



GROUNDTECH
CONSULTING

Job title: New Office Block, Bury

Report type: Geo-Environmental Appraisal

Prepared for: JD Sports

Date: 31 March 2022

Document Control Form	
PROJECT	NEW OFFICE BLOCK, BURY
REPORT NAME	GEO-ENVIRONMENTAL APPRAISAL
REPORT REFERENCE	GRO-21438-3308
STATUS	FINAL
ISSUE DATE	31 MARCH 2022
REVISION	
CLIENT	JD SPORTS
CLIENT CONTACT	-
For and Behalf of Groundtech Consulting	
SIGNATURE	
AUTHOR	Rebecca Rowlinson BSc (Hons)
SIGNATURE	
CHECKED	Callum Holden BSc (Hons) FGS
SIGNATURE	
REVIEWED	James Doyle BSc (Hons) CGeol FGS

SUMMARY

Site Details		
Site Location	The site is located circa 2.4km south east of Bury Town Centre and is approximately centred on National Grid Reference 381527, 408662.	
Site Area	The site is relatively level across its footprint and roughly rectangular in shape, encompassing an area of approximately 1.5 Ha. The site is predominantly formed by concrete hardstanding and is generally featureless. Unsurfaced rough ground is present in the north east in the footprint of the former warehouse building.	
Preliminary Risk Assessment		
Pollution Linkage (PL) Assessment	Human Health	The risk to human health was considered to be Moderate to Low.
	Controlled Waters	The risk to controlled waters was considered to be Low.
	Permanent Ground Gas	The risk from permanent ground gases was considered to be Moderate to High.
Ground Model		
Made Ground Soils	Made Ground was encountered in all locations to a maximum depth of 1.8m bgl, although it was generally less than 1.0m thick and typically comprised concrete or tarmac overlying brown gravelly sand or sandy gravel.	
Natural Soils	The natural strata encountered generally comprised orange brown slightly gravelly occasionally clayey Sand which was encountered underlying the Made Ground to depths between 4.0m and 6.0m bgl. This was in turn generally underlain by interbedded soft to firm sandy Clay and silty clayey Sand to depths between 15.5m and 17.0m bgl where firm to stiff sandy slightly gravelly Clay was encountered to the base of the Cable Percussive boreholes that progressed to this depth.	
Bedrock	Sandstone bedrock was encountered within BH01 at 23.5m and BH04 at 27.3m bgl and was present to the base of the boreholes at 45.0m bgl.	
Groundwater	Groundwater strikes were observed within the natural sand across the site from depths between 1.6m and 6.5m bgl.	
Ground Engineering Assessment		
Foundations	The most suitable foundations for the proposed development are considered to be piles transferring loads to the underlying medium dense to dense Sand. Based on the proposed loadings provided, pile groups will be required.	
Highways	Plate load testing was undertaken at five locations across the site and CBR values ranged between 1.6% and 5.4%. Proof rolling of the subgrade will be required as a minimum.	

SuDS	<i>Soil percolation testing was undertaken at a single location (SuDS1) within the natural Sand and infiltration rates recorded ranged between 2.17×10^{-5} and 4.37×10^{-5} m/s which are considered good drainage conditions and SuDS drainage is likely to be feasible for the proposed development.</i>
Constraints	<i>The main limitation of the site is the poor ground conditions observed to a maximum depth of 11.5m bgl in the form of loose to medium dense sand deposits overlying very soft to soft Low strength Clay in all boreholes. The loose Sand and low strength Clay are not considered a suitable bearing stratum for the proposed development which will exert high column loads.</i> <i>A high-pressure gas main is present in the north eastern corner of the site. An easement will be required in the vicinity of the gas main which should be accurately located prior to development.</i>
GQRA and Revised (PL) Assessment	
Human Health	<i>No elevated contamination has been detected, asbestos has been detected in two out of eight samples at low concentrations. Where present the proposed building and hardstanding will act as a cover layer for asbestos containing soils, in areas of soft landscaping a 600mm cover system should be in place. The risk to human health is considered to be Moderate prior to remedial action.</i>
Controlled Waters	<i>The risk to controlled waters is considered to be Low.</i>
Permanent Ground Gas	<i>A single gas monitoring visit has been undertaken to date and the site has been classified as CS1 and gas protection measures are not considered necessary at this stage. This will be confirmed or otherwise on completion of the monitoring programme.</i> <i>The site is not in an area affected by radon.</i>
Final Appraisal	

The following further work is considered necessary to progress the site to construction phase:

- *Completion of gas monitoring programme.*
- *Issue gas assessment.*
- *Detailed Foundation design.*
- *Confirmation of remedial recommendations with regulators.*

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Plans		
<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
GRO-21438-P01	-	Project Location Plan
GRO-21438-P04	-	Exploratory Hole Location Plan
GRO-21438-P05	-	Generalised Ground Model
GRO-21438-P06	-	Revised Illustrative CSM

1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by Kennedy Redford on behalf of their client JD Sports to undertake a Geo-Environmental Appraisal for a site off Pilsworth Road in Bury.

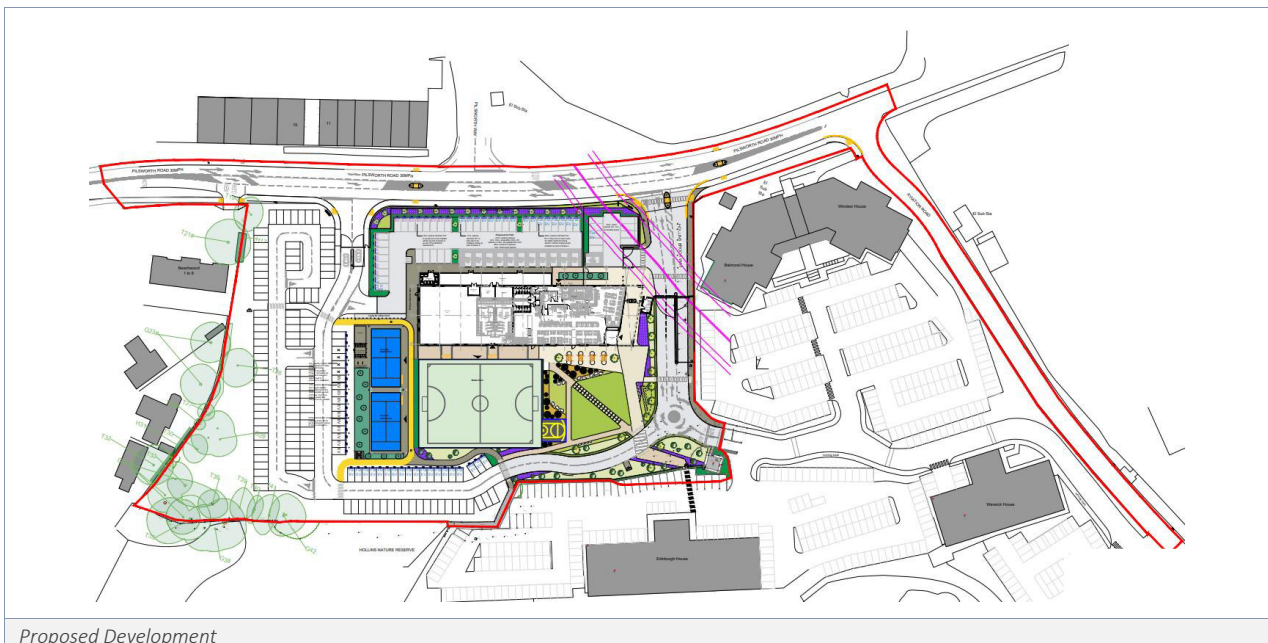
A main investigation was undertaken in accordance with BS 5930:2015, BS 10175:2017, BS 8576:2013, CIRIA C758 and Eurocode 7 to revise the CSM and quantify the level of risk identified in the PRA. The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

The following reports have previously been produced for the site:

- *Preliminary Risk Assessment referenced GRO-21438-3118, dated February 2022 produced by Groundtech Consulting Limited.*
- *Coal Mining Risk Assessment referenced GRO-21438-3119, dated 26 January 2022 produced by Groundtech Consulting Limited.*
- *Phase 2 Site Investigation referenced 4251-ROC-ZZ-XX-RP-ES-PH2SI, dated 01 December 2021 produced by RoC Consulting.*

1.2 Proposed Development

The proposed development is commercial end use comprising a new office block with associated hardsurfaced car park and staff facilities including two covered paddle courts and a MUGA pitch.



1.3 Limitations

Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.



The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 2.4km south east of Bury Town Centre, as shown on the Project Location Plan GRO-21438-P01. The site is approximately centred on National Grid Reference 381527, 408662.



Access to the site is gained off Pilsworth Road to the north east of the site.

2.2 Site Description

The site is relatively level across its footprint and roughly rectangular in shape, encompassing an area of approximately 1.5 hectares.

Site Features

The site was most recently occupied by a large warehouse unit which has recently been demolished. The footprint of the former building is surfaced with uneven ground with grass and some light vegetation. The remainder of the site is surfaced predominantly with concrete and is generally featureless.

A gas main crosses the north east corner of the site.

A vegetated strip is present along the sites northern boundary with some semi-mature and mature trees present.

Site Boundaries and Surrounding Features

The site boundaries are formed by metal fencing and trees are present close to the sites northern, eastern and southern boundaries.

The site is surrounded by the following features/land uses:



- North - *Pilsworth Road followed by light industrial/commercial units.*
- East - *Hollins Brook Way, commercial offices and an associated car park.*
- South - *Commercial office premises and Local Nature Reserve.*
- West - *Commercial buildings and residential housing estate.*

Site photographs are presented in *Appendix 2*.

3.0 PREVIOUS INVESTIGATIONS SUMMARY

3.1 Introduction

The following sections summarise the following reports previously completed for the site:

- *Preliminary Risk Assessment referenced GRO-21438-3118, dated February 2022 produced by Groundtech Consulting Limited.*
- *Coal Mining Risk Assessment referenced GRO-21438-3119, dated 26 January 2022 produced by Groundtech Consulting Limited.*
- *Phase 2 Site Investigation referenced 4251-ROC-ZZ-XX-RP-ES-PH2SI, dated 01 December 2021 produced by RoC Consulting.*

3.2 Site History and Consultations

Site History

The earliest historical records from 1848/51 indicate the site was formed by fields and was undeveloped. Six reservoirs were located between 80m and 150m south. The site remained undeveloped and formed by fields until the 1980s when a warehouse was constructed on the site which has been the only development on site until it was recently demolished.

3.3 Geology and Hydrogeology

Made Ground was not indicated to be present beneath the site, however Made Ground is thought to be present due to past development on the site.

The superficial deposits indicated to underly the site are Hummocky (moundy) Glacial Deposits which characteristically comprises clay, sand, and gravel and are classified as a Secondary A Aquifer.

The solid geology is indicated to be the Trencherbone Rock comprising Sandstone which is classified as a Secondary A Aquifer.

A coal seam is shown to subcrop on site striking north west to south east, dipping to the south west at an angle of 15°. The seam subcropping the site is not named on BGS geological maps.

3.4 Preliminary Conceptual Site Model

The following risks were identified by Groundtech Consulting Limited:

Receptor	Risk	Discussion
Site End Users from Contaminated Soils	Moderate to Low	Made Ground is likely present associated with the previous demolished commercial building and may be contaminated with a range of CoC. Soft landscaping will be present as part of the development.
Site End Users from Inhalation of Vapours	Low	Gross hydrocarbon contamination from former plant hire yard not anticipated.
Potable Water Supply Pipe	Moderate to Low	Former plant hire yard may be a source of organic contamination at installation depths.
Site End Users from Inhalation of Gas	Moderate to High	Deep Made Ground may be present associated with demolition of previous building on site. Numerous

		<i>sources identified in vicinity of site including landfills, ponds and reservoirs.</i>
<i>Controlled Waters</i>	<i>Low</i>	<i>Gross mobile contamination not anticipated and hardstanding across site will have restricted downward migration of contaminants.</i>

3.5 Coal Mining Risk Assessment

A Coal Mining Risk assessment was carried out by Groundtech Consulting which comprised a desk-based review of all available information related to coal mining at the site and should be read in conjunction with this report. The key findings are summarised below:

Recorded Coal Mining

The site is in an area requiring a Coal Mining Report. The Coal Authority Report confirms the property is not within a surface area that could be affected by any past recorded underground coal mining. However, the property is in an area where the Coal Authority believes there is coal which may have been worked at some time in the past.

There are no mine entries on or within 20m of the site and the site is not affected by recorded opencast coal mining.

No risk has been identified from recorded underground coal mine workings at the site.

Unrecorded Coal Mining

The southern half of the site, to the south of the coal seam bisecting the site is indicated to be within a Development High Risk Area and probable unrecorded coal mine workings are indicated in this area.

The coal seam subcropping at the site is anticipated to be the Blenfire Coal or Trencherbone Coal, both of which are recorded as being worked in the area.

A potential risk was identified from unrecorded mine workings and further investigation including intrusive boreholes was required.

3.6 Ground Model

RoC Consulting undertook a Ground Investigation at the site previously to inform proposed road widening works on Hollins Brook Way. The exploratory holes were resultantly localised to the eastern site boundary and are therefore not representative of wider site conditions.

The following scope of works was undertaken by RoC Consulting in October 2021:

- 3 No. windowless sample boreholes drilled to 5.45m bgl (WS101 to WS103).
- 2 No. TRL DCP tests (DCP101 to DCP102).
- 3 No. vacuum excavated slit trenches to locate the high pressure gas main (ST101 to ST103).

Made Ground was encountered at surface level in WS101 and WS102 as tarmac ranging in thickness from 0.05 to 0.1m bgl which was underlain by a limestone gravel subbase to circa 0.2m bgl.

At WS103 Topsoil was encountered at the surface to 0.2m bgl and underlain by a granular demolition fill material containing brick and limestone to 0.8m bgl this was also encountered in WS101 and WS102 to 0.5 and 0.7m bgl respectively.

In WS101 a thin layer of demolition fill material contained within a clay matrix was encountered at 0.50 to 0.75m bgl.

Groundwater strikes were not recorded within the Made Ground.

Immediately underlying Made Ground deposits at all boreholes was interbedded Sand and Clay deposits. Clay was generally comprised of orangish brown sandy clay gravelly Clay. Sand deposits were found to comprise a light brown fine to medium sand/gravelly silty sand.

The Phase 2 site investigation undertaken by RoC Consulting states that SPT values ranged from 2 to 16 in Clay deposits and 2 to 16 in Sand deposits.

Groundwater was not encountered within Glacial Clay deposits or Sand deposits

No visual or olfactory evidence of contamination was observed during the site works.

3.7 Geo-Environmental Testing Results

Six samples were screened for a range of CoC associated with the sites former use. Results from chemical testing analysis indicate there were no exceedances of Contaminants of Concern when screened against a commercial end use scenario. As such the site is not considered to pose a risk toward future users or construction persons during the development process. No asbestos was detected in any of the samples.

Groundwater was not encountered during the investigation and therefore no groundwater testing was undertaken.

3.8 Ground Gas

Ground gas monitoring standpipes were not included as part of the RoC investigation as the proposed development was associated with highway works.

3.9 Remedial Strategy

No specific remedial measures were recommended with respect to contaminated soils at the site due to the lack of elevated contamination identified.

3.10 Geotechnical

The Phase 2 site investigation undertaken by RoC Consulting states that CBR values ranged between 1% and 33% at the two locations where tests were undertaken with less than 5% being acceptable.

The plasticity index range varied between 4 and 16% with a mean value of 11%. These results indicate the Clay to be of a low plasticity.

Two Glacial Clay samples were tested for the determination of undrained shear strength from a depth of 1.0m bgl. Shear strength results vary between 103 and 194kPa with a mean value of 148.5kPa. These results indicate shallow Clay strengths vary between high to very high.



3.11 Gas Main Delineation

The high-pressure gas main present below the site was exposed by vacuum and hand excavation techniques. It was discovered that a protective concrete slab (c.900m in width) was present above the pipe along the entirety of the proposed junction works and beyond.

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site.
Maintain watching brief for visual and olfactory evidence of contamination.
Obtain samples using methodology in current guidance for contamination analysis.
Identify realistic pollution linkages to groundwater.
Determine the presence of unrecorded mine workings.
Calculate soil infiltration rates to determine feasibility of SuDS drainage.
Determine modulus of subgrade reaction to inform highway/pavement design.
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions.
Determine if targeted supplementary investigation in areas of concern is required and for remedial design.
Install monitoring standpipes for gas and groundwater monitoring.
Assess the identified pollution linkages in the CSM.

