05						mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	-	<0.05						mg/l	0.05	Calc

Envirolab Job Number: 19/05398 **Client Project Name: Not specified**

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
Lead (leachable)$_A^\#$	-	3						µg/l	1	A-T-025w
Mercury (leachable)$_A^\#$	-	<0.1						µg/l	0.1	A-T-025w
Nickel (leachable)$_A^\#$	-	<1						µg/l	1	A-T-025w
Selenium (leachable)$_A^\#$	-	<1						µg/l	1	A-T-025w
Zinc (leachable)$_A^\#$	-	2						µg/l	1	A-T-025w
EPH Total (>C10-C40) (leachable)$_A$	-	112						µg/l	80	A-T-007w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_D$#	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.22	0.03						mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.03	<0.01						mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.56	0.05						mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.81	0.18						mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.76	0.19						mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	2.24	0.24						mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.02	0.10						mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.78	0.09						mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	1.84	0.20						mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.23	<0.04						mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	4.65	0.38						mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.15	0.03						mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.09	0.11						mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	0.05	<0.03						mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	2.04	0.26						mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	4.00	0.34						mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	22.5	2.20						mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
PAH 16MS (leachable)										
Acenaphthene (leachable)$_A$	-	0.38						µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_A$	-	0.03						µg/l	0.02	A-T-019w
Anthracene (leachable)$_A$	-	0.11						µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_A$	-	<0.02						µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Chrysene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_A$	-	0.15						µg/l	0.02	A-T-019w
Fluorene (leachable)$_A$	-	0.27						µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_A$	-	<0.02						µg/l	0.02	A-T-019w
Naphthalene (leachable) $_A$	-	0.24						µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_A$	-	0.60						µg/l	0.02	A-T-019w
Pyrene (leachable)$_A$	-	0.11						µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_A$	-	1.89						µg/l	0.02	A-T-019w

Envirolab Job Number: 19/05398

Client Project Name: Not specified

Client Project Ref: MAN.260.001

Lab Sample ID	19/05398/34	19/05398/36						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06	WS06								
Depth to Top	0.20	1.00								
Depth To Bottom										
Date Sampled	30-May-19	30-May-19								
Sample Type	Soil	Soil								
Sample Matrix Code	4A	4AB								
TPH CWG										
Ali >C5-C6$_A^{\#}$	0.03	-						mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<5	-						mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<5	-						mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<5	-						mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	9	-						mg/kg	1	A-T-055s
Ali >C21-C35$_A$	401	-						mg/kg	1	A-T-055s
Total Aliphatics$_A$	416	-						mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<5	-						mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<5	-						mg/kg	1	A-T-055s
Aro >C12-C16$_A$	17	-						mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	68	-						mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	451	-						mg/kg	1	A-T-055s
Total Aromatics$_A$	536	-						mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	952	-						mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	-						mg/kg	0.01	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client: Enzygo Ltd (Manchester) , First Floor, 3 Hardman Square, Manchester, M3 3EB

Project No: 19/05398

Date Received: 05/06/2019 (am)

Cool Box Temperatures (°C): 23.6, 22.9, 23.4, 14.6

Project:

Clients Project No: MAN.260.001

Lab Sample ID	19/05398/29	19/05398/33
Client Sample No		
Client Sample ID/Depth	BH04 1.00m	BH04 4.70m
Date Sampled	28/05/19	28/05/19
Deviation Code		
F	✓	✓

Key
F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

HOLDING TIME EXCEEDANCES

Lab Sample ID	19/05398/29	19/05398/33
Client Sample No		
Client Sample ID/Depth	BH04 1.00m	BH04 4.70m
Date Sampled	28/05/19	28/05/19
Sulphide	✓	✓

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/06662
Issue Number: 1 **Date:** 22 July, 2019

Client: Enzygo Ltd (Manchester)
First Floor,
3 Hardman Square,
Manchester,
M3 3EB

Project Manager: Nigel Ramsumair
Project Name: Deansgate
Project Ref: MAN.260.001
Order No: P002703
Date Samples Received: 11/07/19
Date Instructions Received: 12/07/19
Date Analysis Completed: 22/07/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