4.2 Scope of Works

The following scope of works was completed between the dates of 24th January and 4th February 2022:

- 4 No. cable percussive boreholes (BH01 to BH04) were drilled to depths between 15m and 20m bgl.
- Follow on Rotary open hole drilling was carried out from the base of cable percussive boreholes (BH01 & BH04) to a final depth of 45.0m bgl.
- 5 No. plate load tests were carried out at depths between 0.5m and 0.7m bgl.
- 3 No. trial pits (TP01 to TP03) were carried out to a maximum depth of 3.0m bgl.
- 1 No. soil percolation test (SuDS01) was carried out at a depth of 1.5m bgl.

The exploratory hole locations are presented on Groundtech Plan GRO-21438-P02 and the exploratory hole logs are in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site, and target any areas of concern as summarised in the table below:

Location	Target Rationale
BH01 & BH04	Potential coal mine workings and building footprints
BH01 to BH04	Proposed building footprints
TP01 to TP03	Proposed car park/ Highways & Former plant hire yard
SuDS1	Feasibility of SuDS drainage
CBR1 to CBR5	Proposed highways, car parks and landscaped areas

The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- *BS 5930 'Code of Practice for Site Investigations' 2015.*
- *BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.*
- *BS EN ISO 14689:2002 "Geotechnical investigation and testing – Identification and classification of rock".*

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
<i>Environmental Sample</i>	<i>22</i>
<i>Disturbed Sample</i>	<i>74</i>
<i>Undisturbed U100 Sample</i>	<i>9</i>

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for geo-environmental testing were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Testing

To inform the Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations during the Ground Investigation.

Determinand	Matrix	Number
<i>Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc and pH.</i>	<i>Soil</i>	<i>8</i>
<i>Total Petroleum Hydrocarbons (TPH CWG)</i>	<i>Soil</i>	<i>3</i>
<i>Asbestos Screening</i>	<i>Soil</i>	<i>8</i>
<i>Asbestos Quantification</i>	<i>Soil</i>	<i>2</i>
<i>Waste Acceptance Criteria (WAC)</i>	<i>Soil</i>	<i>2</i>

The Geo-Environmental Laboratory Testing Results are presented in *Appendix 4*.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

BS 1377	Test Method	Number
Part 2	Water Content	5
Part 2	Plasticity Index Analysis	5
Part 2	Particle Size Distribution	2
Part 7	Determination of Undrained Shear Strength in Triaxial Compression	8
BRE	BRE Full Suite	5

The Geotechnical Laboratory Testing Results are presented in *Appendix 5*.

4.5 Gas and Groundwater Monitoring/Sampling

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of high-density polyethylene (HDPE) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth	Response Zone (m bgl)	Targeted Strata	Reason
BH01	5.0	1.0 - 5.0	Sand	Ground Gas
BH02	5.0	1.0 - 5.0	Sand & Clay	Ground Gas
BH04	5.0	1.0 - 5.0	Gravel, Sand & Clay	Ground Gas

Permanent gas and flow rate monitoring was carried out using GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H₂S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (%LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Interim permanent gas and groundwater monitoring results are presented in *Appendix 6*.

5.0 GROUND MODEL

5.1 Made Ground

Made Ground was encountered across the site to a maximum depth of 1.8m bgl and the surface of the site was almost entirely covered with concrete to a maximum depth of 0.3m bgl encountered at location SuDS1, TP01, TP02, TP03 and BH04.

Where the previously existing building had been demolished, the surface consisted of backfill material. In the east of the site. Where BH03 was drilled, there was tarmac surfacing to a depth of 0.15m bgl.

Three main Made Ground populations were encountered during the investigation and are described below:

- *Dark brown to black sandy gravel in SuDS1, TP01, TP03, BH03, and BH04 underlying the hardstanding from a minimum depth of 0.3m bgl to a maximum depth of 1.3m bgl.*
- *Dark brown clayey gravelly sand in TP02, BH01, and BH02 from a minimum depth at ground level to a maximum depth of 0.9m bgl.*
- *Orange brown sandy gravel in BH03 between depths of 0.4m and 1.8m bgl.*



Exploratory Hole Locations

5.2 Natural Ground

The natural strata encountered generally confirmed the published geological records and typically comprised orange brown slightly gravelly occasionally clayey Sand which was encountered underlying the Made Ground to depths between 4.0m and 6.0m bgl.

This was in turn generally underlain by interbedded soft to firm sandy Clay and silty clayey Sand to depths between 15.5m and 17.0m bgl where firm to stiff sandy slightly gravelly Clay was encountered to the base of the Cable Percussive boreholes.

Four main natural stratification encountered during the investigation and are described below:

- *Orange brown slightly gravelly locally clayey medium to coarse Sand in SuDS1, TP01, TP02, TP03, BH01, BH02, and BH03 between depths of 0.75m and 6.0m bgl.*
- *Very soft to soft brown sandy Clay was encountered in BH01 to BH04 from a minimum depth of 4.0m bgl to a maximum depth of 11.5m bgl.*
- *Firm to stiff brown locally gravelly sandy Clay was in BH01 to BH04 from a minimum depth of 6.0m bgl to a maximum depth of 20.0m bgl.*
- *Brown, occasionally silty, occasionally clayey Sand in BH01 to BH04 from a minimum depth of 7.5m bgl to a maximum depth of 17.5m bgl.*

5.3 Bedrock

Bedrock was encountered within BH01 and BH04 at 23.5m and 27.3m bgl respectively and consisted of Sandstone to the maximum investigation depth of 45.0m bgl where the boreholes were terminated.

5.4 Groundwater

Groundwater strikes were observed at locations TP01 to TP03, BH02 and BH03 at depths between 1.6m and 4.0m bgl and were observed within the natural Sand deposits.

5.5 Watching Brief

A watching brief was maintained during the ground investigation for visual and olfactory evidence of contamination.

Ash was encountered within the Made Ground in BH03 between the depths of 0.4m and 1.8m bgl. No other evidence of potential contamination was noted during the investigation.

5.6 Excavation Stability

Collapse was noted during excavation of all trial pits within the natural Sand deposits locally due to the presence of groundwater.

5.7 Excavation/ Borehole Progress

Slow progress while excavating the trial pits or advancing the boreholes was not experienced. No obstructions were noted during the investigation.

6.0 GROUND ENGINEERING

6.1 Geotechnical Testing Results

Comparison of water content and the value of 0.4 times the Liquid Limit in accordance with BRE Digest 412 'Desiccation in Clay Soils' suggests significant desiccation has taken place when 0.4 times the Liquid Limit is greater than the actual water measured water content. This is a rudimentary method but also a good guide.

Results of the plasticity testing and the volume change potential of the Clay is summarised in the table below:

Reference	Depth	Modified PI	Volume Change Potential	Dessicated Y/N
TP02	0.70	23.00	Medium	No
BH01	6.00	19.00	Low	No
BH02	4.00	18.00	Low	No
BH03	6.50	20.68	Medium	No
BH04	4.00	19.40	Low	No

Quick undrained triaxial testing was carried out on eight samples of natural undisturbed Clay and the results of the triaxial test are summarised in the table below:

Reference	Depth (m)	Undrained Shear Strength (kN/m ²)	Relative Strength
BH01	6.5	24.0	Low
BH01	9.5	30.0	Low
BH01	12.5	89.0	High
BH02	6.5	23.0	Low
BH02	9.5	31.0	Low
BH03	5.0	23.0	Low
BH03	9.0	69.0	Medium
BH04	17.0	71.0	Medium

Particle Size Distribution Testing was undertaken two samples of silty sandy Clay and the results are included within the strata descriptions on the exploratory hole logs presented in *Appendix 3*.

6.2 Assessment Background

Background

The ground engineering investigation has been undertaken to formulate an accurate ground model in order to undertake preliminary foundation design. The ground model has been constructed with a moderate to high level of confidence, the ground model has evolved from the information obtained by the PRA.

The site is flat lying and was most recently occupied by a large warehouse unit which has recently been demolished. The footprint of the former building is surfaced with uneven ground with grass and some light vegetation. The remainder of the site is surfaced predominantly with concrete and is generally featureless. A high pressure gas main crosses the north east corner of the site. The hardstanding across the site will require breaking out and crushing as part of the enabling works, any below ground substructure associated with the former building will require grubbing out, and also sorted and crushed for reuse.

It is proposed to develop a maximum 3-storey office block to the east of the site and separate Creche facility building on the western boundary of the site. The design of the superstructure elements has not yet been fully developed, but it is envisaged that a framed structure of beams and columns supporting upper floors and roof will be appropriate. It is anticipated that columns loads for the development will be in the order 500 to 2000 kN (SLS).

Ground Conditions

Made Ground was encountered across the entire site to a maximum depth of 1.8m bgl. However, Made Ground was generally present to less than 1.0m bgl. The Made Ground was almost entirely composed of granular material. Natural strata encountered generally comprised orange brown medium to coarse Sand between the depths of 0.75m and 6.0m bgl which was underlain by interbedded very soft to soft brown sandy Clay/brown locally clayey Sand. Firm to stiff dark brown sandy locally gravelly Clay was encountered to a maximum depth of 20.0m bgl in the cable percussive boreholes.

Bedrock was encountered within BH01 and BH04 at 23.5m and 27.3m bgl respectively and consisted of Sandstone to a maximum depth of 45.0m bgl where the boreholes were terminated. No coal seams or evidence of coal mine workings were encountered during the investigation.

Groundwater has been encountered across the site within the natural Sand deposits between depth of 1.6m and 4.0m bgl.

Limitations

The main limitation of the site is the poor ground conditions observed to a maximum depth of 11.5m bgl in the form of loose to medium dense sand deposits overlying very soft to soft Low strength Clay which was encountered in all boreholes. The loose Sand and low strength Clay is not considered a suitable bearing stratum for the proposed development which will exert high column loads.

Due to the proposed loadings it is anticipated that a deep foundation solution will be required, transferring loads to the underlying high strength Sand strata at depth. The depth to bedrock is another factor that will need to be taken into consideration for foundation design.

A high-pressure gas main is present in the north eastern corner of the site which has previously been located and exposed by RoC Consulting during a previous investigation. Where exposed the gas main had a protective concrete covering. However, this may not be present across the entire length of the gas main on site. An easement will be required in the vicinity of the gas main which should be accurately located prior to development and Cadent should be consulted and informed of the proposed development plans so that necessary mitigation measures can be implemented.

Groundwater has been encountered across the site between 1.6m and 4.0m bgl and dewatering of excavations may be required due to seasonal fluctuations or artificial ground levels caused by construction activities.

6.3 Geotechnical Parameters

The geotechnical test results have been evaluated to derive geotechnical parameters for the soils underlying the site. A 'Depth to C_u ' and 'Depth to SPT N ' value graph is presented on GRO-21438-P05 to provide a generalised ground model for the site.

Characterization of the geotechnical parameters above has been undertaken to select a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state.

- For the loose Sand, a characteristic SPT 'N' value of 6 has been recorded and by correlation a ϕ' of 28° has been selected for ULS conditions.
- For the medium dense Sand, a characteristic SPT 'N' value of 11 has been recorded and by correlation a ϕ' of 30° has been selected for ULS conditions.
- For the dense Sand, a characteristic SPT 'N' value of 40 has been recorded and by correlation a ϕ' of 45° has been selected for ULS conditions.
- For the low strength Clay an undrained shear strength (C_u) characteristic value of 23kPa has been selected to satisfy ULS conditions based on direct measurement from laboratory testing.
- For the medium strength Clay an undrained shear strength (C_u) characteristic value of 69kPa has been selected to satisfy ULS conditions based on direct measurement from laboratory testing.
- For the high strength Clay an undrained shear strength (C_u) characteristic value of 89kPa has been selected to satisfy ULS conditions based on direct measurement from laboratory testing.

6.4 Preliminary Foundation Design – Office Building

As loose Sand and soft low strength Clay has been encountered beneath the site to a maximum depth of 11.5m bgl, traditional shallow foundations are not considered suitable for the proposed commercial development. We understand that it is anticipated that column loads for the development will be in the order 500 to 2000 kN (SLS). Preliminary design has been undertaken based on this criterion.

Loads will be transferred to the piles from ground beams, pile caps and floor slabs of the superstructure. Transverse loading on the piles and the requirement for reinforcement should be taken into consideration in the detailed design to satisfy Equilibrium Limit State conditions.

Pile Foundations

The most suitable foundations for the proposed development are considered to be piles end-bearing within the medium dense to dense Sand. Deepening the piles to the underlying Sandstone which has been encountered from depths between 23.5m and 27.3m bgl is also an option, however unlikely to be economical. End bearing in the firm to stiff Clay does not provide sufficient allowable load for a single pile.

Good workmanship will be required when installing the piles to ensure the assumptions in the design by calculation are met. The type of pile should provide sufficient lateral stability due to the poor ground conditions observed up to 11.5m bgl.

Both CFA and driven piles are considered to be suitable, the allowable loads for the different diameter and types of piles are discussed below.

A suitable working platform should be designed in accordance with BR470 in advance of the piling works.

Piled Solution – Design by Calculation

Preliminary design by calculation has been carried out using due skill and care using the global factor of safety method for pile design, a global factor of safety of 3 has been used. An allowable load has been calculated for a single pile for each cable percussive borehole and is summarised in the table below:

	BH01	BH02	BH03	BH04
CFA Pile (600mm 15-16m)	1350kN*	1550kN	1450kN	1320kN
Driven Pile (300mm 15-16m)	530kN*	600kN	600kN	560kN

*proposed creche area and piles unlikely to be required

For a 600mm diameter pile 15m in length end bearing in the medium dense Sand, allowable loads between 1320kN and 1550kN can be achieved for a 600mm diameter CFA pile. Pile groups will be required for the proposed maximum allowable load of 2000kN. The allowable loads are based on the assumption the piles end bear in the medium dense to dense Sand.

The end bearing resistance of CFA piles will depend on the drilling technique and magnitude of disruption of the medium dense to dense Sand which may reduce the base resistance.

The variability of the Sand end bearing strata requires discussion with the piling contractor. In BH03 and BH04 the Sand strata was encountered shallower at between 7.5m and 10.3m bgl, the strata was in excess of 4.7m and 8m thick. The Sand was encountered between 14m and 17.5m bgl in BH02 (where the borehole was terminated) and was interbedded with stiff Clay. High SPT values of between 40 and 44 were recorded in this strata.

Based on the variability of the end bearing strata, driven piles may be a better solution as they can be driven to sett using pile driving formulae. This will allow the drilling process to determine the end bearing strata over the piling area and the design to be verified or revised accordingly. Relatively conservative N_q bearing capacity factors have been used for the Sand strata and driven piles would allow a more efficient design to be produced if favourable ground conditions are encountered.

In BH03 and BH04 Clay strata beneath the Sand was circa 15m bgl, therefore piles should be shorter to ensure they end bear in the Sand strata and sufficient Sand for the depth of influence of the pile is beneath.

Deepening the piles to the Sandstone bedrock would provide consistent end bearing strata, however is unlikely to be cost beneficial.

Depending on the proposed finished site levels, the ground conditions indicate downdrag may be an issue and should be taken into consideration in the detailed design.

Design Validation

The piling type, length, depth of reinforcement and design should be discussed with a specialist piling contractor. They can then undertake the detailed design including drawings and specifications to provide fitness for purpose design. In accordance with EC7, static load testing is recommended to validate the design, static load testing may also allow a more efficient design to be produced. Static load testing can be undertaken on preliminary piles or more than 1% of working piles to 1.5 times the characteristic load.

The piling works should be carried out in accordance with Execution Standard EN 1536 for Bored Piles or BS EN 12699:2015 for Displacement Piles.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during the Ground Investigation, work should cease and Groundtech Consulting contacted for further advice.

During the construction phase, supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

6.5 Preliminary Foundation Design – Creche

The loadings of the proposed creche building is no greater than 250kN, BH01 was drilled in this area and encountered medium dense Sand between 0.9m and 5m bgl, the Sand became loose between 5m and 6m overlying the Soft Clay strata beneath. The Sand strata will provide a safe Allowable Bearing Pressure of 150kN/m² for a 1.5m square pad foundation. Using the bearing pressure the total settlement will be minimal and will be immediate occurring in the construction phase.

Only one exploratory location has been undertaken in this location of the site to obtain parameters for preliminary design, a watching brief should be maintained during the enabling works/removing slab to confirm the ground conditions are consistent. The watching brief will also confirm or otherwise if differential settlement is a potential issue.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during the Ground Investigation, work should cease and Groundtech Consulting contacted for further advice.

During the construction phase, supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

6.6 Building Near Trees

Trees and bushes are present along the site boundaries including mature trees, and some small bushes and trees are present in the north eastern corner of the site. Foundation excavations will not encounter cohesive strata in the vicinity of existing, proposed or recently removed trees and therefore foundation depths will not requires deepening in accordance with current guidance or heave precautions installed.

All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

6.7 Floor Slabs

Made Ground is generally present in excess of 0.6m bgl and therefore a suspended floor slab is recommended. A suspended floor slab is considered to be suitable for the proposed development and is compatible with the proposed piled foundations.

6.8 Construction

The trial pits indicate that instability of excavations is anticipated within the natural Sand deposits where collapse of the trial pits has been observed. Instability of the Made Ground is a possibility and should be considered in the groundworks method statements.

Tracked high specification plant is recommended to maintain the build programme. Breaking equipment will also be required for the hardsurfacing and locally to penetrate obstructions associated with the former building on site. No notable obstructions have been encountered during the investigation, however they cannot be ruled out.

Groundwater has been encountered within the natural Sand deposits at depths between 1.6m and 4.0m bgl and dewatering of excavations may be required locally.

6.9 Concrete Classification

Made Ground

Water soluble sulphate testing was undertaken on eight samples of the Made Ground. The range of soluble sulphate (SO_4) recorded is 15.4mg/l to 1350mg/l. Associated pH values ranged between 7.6 and 10.8 indicating slightly alkaline to alkaline conditions.

For a dataset containing five to nine results, the mean of the highest two sulphate test results should be taken as the characteristic value along with the lowest of the pH results. For the Made Ground, the characteristic water soluble sulphate concentration is 1320mg/l and the pH value is 7.6.

Natural Strata

Water soluble sulphate testing was undertaken on 5 samples of the natural ground. The range of soluble sulphate (SO_4) recorded is 43.2mg/l to 413mg/l. Associated pH values ranged between 7.0 and 8.9 indicating neutral to slightly alkaline conditions.

For a dataset containing less than five results, the highest sulphate test result should be taken as the characteristic value along with the lowest of the pH results. For the natural strata, the characteristic water soluble sulphate concentration is 413mg/l and the pH value is 7.0.

Discussion and Assessment

Due to the granular deposits present beneath the site where groundwater has been encountered, the groundwater regime is considered to be mobile.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-2 and sulphate class DS-2 conditions prevail within the Made Ground soils, and ACEC Class AC-1 and sulphate class DS-1^d conditions prevail within the natural ground in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

Pyritic Ground

To classify site locations where natural strata may contain sulphides, it is essential to take into account of the total potential sulphate content which may result from oxidation following ground disturbance.

The value of oxidisable sulphides has been calculated by subtracting the results of the acid-soluble sulphate test (AS % SO_4) from the results of the total potential sulphate (TPS % SO_4) and the results are below 0.3% indicating pyrite is not present and this does not affect the classification.

6.10 Highway Design

Five plate load tests were undertaken across the site and the results are presented in the table below. The CBR testing results are presented in *Appendix 7*.

Location	Depth	Strata	CBR Value (%)
CBR1	0.5	Brown Clay	2.1
CBR2	0.5	MG: Dark brown sandy gravel	3.1
CBR3	0.5	Brown Clay	1.6

CBR4	0.7	MG: Dark brown sandy gravel	5.4
CBR5	0.6	Brown Clay	1.8

CBR values of less than 5% were typically achieved for pavement design purposes, with exception of CBR4. As a minimum the subgrade should be proof rolled prior to construction. Some reengineering of the subgrade is required prior to highway construction to achieve the required design CBR value.

The soils are considered to be frost susceptible due to the fines content, highway construction should be a minimum thickness of 450mm to mitigate against the risk.

6.11 Sustainable Urban Drainage System (SuDS)

Soil percolation testing was carried out in general accordance with BRE Digest 365 at position SuDS1. The results are presented in *Appendix 8* and a summary is presented in the table below:

Location	Test No.	Depth (m bgl)	Stratum	Soil Infiltration Rate (m/sec)
SuDS1	1	1.50	Sand	4.37×10^{-5}
SuDS1	2	1.50	Sand	3.03×10^{-5}
SuDS1	3	1.40	Sand	2.17×10^{-5}

In SuDS1, the natural strata where the infiltration test was carried out consisted of orange brown slightly gravelly fine to coarse Sand. Three soil fills were carried out and soil infiltration rates of between 2.17×10^{-5} and 4.37×10^{-5} m/s were calculated. The first two tests were BRE compliant and the final test was not BRE compliant due to insufficient time to drain past 25% effective depth.

The results at this location and depth indicate that the use of a SuDS drainage scheme within the natural Sand deposits is a possibility as good drainage conditions have been recorded. Groundwater levels observed across the site were generally between 4.0m and 6.5m bgl. Locally, perched groundwater was present between the depths of 1.6m and 2.7m bgl within the trial pits. This will need to be considered within the design of SuDS drainage as the groundwater table should be below 1m of the base of SuDS drainage to account for seasonal variations.

6.12 Revised Coal Mining Risk Assessment

Recorded Coal Mining

No risk was identified by the Coal Authority Report and no further action was recommended at the preliminary stage.

Unrecorded Coal Mining

A potential risk from unrecorded shallow mine working was identified by the Coal Mining Risk Assessment undertaken by Groundtech Consulting. This was based on the coal outcrop beneath the southern area of the site and the uncertainty of depth to bedrock.

Sandstone bedrock has been encountered at locations BH01 and BH04 from depths between 23.5m and 27.3m bgl respectively. The Sandstone bedrock was present to the base of both boreholes at 45.0m bgl and no coal or evidence of coal mine workings was encountered.

The risk of unrecorded workings was within either the Blenfire Coal seam or Trencherbone Coal seam which had recorded thicknesses of 0.7m and 1.83m respectively.



The depth of superficial deposits and presence of groundwater indicates the presence of unrecorded mine entries or workings is highly unlikely. In addition, the depth of rock cover proves in excess of ten times the thickness of the coal seams in accordance with CIRIA C758, therefore the risk to the stability of the surface of the site is *Very Low* and no further action is required.

7.0 LAND QUALITY

7.1 Geo-Environmental Testing Results - Soils

Samples of Made Ground and natural strata have been tested for a range of relevant Contaminants of Concern. A Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used and their ranking of importance are listed below:

- *Soil Guideline Values (SGVs) which demonstrate minimal risk,*
- *LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.*
- *C4SLs which demonstrate low risk.*

In deriving the GACs for use on Brownfield sites we have assumed a 1% Soil Organic Matter, unless the results indicate otherwise.

The proposed end-use for the site is a commercial development comprising a maximum 3-storey office block to the east of the site and separate Creche facility building on the western boundary of the site. Areas of soft landscaping and two football pitches will also be included as part of the development. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the Commercial land-use scenario as defined in SR3 (EA, 2009b).

The strata or sources of contamination targeted by the laboratory testing scheduled is summarised in the table below:

Strata	Number of Samples Tested	Locations
<i>Granular Made Ground</i>	<i>7</i>	<i>TP01 to TP03, BH01, BH03, BH04</i>
<i>Natural Sand</i>	<i>1</i>	<i>BH02</i>

A summary of the Geo-Environmental Testing results is presented below and the GQRA Screening Values are presented in *Appendix 9*:

Contaminant	Range (mg/kg)	Metals		
		Commercial Screening Value	Exceedances	Locations
<i>Arsenic</i>	<i>6.6 - 11</i>	<i>640</i>	<i>0</i>	<i>-</i>
<i>Cadmium</i>	<i><0.2 - 0.6</i>	<i>230</i>	<i>0</i>	<i>-</i>
<i>Chromium</i>	<i>10 - 28</i>	<i>8600</i>	<i>0</i>	<i>-</i>
<i>Hexavalent Chromium</i>	<i><4.0</i>	<i>49</i>	<i>0</i>	<i>-</i>
<i>Copper</i>	<i>12 - 34</i>	<i>68000</i>	<i>0</i>	<i>-</i>
<i>Lead</i>	<i>14 - 110</i>	<i>2300</i>	<i>0</i>	<i>-</i>
<i>Mercury</i>	<i><0.3</i>	<i>26</i>	<i>0</i>	<i>-</i>
<i>Nickel</i>	<i>13-37</i>	<i>1800</i>	<i>0</i>	<i>-</i>
<i>Selenium</i>	<i><1.0</i>	<i>13000</i>	<i>0</i>	<i>-</i>

Zinc	31-130	730000	0	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range (mg/kg)	Commercial Screening Values	Exceedances	Locations
Naphthalene	<0.05	190	0	-
Acenaphthylene	<0.05	83000	0	-
Acenaphthene	<0.05 - 0.44	84000	0	-
Fluorene	<0.05 - 0.29	63000	0	-
Phenanthrene	<0.05 - 2.5	22000	0	-
Anthracene	<0.05 - 0.63	520000	0	-
Fluoranthene	<0.05 - 3.8	23000	0	-
Pyrene	<0.05 - 3.5	54000	0	-
Benzo(a)anthracene	<0.05 - 2.0	170	0	-
Chrysene	<0.05 - 1.4	350	0	-
Benzo(b)fluoranthene	<0.05 - 2.1	44	0	-
Benzo(k)fluoranthene	<0.05 - 0.86	1200	0	-
Benzo(a)pyrene	<0.05 - 2.1	35	0	-
Indeno(123cd)pyrene	<0.05 - 1.0	500	0	-
Dibenzo(ah)anthracene	<0.05	3.5	0	-
Benzo(ghi)perylene	<0.05 - 1.3	3900	0	-
TPH CWG – Aliphatics				
Contaminant	Range (mg/kg)	Commercial Screening Values	Exceedances	Locations
>C5-C6	<0.001	3200	0	-
>C6-C8	<0.001	7800	0	-
>C8-C10	<0.001	2000	0	-
>C10-C12	<1.0	9700	0	-
>C12-C16	<2.0	59000	0	-
>C16-C21	<8.0	1600000	0	-
>C21-C35	<8.0	1600000	0	-
Total aliphatics C5-35	<10.0		0	-
TPH CWG – Aromatics				
Contaminant	Range (mg/l)	Commercial Screening Values	Exceedances	Locations
>C5-EC7	<0.001	26000	0	-
>EC7-EC8	<0.001	56000	0	-
>EC8-EC10	<0.001	3500	0	-
>EC10-EC12	<1.0	16000	0	-
>EC12-EC16	<2.0	36000	0	-
>EC16-EC21	<10.0	28000	0	-
>EC21-EC35	<10.0 – 48.0	28000	0	-
Total aromatics C5-35	<10.0 – 53.0	-	-	-
Total aliphatics and aromatics(C5-35)	<10.0 – 53.0	-	-	-
MTBE	<1.00 ug/kg	7900	0	-
Benzene	<1.00 ug/kg	95	0	-
Toluene	<1.00 ug/kg	4400	0	-

<i>Ethylbenzene</i>	<i><1.00 ug/kg</i>	<i>2800</i>	<i>0</i>	<i>-</i>
<i>m/p-Xylene</i>	<i><1.00 ug/kg</i>	<i>3200</i>	<i>0</i>	<i>-</i>
<i>o-Xylene</i>	<i><1.00 ug/kg</i>	<i>2600</i>	<i>0</i>	<i>-</i>
Others				
<i>Natural Moisture Content 5.9 – 15.0%</i>				
<i>pH value 7.6 – 10.8</i>				
<i>Organic Matter 0.6 – 3.0%</i>				
Asbestos Screen				
Position	Depth (m bgl)	Asbestos Type	Quantification (mass%)	
<i>TP01</i>	<i>0.25</i>	<i>None Detected</i>	<i>-</i>	
<i>TP01</i>	<i>0.7</i>	<i>Amosite-Loose Fibres</i>	<i><0.001</i>	
<i>TP02</i>	<i>0.35</i>	<i>None Detected</i>	<i>-</i>	
<i>TP03</i>	<i>0.55</i>	<i>Chrysotile-Loose Fibrous Debris</i>	<i>0.005</i>	
<i>BH01</i>	<i>0.5</i>	<i>None Detected</i>	<i>-</i>	
<i>BH02</i>	<i>1.0</i>	<i>None Detected</i>	<i>-</i>	
<i>BH03</i>	<i>1.0</i>	<i>None Detected</i>	<i>-</i>	
<i>BH04</i>	<i>0.5</i>	<i>None Detected</i>	<i>-</i>	

7.2 Generic Quantitative Risk Assessment - Soils

Made Ground was encountered beneath the site to a maximum depth of 1.8m bgl. However, it was generally present to depths of less than 1.0m bgl. Made Ground generally consisted of dark brown gravelly sand and dark brown sandy gravel. No evidence of contamination was noted during the investigation.

No elevated concentrations of metals, speciated Polycyclic Aromatic Hydrocarbons (PAHs) or hydrocarbons have been recorded by the laboratory testing based on the site having a commercial end use. Furthermore, TPH concentrations were almost entirely recorded at levels below the laboratory limits of detection.

A creche is to be included in the proposed development. Young children are a more sensitive receptor, therefore the samples tested were also screened against more stringent screening values of residential without plant uptake. No elevated concentrations of metals, speciated Polycyclic Aromatic Hydrocarbons (PAHs) or hydrocarbons were identified based on using more stringent CoC screening values.

Asbestos

Amosite loose fibres were detected at a trace concentration of <0.001 mass% in TP01 at a depth of 0.7m bgl in the west of the site. Chrysotile loose fibrous debris was detected at a concentration of 0.005 mass% in TP03 at a depth of 0.55m bgl in the south east of the site.

The asbestos was associated with black brown sandy gravel with fragments of brick and tarmac present at both locations. The source of the asbestos is likely to be the previously demolished commercial building. No other asbestos has been identified within the samples screened through laboratory testing. The source of the asbestos is likely the subgrade material imported historically to construct the hardsurfacing and warehouse, shown on historical maps in 1988/92, for use within the subbase. No other asbestos has been identified within the samples screened through laboratory testing, however should be assumed to be widespread as the Made Ground is similar in nature.

7.3 Permanent Ground Gases

Three standpipes were installed for gas monitoring within BH01, BH02 and BH04. One monitoring visit has been carried out to date on 28th February 2022 and a further three visits are planned.

Concentrations of methane (CH₄) were not recorded within any monitoring locations. Carbon dioxide (CO₂) has been recorded at a maximum concentration of 4.3% v/v within BH01. Detectable levels of oxygen (O₂) were recorded within the standpipes at a minimum level of 12.3% v/v.

No positive gas flow rates were detected during the monitoring visits.

The atmospheric pressure was 1008mb on the monitoring visit which was completed during a period of falling barometric pressure.

Groundwater was recorded within all standpipes, at depths of between 0.47m and 4.0m bgl.

Characterisation of the Gas Screening Value (GSV)

Based upon the initial results recorded, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual “hazardous gas flow rates” (Q_{hg}) have been derived for each monitoring point. As no levels of methane have been recorded, a GSV for carbon dioxide only has been calculated.

$$GSV (l/hr) = \text{max borehole flow rate (l/hr)} \times \text{max gas concentration (\%)}$$

For this assessment, the maximum recorded concentration of carbon dioxide of 4.3%v/v has been used. No positive gas flow rates have been detected therefore the limit of detection of the gas analyser of 0.1l/hr has been adopted to calculate the GSV.

$$\text{Carbon Dioxide GSV} = 0.043 (4.3\%) \times 0.1 = 0.0043 \text{ l/hr}$$

Assessment

In order to assess the ground gas regime beneath the site and the need to incorporate ground gas precautions, guidance was taken from CIRIA C655 ‘Assessing risks posed by hazardous ground gases to buildings’. Based on the site having commercial end use, the Wilson and Card method has been used to carry out the assessment.

When considering the results to date in accordance with CIRIA C665 (Section A Development and Table 8.5 – Modified Wilson and Card Classification) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of 0.07l/hr and typical carbon dioxide concentrations are generally less than 5% v/v, the site falls into CS1 based on the monitoring undertaken to date.

Characteristic Situation 1

The proposed development is classified as Building Type C in accordance with BS 8485:2015 and the site falls into CS1 in accordance with Table 2 of the above guidance and no gas protection measures are required.



The above recommendations are based on the gas monitoring carried out to date and a full assessment will be provided upon completion of the gas monitoring programme.

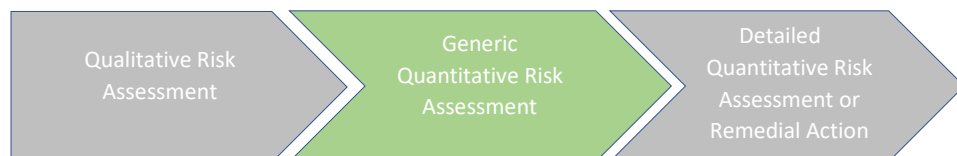
Radon

The site is not located in an area where radon precautions are required within new structures.