UKAS TESTING
1247

Envirolab Job Number: 19/06662

Client Project Name: Deansgate

Client Project Ref: MAN.260.001

Lab Sample ID	19/06662/1	19/06662/3	19/06662/4					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH2	BH4	BH5							
Depth to Top										
Depth To Bottom										
Date Sampled	09-Jul-19	09-Jul-19	09-Jul-19							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
pH (w)$_A^\#$	8.01	7.73	8.02					pH	0.01	A-T-031w
Hardness Total$_A^\#$	713	583	636					mg/l Ca CO3	2	A-T-049w
Ammoniacal nitrogen as N (w)$_A^\#$	1.34	0.27	0.10					mg/l	0.02	A-T-033w
Sulphate (w)$_A^\#$	481	235	334					mg/l	1	A-T-026w
Sulphide (w)$_A$	<0.1	<0.1	<0.1					mg/l	0.1	A-T-S2-w
Arsenic (dissolved)$_A^\#$	<1	2	<1					µg/l	1	A-T-025w
Boron (dissolved)$_A^\#$	85	148	127					µg/l	10	A-T-025w
Cadmium (dissolved)$_A^\#$	<0.2	<0.2	<0.2					µg/l	0.2	A-T-025w
Copper (dissolved)$_A^\#$	2	3	5					µg/l	1	A-T-025w
Chromium (dissolved)$_A^\#$	<1	<1	<1					µg/l	1	A-T-025w
Chromium (hexavalent) (w)$_A^\#$	<0.01	<0.01	<0.01					mg/l	0.01	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01					mg/l	0.01	Calc
Lead (dissolved)$_A^\#$	<1	<1	<1					µg/l	1	A-T-025w
Mercury (dissolved)$_A^\#$	<0.1	<0.1	<0.1					µg/l	0.1	A-T-025w
Nickel (dissolved)$_A^\#$	2	8	10					µg/l	1	A-T-025w
Selenium (dissolved)$_A^\#$	<1	<1	<1					µg/l	1	A-T-025w
Zinc (dissolved)$_A^\#$	3	3	3					µg/l	1	A-T-025w
EPH Total (>C10-C40) (w)$_A$	<40	<40	<40					µg/l	40	A-T-007w

Envirolab Job Number: 19/06662

Client Project Name: Deansgate

Client Project Ref: MAN.260.001

Lab Sample ID	19/06662/1	19/06662/3	19/06662/4					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH2	BH4	BH5							
Depth to Top										
Depth To Bottom										
Date Sampled	09-Jul-19	09-Jul-19	09-Jul-19							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
PAH 16MS (w)										
Acenaphthene (w)$_A^{\#}$	<0.01	0.06	<0.01					µg/l	0.01	A-T-019w
Acenaphthylene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Anthracene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Benzo(a)anthracene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Benzo(a)pyrene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Benzo(ghi)perylene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Chrysene (w)$_A^{\#}$	<0.01	0.03	<0.01					µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (w)$_A^{\#}$	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Fluoranthene (w)$_A^{\#}$	<0.01	0.07	<0.01					µg/l	0.01	A-T-019w
Fluorene (w)$_A^{\#}$	<0.01	0.03	<0.01					µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (w)$_A^{\#}$	<0.01	0.02	<0.01					µg/l	0.01	A-T-019w
Naphthalene (w)$_A^{\#}$	<0.01	0.17	<0.01					µg/l	0.01	A-T-019w
Phenanthrene (w)$_A^{\#}$	<0.01	0.11	<0.01					µg/l	0.01	A-T-019w
Pyrene (w)$_A^{\#}$	<0.01	0.07	<0.01					µg/l	0.01	A-T-019w
Total PAH 16MS (w)$_A^{\#}$	<0.01	0.66	<0.01					µg/l	0.01	A-T-019w

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Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client: Enzygo Ltd (Manchester) , First Floor, 3 Hardman Square, Manchester, M3 3EB

Project No: 19/06662

Date Received: 12/07/2019 (am)

Project: Deansgate

Cool Box Temperatures (°C): 20.0

Clients Project No: MAN.260.001

Lab Sample ID	19/06662/1	19/06662/3	19/06662/4
Client Sample No			
Client Sample ID/Depth	BH2	BH4	BH5
Date Sampled	09/07/19	09/07/19	09/07/19
Deviation Code			
A7 (no HNO3)	✓	✓	✓
A8 (no NaOH)	✓	✓	✓
A9 (no H2SO4)	✓	✓	✓

Key

A7 (no HNO3) *No HNO3 preserved bottle provided (dissolved metals will be deviating)*

A8 (no NaOH) *No NaOH preserved bottle provided (cyanides, sulphide will be deviating)*

A9 (no H2SO4) *No H2SO4 preserved bottle provided (phenols, ammonia, DOC, COD will be deviating)*

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Appendix 8 – Core Photos





enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
	Client **Whitbread PLC**	**Project No.** **MAN.260.001**





enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
	Client **Whitbread PLC**	**Project No.** **MAN.260.001**