7.4 Revised Pollution Linkage Assessment

A pollution linkage assessment has been revised based on the Ground Investigation and testing in accordance with LCRM and CIRA C552 as set out in *Appendix 10* to identify any realistic pollution linkages in order to quantify the risks to human health and controlled waters. The revised pollution linkages are displayed on *GRO-21438-P06* - Illustrative Revised CSM.

Human Health Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely to Low Likelihood	Medium	Moderate	Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site. The site is currently utilised as an overflow car park to the adjacent JD Sports offices to the east. Historically, there has been a warehouse located on the site which has now been demolished. Made Ground was present beneath the site, no evidence of contamination was noted. No elevated concentrations of metals, speciated PAHs or hydrocarbons were detected by the laboratory testing. Asbestos fibres were detected within TP01 at 0.7m bgl and TP03 at 0.55m bgl at concentrations between <0.001 mass% and 0.005 mass%. The source of the asbestos is likely to be demolition material from the previous warehouse. The JIWG Receptor tool concluded the overall ranking is Low. No elevated contamination or asbestos was detected in the previous investigation undertaken by RoC Consulting.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						The proposed development is commercial end use comprising a three-storey office block in the east and separate Creche facility building on the western boundary of the site with associated staff welfare facilities including two five-a-side football pitches. Asbestos has been detected in the west and east of the site and should be assumed to be site wide at low concentrations. In conclusion, Made Ground is present beneath the site however no elevated levels of CoC were detected within the samples tested. Asbestos has been detected and areas of soft landscaping are proposed. Therefore a pollution linkage has been identified.
PL2	Contaminated Soils	Inhalation of vapour.	Unlikely	Medium to Severe	Low	Pollution linkage 2 refers to vapours migrating into confined spaces within the proposed development. No significant sources of volatile contamination have been identified on the site and no visual or olfactory evidence of hydrocarbon contamination was noted during the Ground Investigation. No elevated concentrations of hydrocarbons were detected by the laboratory testing and recorded concentrations were predominantly below laboratory detection limits. Therefore, no plausible pollution linkage is considered to exist.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	Pollution Linkage 3 relates to contamination on the subject site affecting adjacent site users. No sources of mobile contamination have been identified on the site therefore a viable pollution linkage has not been identified.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL4	Contaminated Soils	Attacking potable water supply pipe.	Unlikely	Medium	Low	<i>Pollution Linkage 4 refers to the possible contaminants permeating potable water pipes and consumption by the future site end users of the tainted water supply. Made Ground is present at installation depths across the site. However, no evidence of organic contamination was noted during the investigation and hydrocarbon concentrations recorded were predominantly below laboratory detection limits. It is anticipated that standard PE pipes will be suitable. However, it would be prudent to undertake a local water company risk assessment to select the correct material.</i>
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Unlikely	Medium to Severe	Low	<i>Made Ground is present beneath the site, it is generally present at shallow depths of less than 1.0m bgl. Deep Made ground was encountered at a single location to 1.8m bgl. Widespread demolition material does not appear to be present on site associated with the former warehouse.</i> <i>No methane has been detected by the monitoring undertaken to date and a maximum carbon dioxide concentration of 4.3%v/v has been recorded along with no positive flow rates. Interim gas monitoring results categorise the site as CS1 based on the GSV and therefore no gas protection measures are considered necessary at this stage.</i> <i>This will be confirmed upon completion of the gas monitoring programme.</i> <i>The site is not within an area requiring radon precautions within foundations.</i>

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Medium	Very Low	Pollution Linkage 7 refers to the impaction of Hollins Brook 91m south of the site from contaminated soils and groundwater. No sources of mobile contamination have been identified through the Ground Investigation and a plausible pollution linkage does not exist.

7.5 Outline Remedial Strategy

Soils

Made Ground was encountered beneath the entire site to a maximum depth of 1.8m bgl. No elevated concentrations of CoC above commercial screening values were detected by the laboratory testing. Asbestos was detected locally at concentrations between <0.001 mass% and 0.005 mass%.

The majority of the site will be covered with hardsurfacing which will break the pollution linkage to the Made Ground containing asbestos fibres. Where soft landscaping areas are present, it is recommended that 600mm of suitably clean topsoil is placed including a demarcation layer or a 100mm thick hard dig layer to mitigate the risk of asbestos fibres in the Made Ground.

Controlled Waters

No specific remedial measures are required with respect to controlled waters.

Permanent Ground Gasses

Based on the single gas monitoring visit undertaken to date the site falls into CS1 and gas protection measures are not considered necessary at this stage. This will be confirmed or otherwise on completion of the monitoring programme.

The site is not in an area requiring radon precautions.

Watching Brief and Regulatory Compliance

A watching brief is recommended during future ground works for any previously unseen contamination. If identified, work should cease in that area and advice sought from Groundtech Consulting Limited.

Approval from the regulators should be obtained prior to the development commencing to avoid any delays at the construction stage.

7.6 Asbestos in Soils

Asbestos fibres were detected within two out of eight samples of Made Ground that were screened. One of the samples had trace concentrations of <0.001 mass% and one sample had concentrations of 0.005 mass% where loose fibrous debris was present.

Where possible, it is advised that any Made Ground soils containing asbestos are left in the ground undisturbed.

Where soils will be disturbed as part of the ground works, in accordance with the Joint Industry Working Group (JIWG) decision support tool for CAR2012 work categories, the combined hazard and exposure ranking is Medium for the asbestos detected. The work is classified as non-licensed, and CAR does not apply.

The JIWG tables are presented in *Appendix 11*. This should be used as an aid to classify risk and recommend the level of protection required, the final decision on how asbestos within the soils should be managed should be made by the contractor.

7.7 Health and Safety - Construction and Ground Workers

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

PL Ref	Potential Source	Pollution Linkage	Likelihood	Severity	Level of Risk
PL8	Made Ground	Ingestion, direct contact, inhalation of dusts.	Unlikely	Medium	Low
PL8	Asbestos	Inhalation of dusts	Low likelihood	Medium	Medium

The risks from asbestos fibres and loose fibrous debris should be communicated to ground workers through a site induction and information on noticeboards.

General guidance on these matters is given in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

7.8 Waste Classification by Assessment

We have reviewed the testing results and inputted them into the HazWasteOnline model which allows users to code and classify waste as defined in the EWC (European Waste Catalogue 2002) based on EC Regulation 1272/2008 on the Classification, labelling and packaging of substances and mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste (1st edition 2015)-Technical Guidance”).

This is a useful tool as waste producers have the legal responsibility to classify any waste they produce.

Eight samples were tested to assess whether they contained any contaminants in the hazardous range when screened against assessment criteria within WM3. The results are in the Waste Classification Report presented in *Appendix 12*.

Location	Depth (m bgl)	Material	Classification	Hazardous Properties
TP01	0.25	MG: Dark brown sandy gravel	Non-Hazardous	-
TP01	0.70	MG: Black clayey sandy gravel	Non-Hazardous	-
TP02	0.35	MG: Dark brown gravelly sand	Non-Hazardous	-
TP03	0.55	MG: Dark brown sandy gravel	Non-Hazardous	-

BH01	0.50	MG: Dark brown clayey gravelly sand	Non-Hazardous	-
BH02	1.00	Brown slightly gravelly clayey Sand	Non-Hazardous	-
BH03	1.00	MG: Orange brown sandy gravel	Non-Hazardous	-
BH04	0.50	MG: Brown sandy gravel	Non-Hazardous	-

Asbestos fibres were detected at concentrations of less than 0.1 mass% and these concentrations therefore do not affect the classification.

7.9 Waste Acceptance Criteria (WAC) Results

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste) led to the establishment of a methodology for classifying wastes. Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. There are three different WAC, these are for:

- Inert waste
- Non –hazardous waste
- Hazardous waste

Wastes should first be classified based on their total concentrations as detailed in the previous section. WAC testing is then required if the end disposal route is a landfill.

Solid and eluate WAC analysis was undertaken on two samples, the findings of which are presented in the table below.

Reference	Depth (m)	Strata Type	Classification	WAC Analysis	Landfill Disposal
TP01	0.25	MG: Dark brown sandy gravel	Non-Hazardous	SNR	Non-hazardous
BH03	1.0	MG: Brown sandy gravel	Non-Hazardous	Inert	Inert Landfill

The WAC testing has revealed that if the end disposal route of the Made Ground is landfill the material would be accepted at an Inert or Non-Hazardous landfill.

The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.

If any organic contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Materials should be segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route. It



is recommended that where possible that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

The reuse of soils on the site this should be done in accordance with the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE CoP). Any re-use scheme should be designed to minimise disposal costs.

After a cut and fill balance plan/volume calculation has been carried out, a U1 and T5 exemption could be registered. This will allow the use of the following soils without a waste permit or under Dow CoP MMP:

- *1,000 tonnes (c. 600m³) of non-hazardous soil*
- *5,000 tonnes (c. 3,000m³) of natural sand and gravels.*
- *50,000 tonnes (c. 25,000m³) of bituminous material to be used in roadways.*
- *5,000 tonnes (c. 3,000m³) of crushed concrete / stone.*

8.0 FINAL APPRAISAL

8.1 Land Quality

Made Ground has been encountered across the site to a maximum depth of 1.8m bgl and generally consisted of either dark brown gravelly sand or sandy gravel. No visual or olfactory evidence of contamination has been noted.

Geo-Environmental testing indicates that there are no elevated concentrations of metals, speciated PAHs or hydrocarbons above commercial screening values. Asbestos fibres were detected within TP01 at 0.7m and TP03 at 0.55m bgl at concentrations of <0.001 mass% and 0.005 mass% respectively. No elevated contamination or asbestos was detected during the previous investigation of the site undertaken by RoC Consulting.

The risk from contaminated soils is considered to be *Moderate*. The majority of the redevelopment will be covered by hardsurfacing which will act as a cover system, in areas of soft landscaping a 600mm of suitably clean subsoil/topsoil and hard dig layer should be placed to mitigate the risk from asbestos fibres.

No evidence of hydrocarbon contamination has been observed or detected during the investigation and hydrocarbons were generally present at concentrations below laboratory detection limits. The risk from vapours is considered to be *Low*.

Based on the initial ground gas monitoring visits, the site falls into CS1 and gas protection measures are not considered necessary at this stage. This will be confirmed on completion of the gas monitoring programme. The site is not in an area affected by radon.

The risk to controlled water has been assessed as *Low*.

Eight samples of Made Ground/natural ground have been analysed and all have been classified as *Non-Hazardous* for waste disposal.

8.2 Ground Engineering

The most suitable foundations for the proposed development are considered to be piles transferring loads to the underlying medium dense to dense Sands. A range of allowable loads have been calculated for different types of piles and diameters. Based on the proposed loading provided, pile groups will be required.

Suspended floor slabs should be adopted at the site due to the compatibility with the proposed pile foundation solution and depth of Made Ground.

Three soil percolation tests were undertaken at a single location and the use of SuDS drainage is considered feasible within the natural Sand deposits where good soil infiltration rates have been calculated.

Five plate load tests have been undertaken across the site and CBR values for the underlying Clay ranged between 1.6% and 5.4%. Proof rolling of the subgrade will be required as a minimum.

Constraints

A high-pressure gas main is present in the north east of the site which has been located by slit trenches carried out in a previous investigation by RoC Consulting. An easement will be required around the gas main and its location need to be considered by the development layout.



8.3 Required Supplementary Investigation

The following further work is considered necessary to progress the site to construction phase:

Completion of gas monitoring programme.

Issue gas assessment.

Detailed foundation design.

Confirmation of remedial recommendations with regulators.

9.0 RELEVANT INDUSTRY REFERENCES

- British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.
- British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2015
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of soil*" BS EN ISO 14688:2002.
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of rock*" BS EN ISO 14689:2002.
- BRE Report BR211 '*Radon – Guidance on protective measures for new buildings*' 2015 Edition.
- BRE Special Digest 1: "*Concrete in Aggressive Ground*" 3rd Ed 2005.
- CIRIA 552 "*Contaminated Land Risk Assessment – A guide to good practice*" 2001.
- CIRIA C665 "*Assessing Risks Posed by Hazardous Ground Gases to Buildings*" 2007.
- Wilson & Card "*Proposed method classifying gassing sites*" Ground Engineering 1999.
- Card & Steve Wilson in "*A pragmatic approach to ground gas risk assessment for the 21st Century*" - CIRIA/Environmental Protection UK Ground gas seminar 2011
- BS 8576:2013 '*Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*'
- BS 8485:2015 '*Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings*'
- The Hazardous Waste (England) Regulations 2005.
- Environment Agency Hazardous Waste: "*Guidance on the classification and assessment of waste*" WM3 ver 1 May 2015.
- The National Planning Policy Framework (NPPF) March 2012
- DETR. Circular 02/2000 Contaminated Land.
- Environment Agency, 2009 'Using Soil Guideline Values'.
- Environment Agency, 2009 'Updated Technical Background to the CLEA model'.
- Environment Agency, 2009 'Human health toxicological assessment of contaminants in soil'.
- Department of the Environment, 1994, CLR Report No 1 'A framework for assessing the impact of contaminated land on groundwater and surface water'.
- Department of the Environment, 1994, CLR Report No 2 'Guidance on Preliminary Site Inspection of Contaminated Land'.
- Department of the Environment, 1994, CLR Report No 3 'Documentary research on Industrial Sites'.
- Department of the Environment, 1994, CLR Report No 4 'Sampling Strategies for Contaminated Land'.
- DEFRA and the Environment Agency, 2002-2004, CLR10 'Soil Guideline Value Reports for Individual Soil Contaminants'.
- DEFRA and the Environment Agency, 2004, CLR Report No 11 'Model Procedures for the Management of Contaminated Land'.
- Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R. C. and Nathanail, J.F. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- CL:AIRE, 2014 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination'.
- Water Framework Directive.
- Environmental Quality Standards.

UK Drinking Water Standards: Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) and Water Supply (Water Quality) Regulations

UKWIR Report 10/WM/03/21 2010 "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites"

Health & Safety Executive, 1991. 'Protection of Workers & the General Public during the Development of Contaminated Land'.

Environment Agency & NHBC, 2000. R&D Publication 66. Guidance for the Safe Development of Housing on Land Affected by Contamination.

Environment Agency "Guidance on the classification and assessment of waste (1st edition 2015) Technical Guidance WM3"

NHBC Standards 2019

CL:AIRE "*The Definition of Waste: Development Industry Code of Practice*" Version 2 March 2011.

CIRIA "*Asbestos in soil and made ground: a guide to understanding and managing risks*" C733 2014

Control of Asbestos Regulations (CAR) 2012

Harris, M R, Herbert, S. M, Smith, M A 'Remedial Treatment for Contaminated Land' (twelve volumes), special publications 101-112, CIRIA 1996.

Department of the Environment. 1995. Industry Profiles - 48 separate publications available from The Stationery Office, London

BRE Digest 365 "Soakaway Design" 2015.

Environment Agency. R&D Publication 20. Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources. 1999.

Environment Agency Technical Guidance Note 01. Hydrogeological Risk Assessment for Landfills.

Specification for Highways Works – Series 600 Earthworks November 2016

APPENDIX 1 - Plans

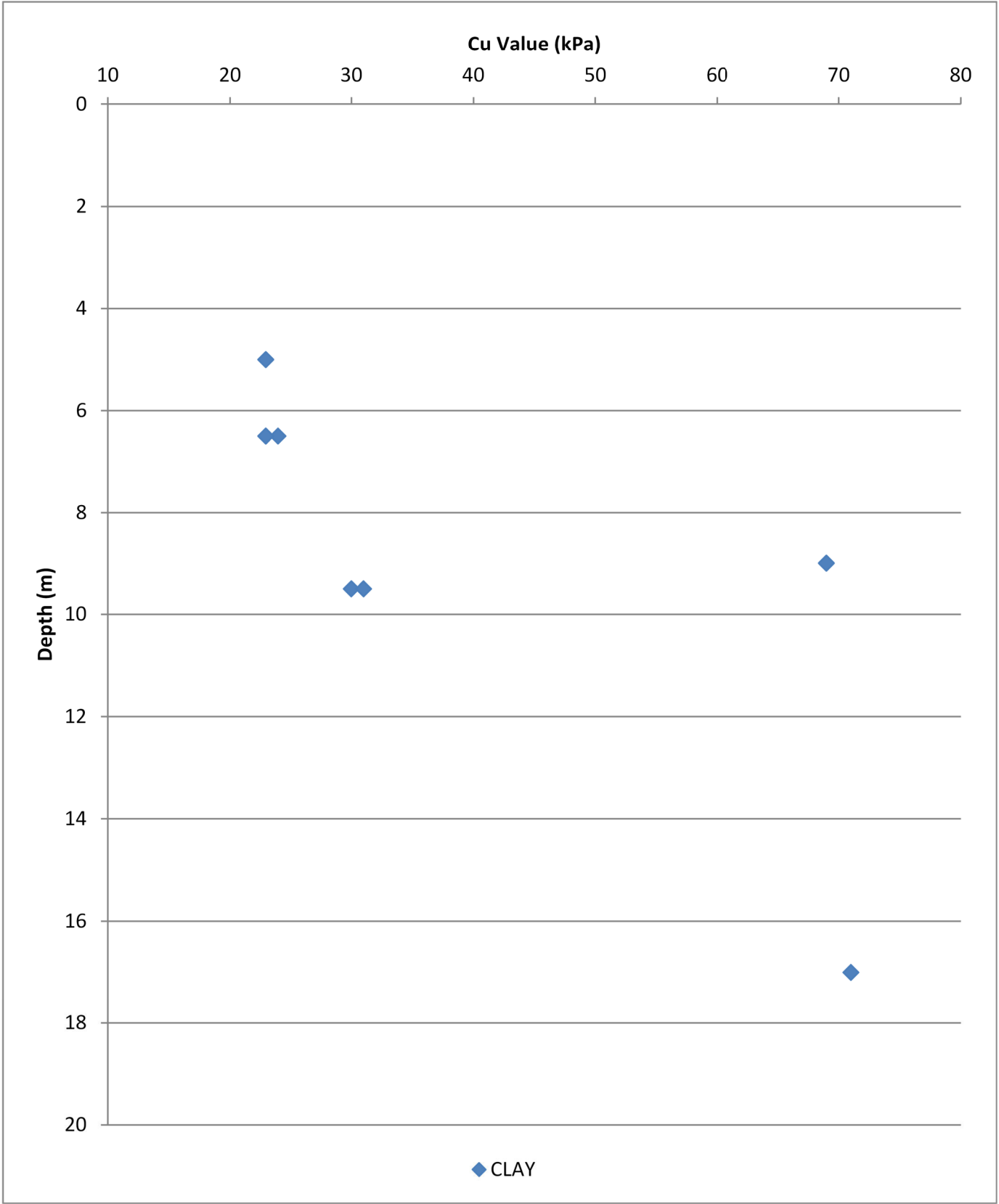
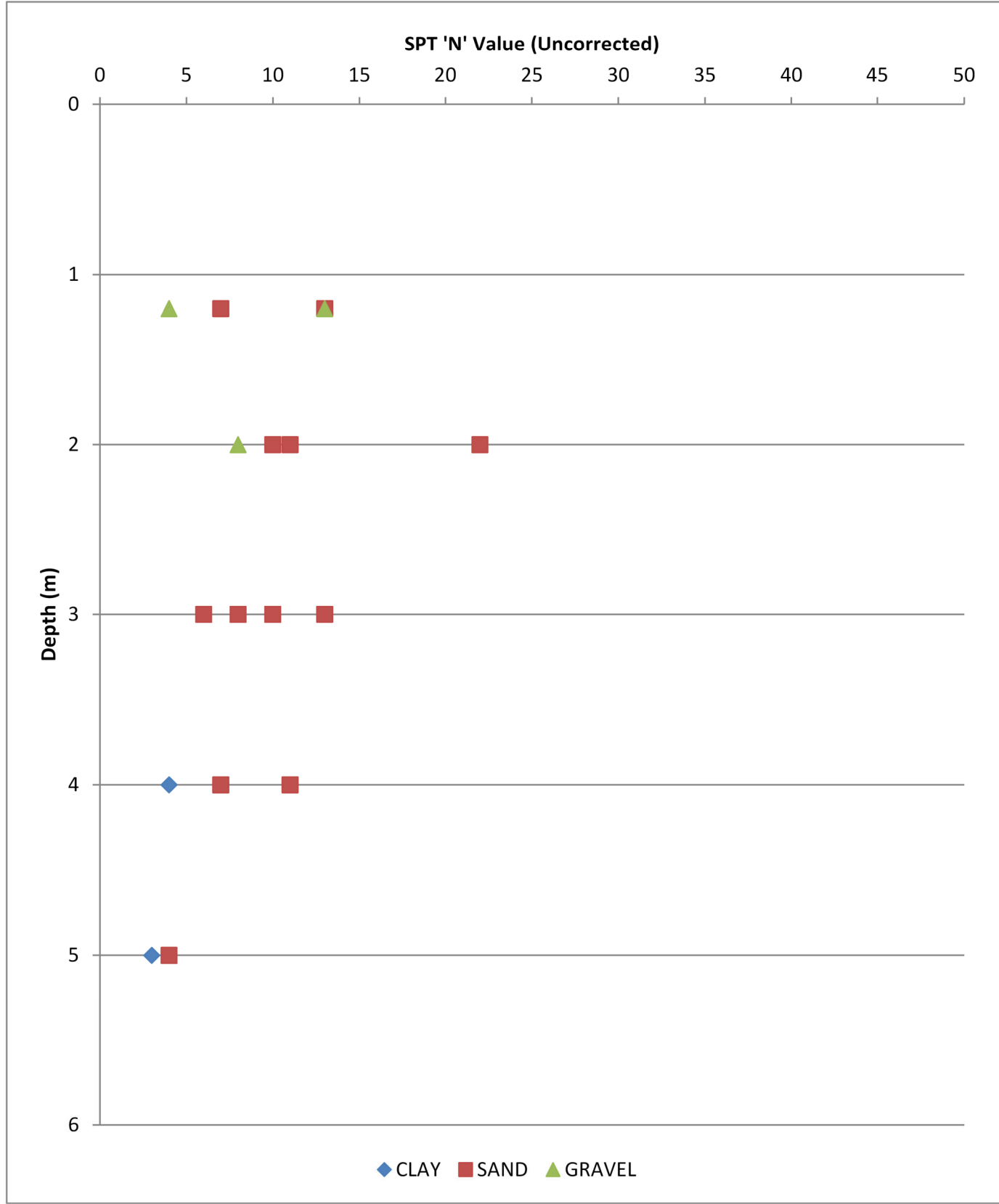


GROUNDTECH CONSULTING	CLIENT	DATE			Status	Notes - Site Location
	JD SPORTS	JANUARY 2022			Preliminary	
	PROJECT TITLE	SCALE			Draft	
	NEW OFFICE BLOCK, BURY	NTS			Issued	
	PLAN TITLE	PLAN NUMBER			For Comment	
	PROJECT LOCATION PLAN	GRO-21438-P01	Rev.	Details	Date	Approved





GROUNDTECH CONSULTING 	CLIENT	DATE				Status		Notes  – Site Location  – Borehole Location  – Trial Pit Location 
	JD SPORTS	JANUARY 2022				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	NEW OFFICE BLOCK, BURY	NTS				Issued		
	PLAN TITLE	PLAN NUMBER				For Comment		
	EXPLORATORY HOLE LOCATION PLAN	GRO-21438-P04				Approved		



GROUNDTECH
CONSULTING



CLIENT

JD SPORTS

PROJECT TITLE

NEW OFFICE BLOCK, BURY

PLAN TITLE

GENERALISED GROUND MODEL

DATE

FEBRUARY 2022

SCALE

NTS

PLAN NUMBER

GRO-21438-P05

Rev.

Details

Date

Status

Preliminary

Draft

Issued

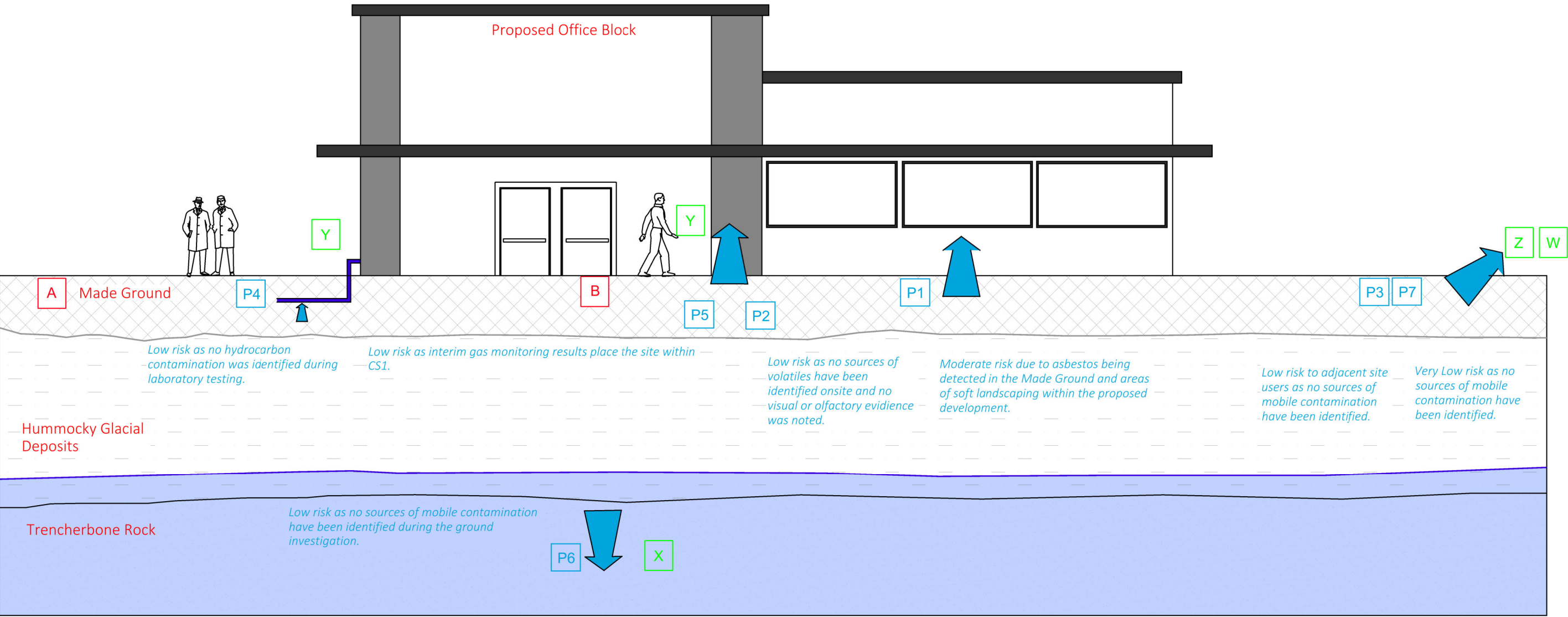
For Comment

Approved

Notes



SOURCES	POLLUTION LINKAGES	RECEPTORS
A. Contaminated soils / Made ground. B. Ground gas.	P1. Ingestion of soil and dust. P2. Inhalation of vapour. P3. Inhalation of soil dust by adjacent site users. P4. Attacking of potable water supply pipe. P5. Migration and accumulation of ground gas in internal places. P6. Impaction of groundwater from soil contamination. P7. Migration of soil and groundwater contamination impacting surface waters.	W. Hollins Brook X. Groundwater within the Secondary A Aquifer. Y. Site end users. Z. Adjacent site users.



GROUNDTECH CONSULTING 	CLIENT	DATE				Status		Notes
	JD SPORTS	JANUARY 2022				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	NEW OFFICE BLOCK, BURY	NTS				Issued		
	PLAN TITLE	PLAN NUMBER				For Comment		
	REVISED ILLUSTRATIVE CSM	GRO-21438-P06	Rev.	Details	Date	Approved		







APPENDIX 2 - Site Photographs



Photograph 1 – Site entrance.



Photograph 2 – Entrance area of site.



Photograph 3 – Tarmac area to the east of the site along with adjacent office block.



Photograph 4 - Area of former warehouse building.



Photograph 5 – Existing building on site.



Photograph 6 – Western part of the site.



APPENDIX 3 - Exploratory Hole Logs



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Borehole Log

Borehole No.

BH01

Sheet 1 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 24/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.30			Stone.	
		0.30	D						
		0.50	ES						
		1.00	ES		0.90			MADE GROUND: Dark brown clayey gravelly medium to coarse sand. Gravel is angular to subangular fine to medium of mixed lithologies including brick.	
		1.20		N=13 (1,2/3,3,3,4)					
		1.20 - 1.65	D						
		2.00	ES					Medium dense orange brown slightly gravelly medium to coarse SAND. Gravel is angular to subangular fine to medium of mixed lithologies.	
		2.00		N=11 (1,2/2,2,3,4)					
		2.00 - 2.45	D						
		2.00 - 5.45	D						
		3.00		N=10 (1,1/2,2,3,3)					
		3.00 - 3.45	D						
		4.00		N=11 (1,2/2,3,3,3)					
		4.00 - 4.45	D						
		5.00		N=4 (1,0/1,1,1,1)					
								Becoming loose to very loose at 5.0m bgl.	
		6.00	D		6.00			Soft low strength brown sandy CLAY. Sand is fine to medium.	
		6.50 - 6.95	U						
		7.00	D						
		8.00		N=4 (1,0/1,1,1,1)					
		8.00 - 8.45	D						
		9.50 - 9.95	U						
		10.00	D						

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 6.5m bgl. 4. Cable percussive drilling carried out from ground level to 20.0m bgl. 5. Rotary open hole drilling carried out from 20.0m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





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Borehole Log

Borehole No.

BH01

Sheet 2 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 24/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		11.00 - 11.45	D	N=7 (1,1/1,2,2,2)	11.50			Soft brown slightly gravelly sandy CLAY. Sand is fine to medium. Gravel is angular to subangular fine to medium of mixed lithologies.	11		
		11.50									
		12.00	D						12		
		12.50 - 12.95	U	N=24 (3,4/4,5,7,8)	12.50			Firm to stiff high strength brown sandy CLAY. Sand is fine to medium.			
		12.50 - 12.95	U								
		13.00	D						13		
		13.00	D								
		14.00		N=17 (1,2/3,4,5,5)	15.00			Medium dense brown medium to coarse SAND.	14		
		14.00 - 14.45	D								
		15.00 - 17.50	D						15		
		15.50		N=23 (2,3/4,5,7,7)	17.00			Firm to stiff brown CLAY with bands of sand. Sand is fine to medium.	16		
		15.50 - 15.95	D								
		17.00		N=39 (4,5/7,8,10,14)	20.00				17		
		17.00 - 17.50	D								
		18.50		N=31 (3,4/6,7,8,10)	20.00				18		
		18.50 - 18.95	D								
		20.00							19		
									20		
		Continued on next sheet									

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 6.5m bgl. 4. Cable percussive drilling carried out from ground level to 20.0m bgl. 5. Rotary open hole drilling carried out from 20.0m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH01

Sheet 3 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 24/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00 - 20.45	D					Firm to stiff brown CLAY with boulders.	21
									22
									23
									24
									25
					25.30			Red sandstone.	26
									27
									28
									29
									30

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 6.5m bgl. 4. Cable percussive drilling carried out from ground level to 20.0m bgl. 5. Rotary open hole drilling carried out from 20.0m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH01

Sheet 4 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 24/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 6.5m bgl. 4. Cable percussive drilling carried out from ground level to 20.0m bgl. 5. Rotary open hole drilling carried out from 20.0m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH01

Sheet 5 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 24/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					45.00				41
									42
									43
									44
									45
									46
									47
									48
									49
									50

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 6.5m bgl. 4. Cable percussive drilling carried out from ground level to 20.0m bgl. 5. Rotary open hole drilling carried out from 20.0m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH02

Sheet 1 of 2

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 27/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	D		0.80			MADE GROUND: Brown gravelly clayey medium to coarse SAND. Gravel is angular to subangular medium to coarse of mixed lithologies including brick.	
		1.00	D					Loose orange brown slightly gravelly clayey medium to coarse SAND. Gravel is angular to subangular fine to medium of mixed lithologies.	1
		1.00	ES						
		1.20							
		1.20 - 1.65	D	N=7 (1,1/1,2,2,2)				Soft to firm brown sandy CLAY. Sand is fine to medium.	
		2.00							
		2.00 - 2.45	D	N=10 (1,2/1,3,3,3)					2
		3.00						Firm dark brown gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of mixed lithologies including coal and sandstone.	
		3.00 - 3.45	D	N=12 (2,3/2,3,3,4)					3
		4.00							
		4.00 - 4.45	D	N=7 (1,1/1,2,2,2)	4.10			Firm dark brown gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of mixed lithologies including coal and sandstone.	4
		5.00							
		5.00 - 5.45	D	N=3 (1,0/0,1,1,1)					5
		6.50 - 6.95	U		6.00			Firm dark brown gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of mixed lithologies including coal and sandstone.	6
		7.00	D						7
		8.00							
		8.00 - 8.45	D	N=14 (2,2/2,3,4,5)					8
		9.50 - 9.95	U					Firm dark brown gravelly sandy CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of mixed lithologies including coal and sandstone.	9
		10.00	D						10