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enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
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enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
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enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
	Client **Whitbread PLC**	**Project No.** **MAN.260.001**





enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
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enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
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enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
	Client **Whitbread PLC**	**Project No.** **MAN.260.001**



enzygo environmental consultants **Enzygo GeoEnvironmental Ltd** **Manchester** **3 Hardman Square** **Tel: 0161 413 6444**	**Project** **Premier Inn, Deansgate**	**Drawing Title** **Rotary Core Photos**
	Client **Whitbread PLC**	**Project No.** **MAN.260.001**

Appendix 2

GROUNDWATER MONITORING RESULTS NOVEMBER 2020 TO JANUARY 2021

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 10/11/2020
Job No: MAN.260.003
Visit No: 1 **of** 3
Operator: NR
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1																	9.00	20.08	33.72	24.72	ND	
BH2																	8.80	20.12	33.62	24.82	ND	
BH3																	9.05	20.50	33.63	24.58	ND	
BH4																	9.71	11.73	34.50	24.79	ND	
BH5																	9.76	15.10	34.09	24.33	ND	
BH6																	4.75	7.25	33.96	29.21	ND	
WS1																	Dry	4.39	33.63	N/A	ND	
WS2																	Dry	3.10	34.04	N/A	ND	
WS3																	Dry	2.06	34.45	N/A	ND	
WS4A																	Dry	4.58	33.71	N/A	ND	
WS5																	Dry	4.93	34.12	N/A	ND	
WS6A																	Dry	1.35	34.04	N/A	ND	
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**9.76**	**20.5**	**34.5**	**29.21**		
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.75**	**1.35**	**33.62**	**24.33**		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry		Moist		Wet	X	Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight		Cloudy		Overcast	X
Preciptation:	None		Slight	X	Moderate		Heavy	
Barometric pressure (mbar):			Before	1015			After	1015
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before				After	

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Whitbread PLC
Site: Deansgate Pl
Date: 18/12/2020
Job No: MAN.260.003
Visit No: 2 **of** 3
Operator: NR
Project Manager: Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1																	8.80	20.05	33.72	24.92	ND	
BH2																	8.67	20.12	33.62	24.95	ND	
BH3																	9.02	20.50	33.63	24.61	ND	
BH4																	9.75	11.73	34.50	24.75	ND	
BH5																	9.56	15.10	34.09	24.53	ND	
BH6																	4.75	7.25	33.96	29.21	ND	
WS1																	Dry	4.41	33.63	N/A	ND	
WS2																	Dry	3.10	34.04	N/A	ND	
WS3																	Dry	2.06	34.45	N/A	ND	
WS4A																	Dry	4.58	33.71	N/A	ND	
WS5																	Dry	4.93	34.12	N/A	ND	
WS6A																	Dry	1.35	34.04	N/A	ND	
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.75	20.5	34.5	29.21		
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.75	1.35	33.62	24.53		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry		Moist		Wet	X	Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight	X	Cloudy		Overcast	
Preciptation:	None		Slight	X	Moderate		Heavy	
Barometric pressure (mbar):			Before	1001			After	1001
Pressure trend:			Falling	X	Steady		Rising	
Air Temperature (Deg. C):			Before	11			After	11

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client:	Whitbread PLC	**Job No:**	MAN.260.001		
Site:	Deansgate Pl	**Visit No:**	3 **of** 3		
Date:	13/01/2021	**Operator:**	NR	**Project Manager:**	Nigel Ramsumair

Monitoring Point	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Free phase Hydrocarbons (LNAPL's or DNAPL's)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
BH1																	8.81	20.05	33.72	24.91	ND	
BH2																	8.76	20.12	33.62	24.86	ND	
BH3																	9.30	20.50	33.63	24.33	ND	
BH4																	9.73	11.73	34.50	24.77	ND	
BH5																	9.57	15.10	34.09	24.52	ND	
BH6																	4.75	7.25	33.96	29.21	ND	
WS1																	Dry	4.41	33.63	N/A	ND	
WS2																	Dry	3.10	34.04	N/A	ND	
WS3																	Dry	2.06	34.45	N/A	ND	
WS4A																	Dry	4.58	33.71	N/A	ND	
WS5																	Dry	4.93	34.12	N/A	ND	
WS6A																	Dry	1.35	34.04	N/A	ND	
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**9.73**	**20.5**	**34.5**	**29.21**		
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.75**	**1.35**	**33.62**	**24.33**		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry		Moist		Wet	X	Snow	
Wind:	Calm		Light	X	Moderate		Strong	
Cloud cover:	None		Slight		Cloudy	X	Overcast	
Preciptation:	None		Slight		Cloudy	X	Heavy	
Barometric pressure (mbar):			Before	1016			After	1016
Pressure trend:			Falling		Steady		Rising	X
Air Temperature (Deg. C):			Before	3			After	3