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 4.00m bgl. 5. Hole terminated at 20.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH02

Sheet 2 of 2

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 27/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00		N=32 (4,5/7,8,8,9)					11
		12.50 - 12.95	U						12
		14.00		N=44 (4,5/7,10,12,15)	14.00				14
		14.00 - 14.45	D					Very dense brown fine to medium SAND interbedded with firm to stiff dark brown sandy CLAY. Sand is fine to medium.	15
		15.50		N=40 (3,5/8,10,10,12)					16
		15.50 - 15.95	D						17
		17.00		N=40 (2,4/7,9,12,12)	17.50				18
		17.00 - 17.45	D						19
								End of borehole at 17.50 m	20

Remarks

1. Location cleared by utility clearance. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 4.00m bgl. 5. Hole terminated at 20.0m bgl. 6. Standpipe installed to 5.0m bgl, 1m plain and 4m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH03

Sheet 1 of 2

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.15			MADE GROUND: Tarmac.	
		0.50	ES		0.40			MADE GROUND: Brown sandy angular to subangular fine to medium gravel of mixed lithologies including brick. Sand is medium to coarse.	
		0.80	D					MADE GROUND: Orange brown sandy angular to subangular fine to medium gravel of mixed lithologies including ash and brick. Sand is medium to coarse.	1
		1.00	ES						
		1.20		N=13 (2,2/3,3,3,4)					
		1.20 - 1.65	D						
		2.00	ES		1.80			Medium dense dark brown gravelly medium to coarse SAND. Gravel is angular to subangular fine to medium of mixed lithologies including sandstone.	2
		2.00		N=22 (3,3/22 for 275mm)					
		2.00 - 2.45	D						
		3.00		N=8 (1,2/1,2,2,3)				Becoming loose at 3.0m bgl.	3
		3.00 - 3.45	D						
		4.00		N=4 (1 for 125mm/4 for 235mm)	4.00			Very soft to soft low strength dark brown sandy CLAY. Sand is fine to medium.	4
		4.00 - 4.45	D						
		5.00 - 5.45	U						5
		5.50	D						6
		6.50		N=21 (2,3/3,5,6,7)					
		6.50 - 6.95	D		6.80			Firm to stiff medium strength sandy CLAY. Sand is fine to medium.	7
									8
		9.00 - 9.45	U						9
		9.50	D						10

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Tarmac broken out to 0.15m bgl. 3. Hand dug pit to 1.20m bgl. 4. Groundwater encountered at 3.00m bgl rising to 2.90m bgl after 20 minutes. 5. Hole terminated at 15.0m bgl. 6. Hole backfilled with arisings.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

BH03

Sheet 2 of 2

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 10.50 - 10.95	D	N=30 (5,4/5,7,8,10)	10.30			Medium dense dark brown very clayey fine to medium SAND.	11
		12.00 12.00 - 12.45	D	N=26 (5,5/5,6,7,8)					12
		13.50 13.50 - 13.95	D	N=39 (3,5/7,10,10,12)					13
		15.00 15.00 - 15.45	D	N=47 (5,6/8,10,14,15)	15.00				14
								Becoming dense from 13.5m bgl.	15
								End of borehole at 15.00 m	16
									17
									18
									19
									20

Remarks

1. Location cleared by utility clearance. 2. Tarmac broken out to 0.15m bgl. 3. Hand dug pit to 1.20m bgl. 4. Groundwater encountered at 3.00m bgl rising to 2.90m bgl after 20 minutes. 5. Hole terminated at 15.0m bgl. 6. Hole backfilled with arisings.





GROUNDTECH
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Borehole Log

Borehole No.

BH04

Sheet 1 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 0.30 0.50	ES D ES		0.30			MADE GROUND: Grey concrete.	
		1.00 1.20 1.20 - 1.65	ES D	N=4 (1,1/1,1,1,1)	1.20			MADE GROUND: Brown sandy angular to subangular fine to medium gravel of mixed lithologies including brick. Sand is medium to coarse.	1
		2.00 2.00 2.00 - 2.45	ES D	N=8 (1,2/2,2,2,2)	2.00			Loose brown clayey sandy angular to subangular fine to medium GRAVEL of mixed lithologies including sandstone. Sand is medium to coarse.	2
		3.00 3.00 3.00 - 3.45	ES D	N=6 (1,1/1,1,2,2)				Loose brown slightly gravelly silty fine to medium SAND. Gravel is angular to subangular fine to medium of mixed lithologies.	3
		4.00 4.00 - 4.45	D	N=7 (1,1/1,2,2,2)	4.00			Soft brown sandy CLAY. Sand is fine to medium.	4
		5.00 - 5.45	U						5
		6.00 6.50 6.50 - 6.95	D D	N=8 (1,1/2,2,2,2)					6
		8.00 8.00 - 8.45	D	N=15 (2,2/3,3,4,5)	7.50			Medium dense brown fine to medium silty SAND.	8
		9.50		N=13 (1,2/3,3,3,4)					9
					10.00				10

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Concrete cored out to 0.30m bgl. 3. Groundwater encountered at 5.8m bgl. 4. Cable percussive drilling undertaken to 18.5m bgl. 5. Rotary open hole follow on undertaken from 18.5m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl., 1m plain and 4m slotted.





GROUNDTECH
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Borehole Log

Borehole No.

BH04

Sheet 2 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

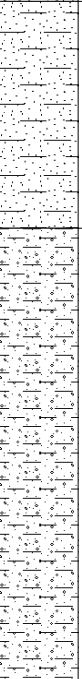
Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00 11.00 - 11.45	D	N=30 (2,4/5,7,8,10)	14.00			Dark brown slightly gravelly clayey SAND. Sand is medium to coarse. Gravel is angular to subangular fine to medium of mixed lithologies including coal.	11
		12.50 12.50 - 12.95	D	N=29 (3,4/4,5,8,12)					12
		14.00 - 14.45	U						13
		14.50 14.50 - 14.95	D	N=17 (2,3/4,4,4,5)					14
		15.50 15.50 - 15.95	D	N=30 (2,5/6,6,8,10)	15.50		Medium dense dark brown very clayey fine to medium SAND.	15	
		17.00 - 17.45	U		18.50			16	
		17.50	D					17	
		18.50 18.50 - 18.95	D	N=32 (4,5/7,8,8,9)				18	
								19	
								20	
							Continued on next sheet		

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Concrete cored out to 0.30m bgl. 3. Groundwater encountered at 5.8m bgl. 4. Cable percussive drilling undertaken to 18.5m bgl. 5. Rotary open hole follow on undertaken from 18.5m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl., 1m plain and 4m slotted.





Borehole No.

BH04

Sheet 3 of 5

Project Name: NEW OFFICE BLOCK

Project No.	GRO-21438
-------------	-----------

Co-ords: -

Hole Type
CP

Location: BURY

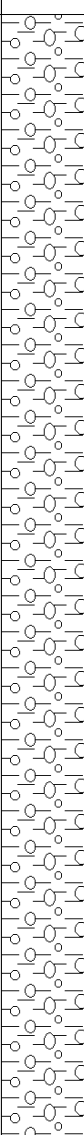
Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
Well 1					27.50				21
							22		
							23		
							24		
							25		
							26		
							27		
							28		
							29		
							30		
							Continued on next sheet		

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Concrete cored out to 0.30m bgl. 3. Groundwater encountered at 5.8m bgl. 4. Cable percussive drilling undertaken to 18.5m bgl. 5. Rotary open hole follow on undertaken from 18.5m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl., 1m plain and 4m slotted.





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Borehole Log

Borehole No.

BH04

Sheet 4 of 5

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -

Hole Type
CP

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Continued on next sheet

Remarks

1. Location cleared by utility clearance. 2. Concrete cored out to 0.30m bgl. 3. Groundwater encountered at 5.8m bgl. 4. Cable percussive drilling undertaken to 18.5m bgl. 5. Rotary open hole follow on undertaken from 18.5m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl., 1m plain and 4m slotted.





Borehole No.

BH04

Sheet 5 of 5

Project Name: NEW OFFICE BLOCK

Project No.	GRO-21438
-------------	-----------

Co-ords: -

Hole Type	CP
-----------	----

Location: BURY

Level:

Scale
1:50

Client: JD SPORTS

Dates: 26/01/2022 -

Logged By
RR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					45.00				41
									42
									43
									44
									45
									46
									47
									48
									49
									50

Remarks

1. Location cleared by utility clearance. 2. Concrete cored out to 0.30m bgl. 3. Groundwater encountered at 5.8m bgl. 4. Cable percussive drilling undertaken to 18.5m bgl. 5. Rotary open hole follow on undertaken from 18.5m bgl to 45.0m bgl. 6. Standpipe installed to 5.0m bgl., 1m plain and 4m slotted.



Trial Pit Log

Trialpit No
TP01
Sheet 1 of 1

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -
Level:

Date
25/01/2022

Location: BURY

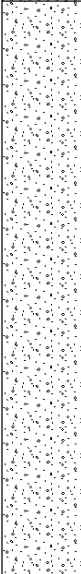
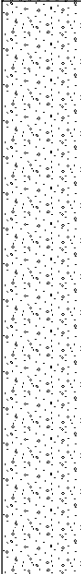
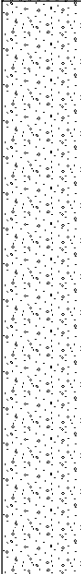
Dimensions
(m):

Depth
3.00

Scale
1:25

Logged
RR

Client: JD SPORTS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.25	ES		0.25			MADE GROUND: Grey concrete.	
							MADE GROUND: Dark brown sandy angular to subangular fine to medium gravel of mixed lithologies including brick. Sand is medium to coarse.	
	0.70	ES		0.65			MADE GROUND: Black clayey sandy subangular to subrounded fine to medium gravel of mixed lithologies including tarmac and brick. Sand is medium to coarse.	1
	1.20	ES		1.10			Orange brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium of mixed lithologies including coal.	
	1.30	D						
	1.90	D						2
	2.00	D						
	2.50	D						
	3.00	D		3.00			End of pit at 3.00 m	3
								4
								5

Remarks: 1. Groundwater encountered at 2.7m bgl 2. Pit sides unstable 3. Pit backfilled with arisings

Stability:



Trial Pit Log

Trialpit No
TP02
Sheet 1 of 1

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -
Level:

Date
25/01/2022

Location: BURY

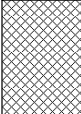
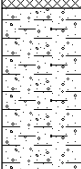
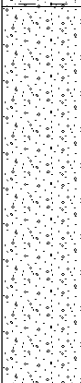
Dimensions (m):

Depth
2.50

Scale
1:25

Logged
RR

Client: JD SPORTS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.35	ES		0.30			MADE GROUND: Grey concrete.	
	0.70 0.70	D ES		0.70			MADE GROUND: Dark brown gravelly medium to coarse sand with pockets of clay. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and sandstone.	
							Soft orange brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of mixed lithologies including sandstone.	1
	1.40 1.45	ES D		1.25			Orange brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium of mixed lithologies including sandstone and coal.	
	2.00	D						2
	2.50	D		2.50			End of pit at 2.50 m	3
								4
								5

Remarks: 1. Groundwater encountered at 2.0m bgl 2. Pit sides unstable 3. Pit backfilled with arisings

Stability:



Trial Pit Log

Trialpit No
TP03
Sheet 1 of 1

Project Name: NEW OFFICE BLOCK

Project No.
GRO-21438

Co-ords: -
Level:

Date
24/01/2022

Location: BURY

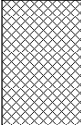
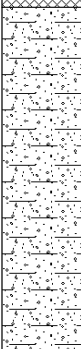
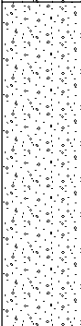
Dimensions
(m):

Depth
3.00

Scale
1:25

Logged
RR

Client: JD SPORTS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼				0.30			MADE GROUND: Grey concrete.	
	0.55	ES					MADE GROUND: Dark brown sandy angular to subangular fine to medium gravel of mixed lithologies including brick. Sand is medium to coarse.	
	0.80	ES		0.75			Orange brown clayey slightly gravelly medium to coarse SAND with bands of grey. Gravel is angular to subangular fine to medium of mixed lithologies including sandstone and coal.	1
	1.00	D						
	1.50	D						
	1.90	ES		1.90			Orange brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium of mixed lithologies including sandstone and coal.	2
	2.00	D						
	2.50	D						
				3.00			End of pit at 3.00 m	3
								4
								5

Remarks: 1. Groundwater encountered at 1.6m bgl 2. Pit sides unstable 3. Pit backfilled with arisings

Stability:



APPENDIX 4 - Geo-Environmental Testing



Rebecca Rowlinson
Groundtech Consulting Ltd
First Floor, Lloyd House
Oxford Court
Greenfold Way
WN7 3XJ

t: 07449819886

e: rr@groundtechconsulting.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 22-37451

Replaces Analytical Report Number: 22-37451, issue no. 1
Additional analysis undertaken.

Project / Site name:	New Office Block, Bury	Samples received on:	28/01/2022
Your job number:	GRO-21438	Samples instructed on/ Analysis started on:	04/02/2022
Your order number:	ORD-21438-2294	Analysis completed by:	17/03/2022
Report Issue Number:	2	Report issued on:	21/03/2022
Samples Analysed:	8 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-37451
Project / Site name: New Office Block, Bury
Your Order No: ORD-21438-2294

Lab Sample Number				2160716	2160717	2160718	2160719	2160720
Sample Reference				TP01	TP01	TP02	TP03	BH01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.70	0.35	0.55	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	38	35	56	36	< 0.1
Moisture Content	%	0.01	NONE	7.6	13	12	5.9	12
Total mass of sample received	kg	0.001	NONE	0.9	1	1	0.9	0.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Amosite	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	0.005	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	0.005	-
Asbestos Analyst ID	N/A	N/A	N/A	SCA	SCA	SCA	SCA	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	10.8	7.6	9.6	9.6	8
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2600	2700	1300	230	45
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.3	1.3	0.67	0.12	0.023
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1290	1350	666	117	22.5
Organic Matter (automated)	%	0.1	MCERTS	1.8	3	1.8	1.1	1.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.29	0.44	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.29	0.22	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.5	0.62	0.66	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.63	0.23	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	3.8	0.93	0.83	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	3.5	0.8	0.82	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2	0.48	0.43	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.4	0.36	0.41	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	0.47	0.33	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.86	0.27	0.23	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.1	0.43	0.41	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1	0.24	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	0.26	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	21.8	5.75	4.12	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.4	11	7.1	7.3	6.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.6	< 0.2	0.4	< 0.2
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	18	17	28	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	34	27	15	28	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	53	75	110	24	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	15	13	36	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	86	79	93	60

Analytical Report Number: 22-37451
 Project / Site name: New Office Block, Bury
 Your Order No: ORD-21438-2294

Lab Sample Number				2160716	2160717	2160718	2160719	2160720
Sample Reference				TP01	TP01	TP02	TP03	BH01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.70	0.35	0.55	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	MCERTS	< 10	-	-	< 10	-

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	-	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	48	-	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	MCERTS	53	-	-	< 10	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-37451
Project / Site name: New Office Block, Bury
Your Order No: ORD-21438-2294

Lab Sample Number				2160721	2160722	2160723
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.00	0.50
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	44	< 0.1
Moisture Content	%	0.01	NONE	15	7.4	9.5
Total mass of sample received	kg	0.001	NONE	1	0.9	1

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	SCA	SCA	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	8.9	8.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	97	31	94
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.049	0.015	0.047
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	48.7	15.4	47.1
Organic Matter (automated)	%	0.1	MCERTS	1.4	0.6	0.9

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.9	3.4	6.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	10	12	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	12	23
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	42	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	10	13	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	31	52	96

Analytical Report Number: 22-37451
Project / Site name: New Office Block, Bury
Your Order No: ORD-21438-2294

Lab Sample Number				2160721	2160722	2160723
Sample Reference				BH02	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.00	0.50
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Monoaromatics & Oxygenates						
Benzene	µg/kg	1	MCERTS	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	MCERTS	-	< 10	-

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	MCERTS	-	< 10	-

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 22-37451
Project / Site name: New Office Block, Bury
Your Order No: ORD-21438-2294

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2160717	TP01	0.70	121	Loose Fibres	Amosite	< 0.001	< 0.001
2160719	TP03	0.55	143	Loose Fibrous Debris	Chrysotile	0.005	0.005

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

Analytical Report Number : 22-37451

Project / Site name: New Office Block, Bury

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2160716	TP01	None Supplied	0.25	Brown sandy clay with stones.
2160717	TP01	None Supplied	0.7	Brown clay and loam with stones.
2160718	TP02	None Supplied	0.35	Brown clay and loam with stones.
2160719	TP03	None Supplied	0.55	Grey clay and sand with stones.
2160720	BH01	None Supplied	0.5	Brown sand with gravel.
2160721	BH02	None Supplied	1	Brown sand with gravel.
2160722	BH03	None Supplied	1	Brown clay and sand with stones.
2160723	BH04	None Supplied	0.5	Grey clay and sand with gravel.

Analytical Report Number : 22-37451

Project / Site name: New Office Block, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Analytical Report Number : 22-37451

Project / Site name: New Office Block, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 22-37451

Project / Site name: New Office Block, Bury

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	2160720	a	None Supplied	None Supplied	None Supplied
BH02	None Supplied	S	2160721	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	2160722	a	None Supplied	None Supplied	None Supplied
BH04	None Supplied	S	2160723	a	None Supplied	None Supplied	None Supplied
TP01	None Supplied	S	2160716	a	None Supplied	None Supplied	None Supplied
TP01	None Supplied	S	2160717	a	None Supplied	None Supplied	None Supplied
TP02	None Supplied	S	2160718	a	None Supplied	None Supplied	None Supplied
TP03	None Supplied	S	2160719	a	None Supplied	None Supplied	None Supplied

APPENDIX 5 - Geotechnical Testing



LABORATORY REPORT



4043

Contract Number: PSL22/0922

Report Date: 09 March 2022
Client's Reference: ORD-21438
Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Rebecca Rowlinson

Contract Title: New Office Block, Bury
Date Received: 7/2/2022
Date Commenced: 7/2/2022
Date Completed: 9/3/2022

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:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(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

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP02		D	0.70		Brown sandy CLAY
BH01		D	6.00		Brown sandy CLAY
BH02		D	4.00		Brown sandy CLAY
BH03		D	6.50		Brown slightly gravelly sandy CLAY
BH04		D	4.00		Brown slightly gravelly sandy CLAY
BH01		U	6.50		Soft brown sandy CLAY
BH01		U	9.50		Soft brown slightly gravelly sandy CLAY
BH01		U	12.50		Stiff brown slightly gravelly sandy CLAY
BH02		U	6.50		Soft brown slightly gravelly sandy CLAY
BH02		U	9.50		Soft brown sandy CLAY
BH03		U	5.00		Soft brown slightly gravelly sandy CLAY
BH03		U	9.00		Firm brown very sandy CLAY
BH04		U	17.00		Firm brown slightly gravelly sandy CLAY
BH02		AMAL	14.00	17.00	Brown slightly gravelly slightly sandy CLAY
BH03		AMAL	10.50	13.50	Brown slightly gravelly very sandy CLAY



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Contract No:

PSL22/0922

Client Ref:

21438

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



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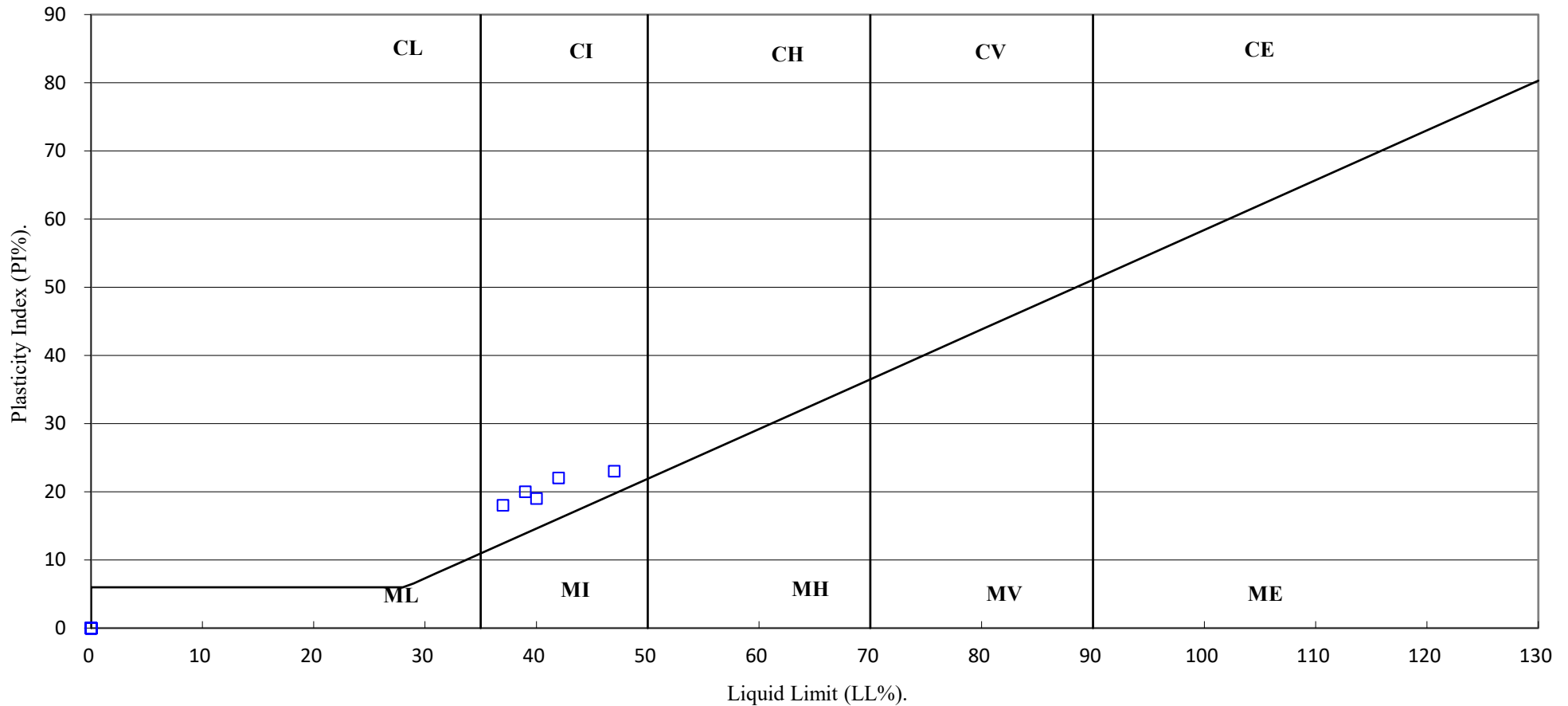
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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

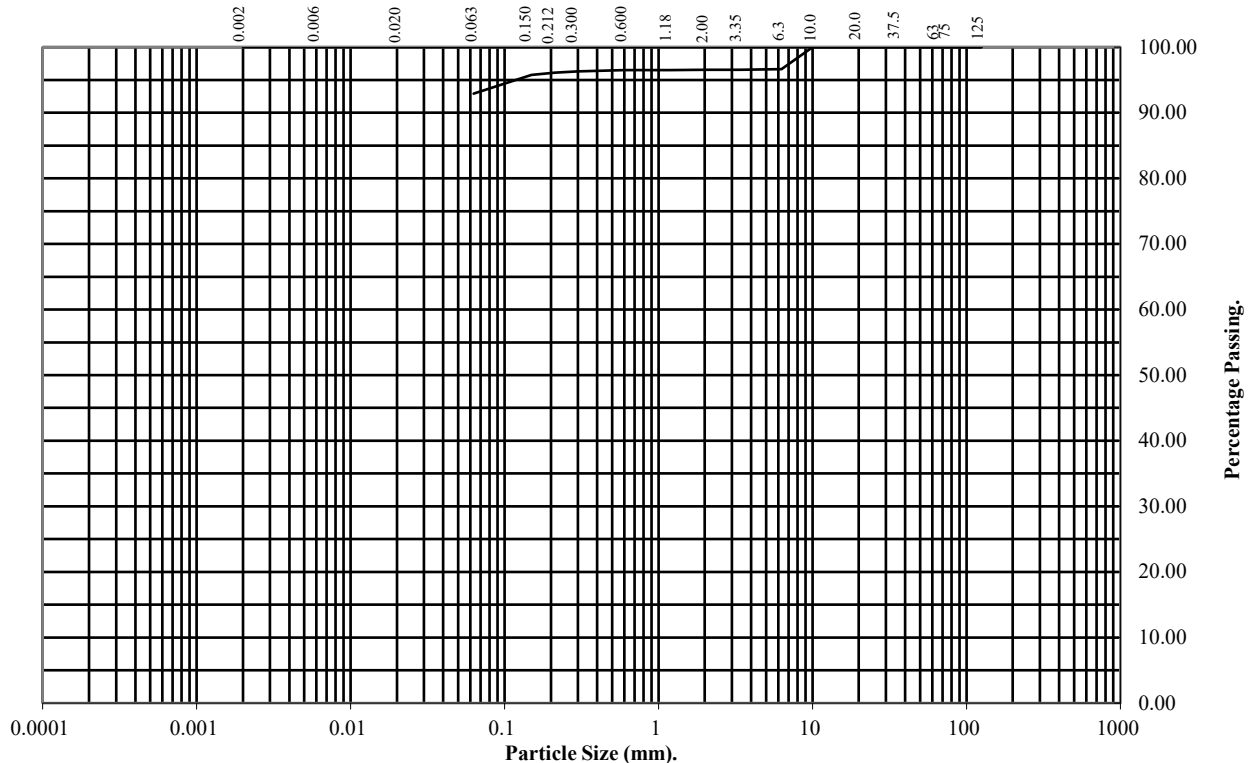
Hole Number: BH02

Top Depth (m): 14.00

Sample Number:

Base Depth(m): 17.00

Sample Type: **AMAL**



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

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	4
Silt/Clay	93

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

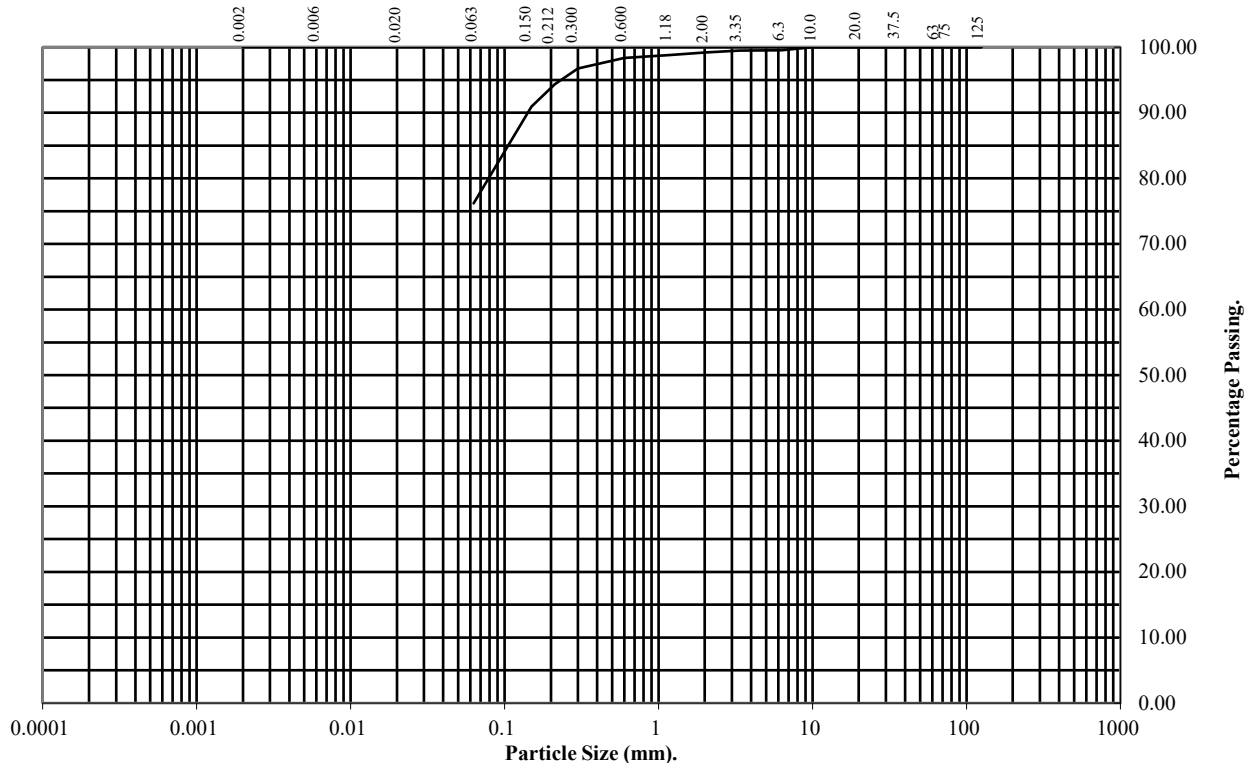
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH03 Top Depth (m): 10.50

Sample Number: Base Depth(m): 13.50

Sample Type: AMAL



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	99
0.6	98
0.3	97
0.212	94
0.15	91
0.063	76

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	23
Silt/Clay	76

Remarks:

See Summary of Soil Descriptions



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

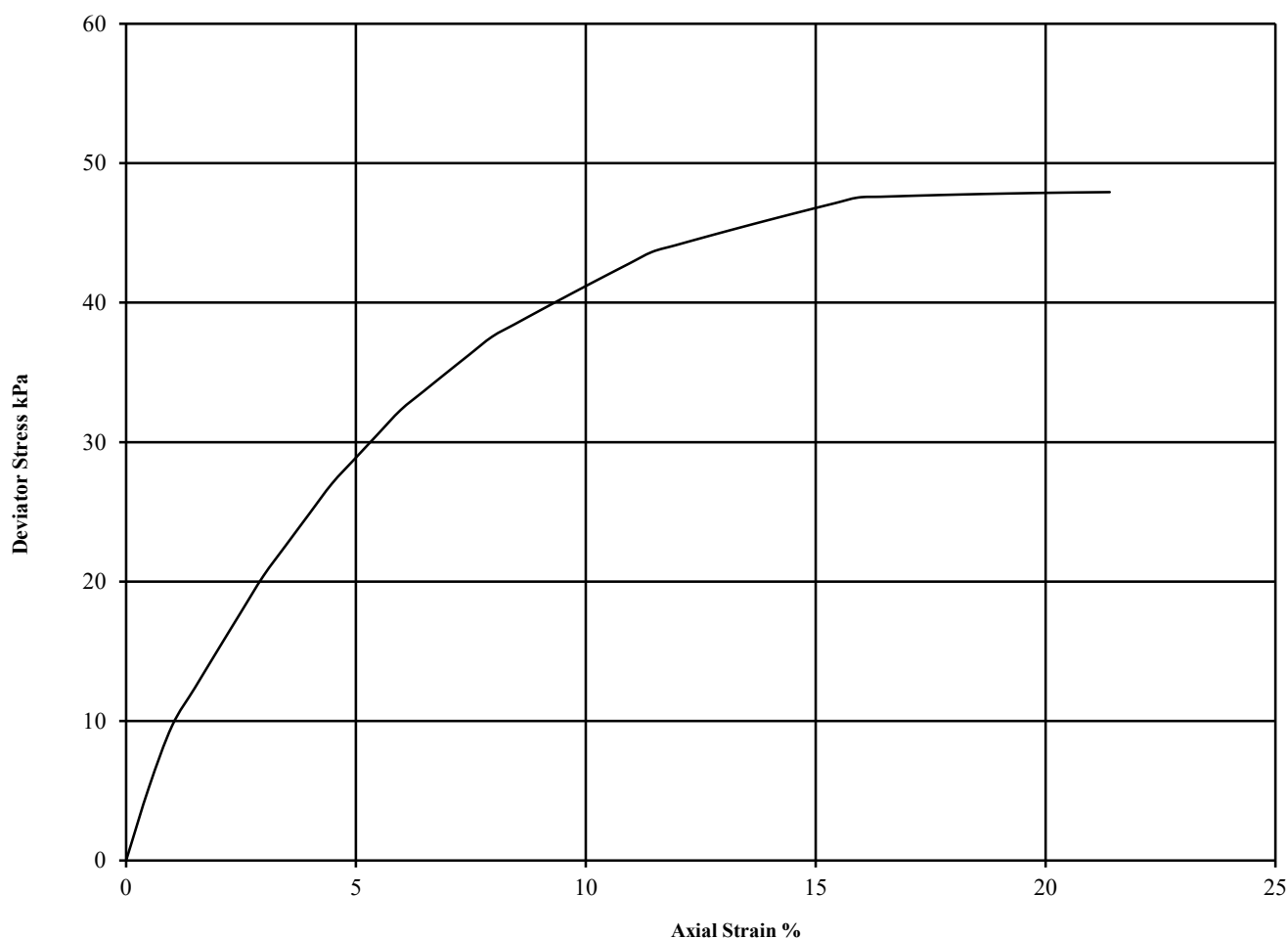
Hole Number: BH01

Top Depth (m): 6.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	30	1.96	1.51	130	48	24	21.4	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

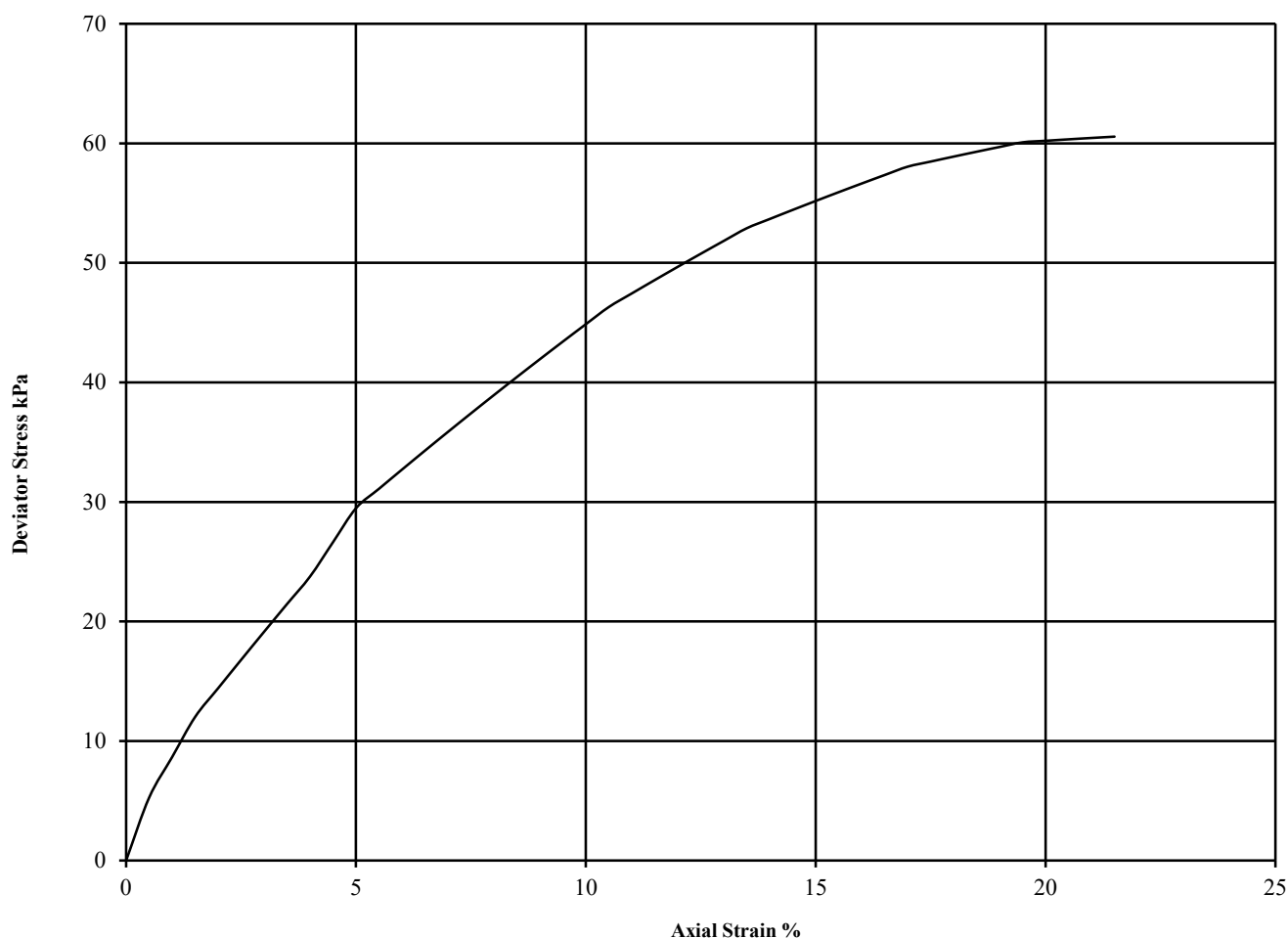
Hole Number: BH01

Top Depth (m): 9.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		206	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	25	2.05	1.64	190	61	30	21.5	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

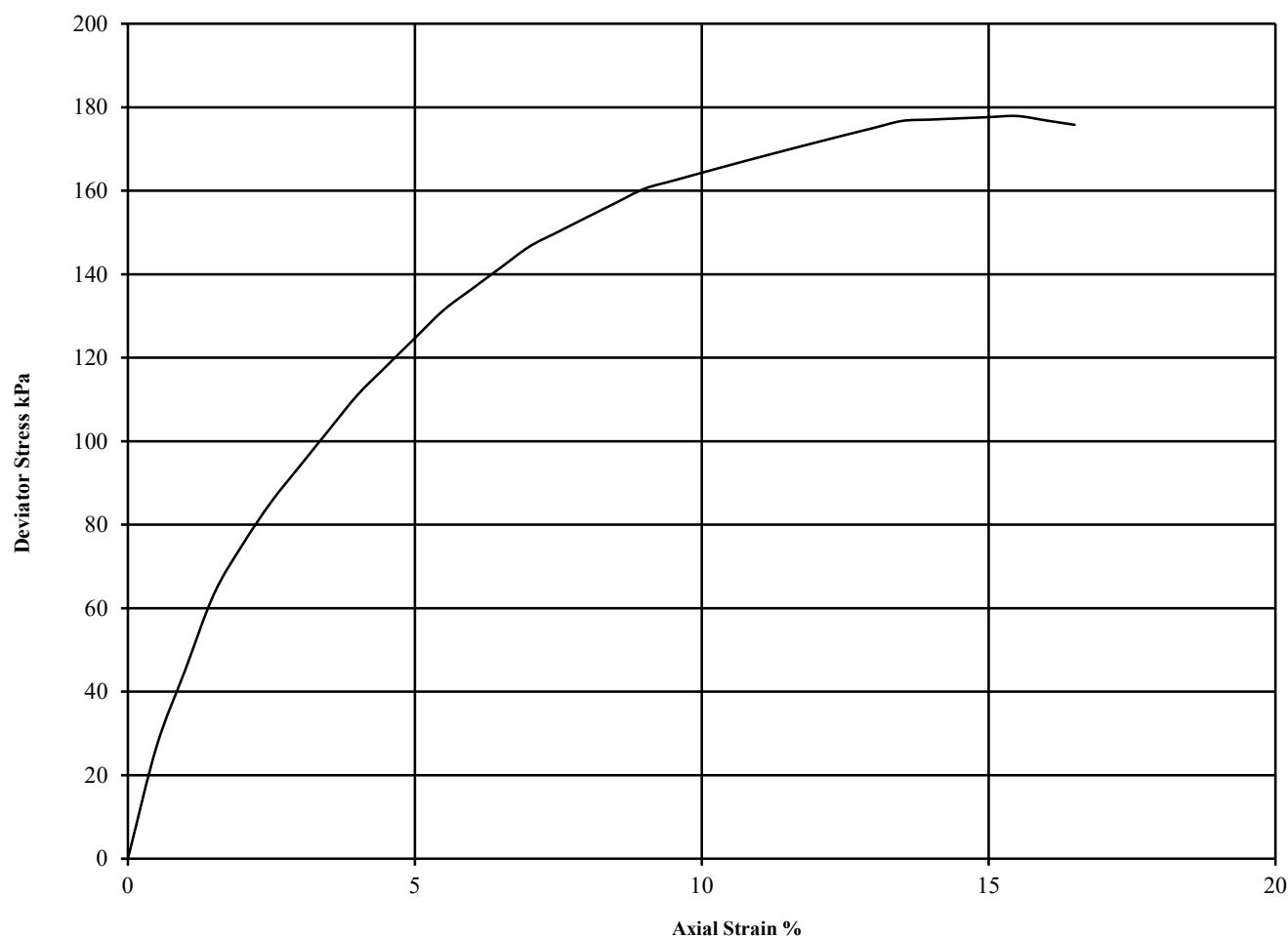
Hole Number: BH01

Top Depth (m): 12.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		38	Height (mm):		76	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.77 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	20	2.10	1.74	250	178	89	15.5	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

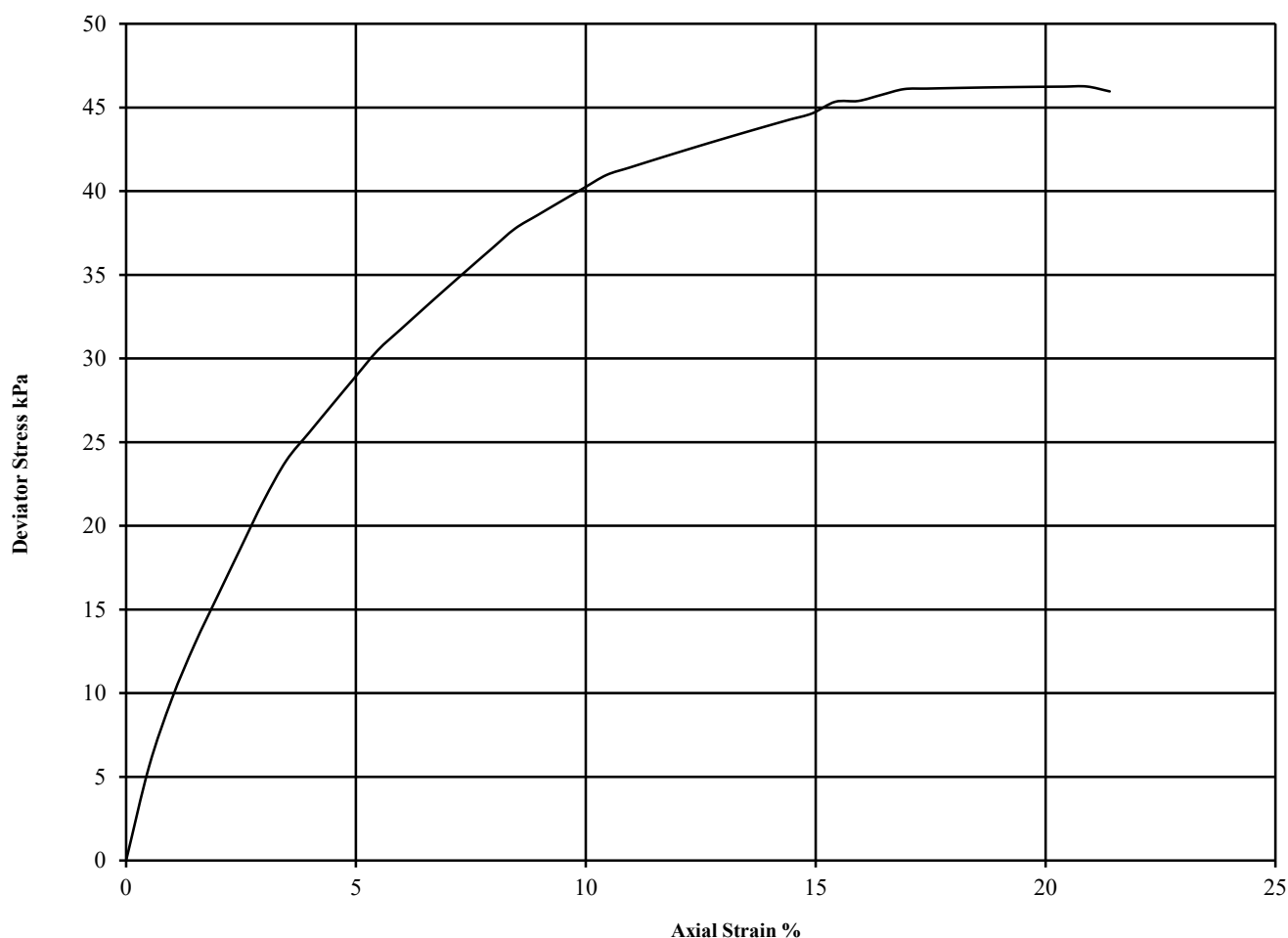
Hole Number: BH02

Top Depth (m): 6.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	29	1.97	1.53	130	46	23	20.9	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

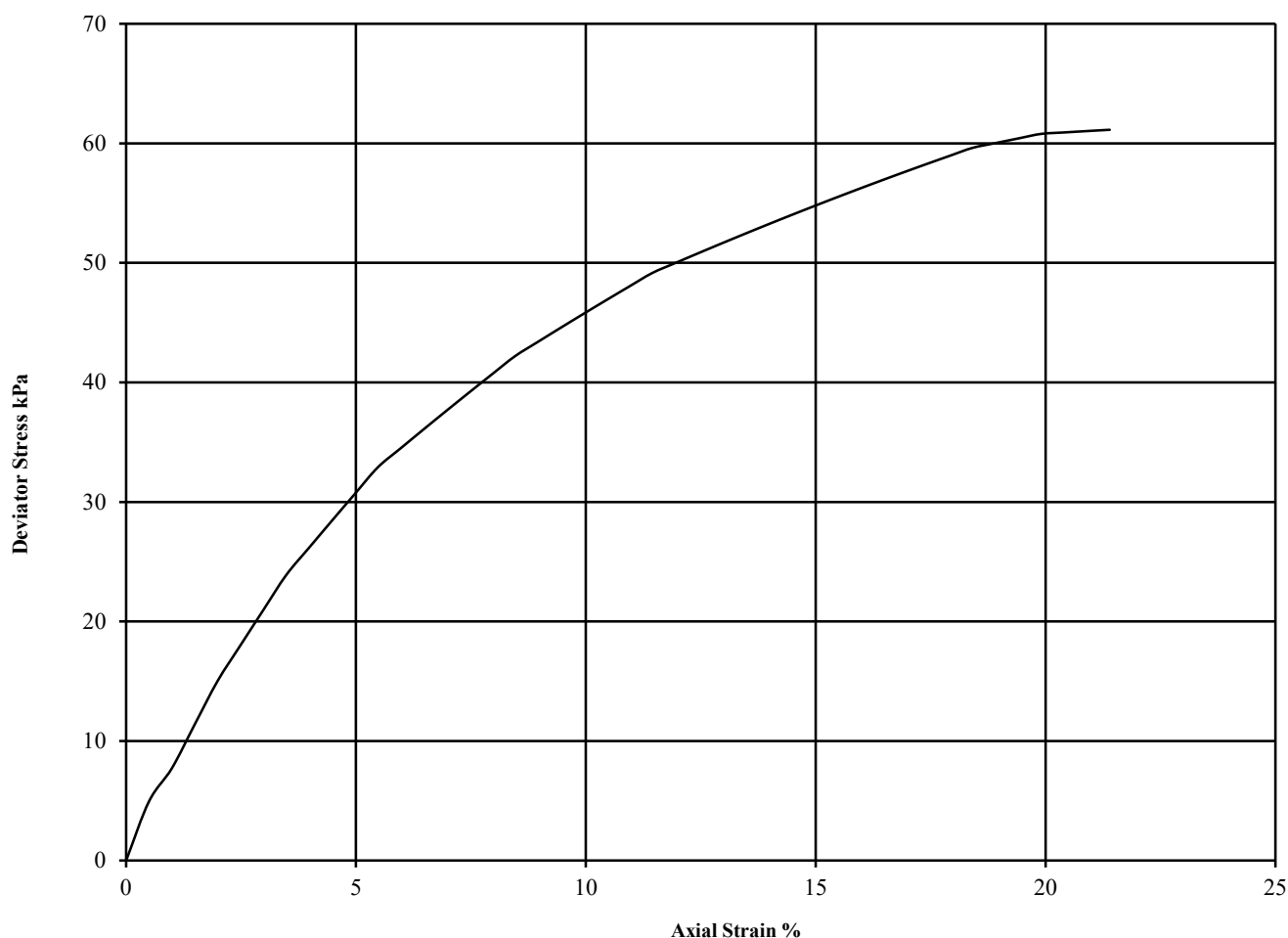
Hole Number: BH02

Top Depth (m): 9.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	29	1.98	1.53	190	61	31	21.4	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

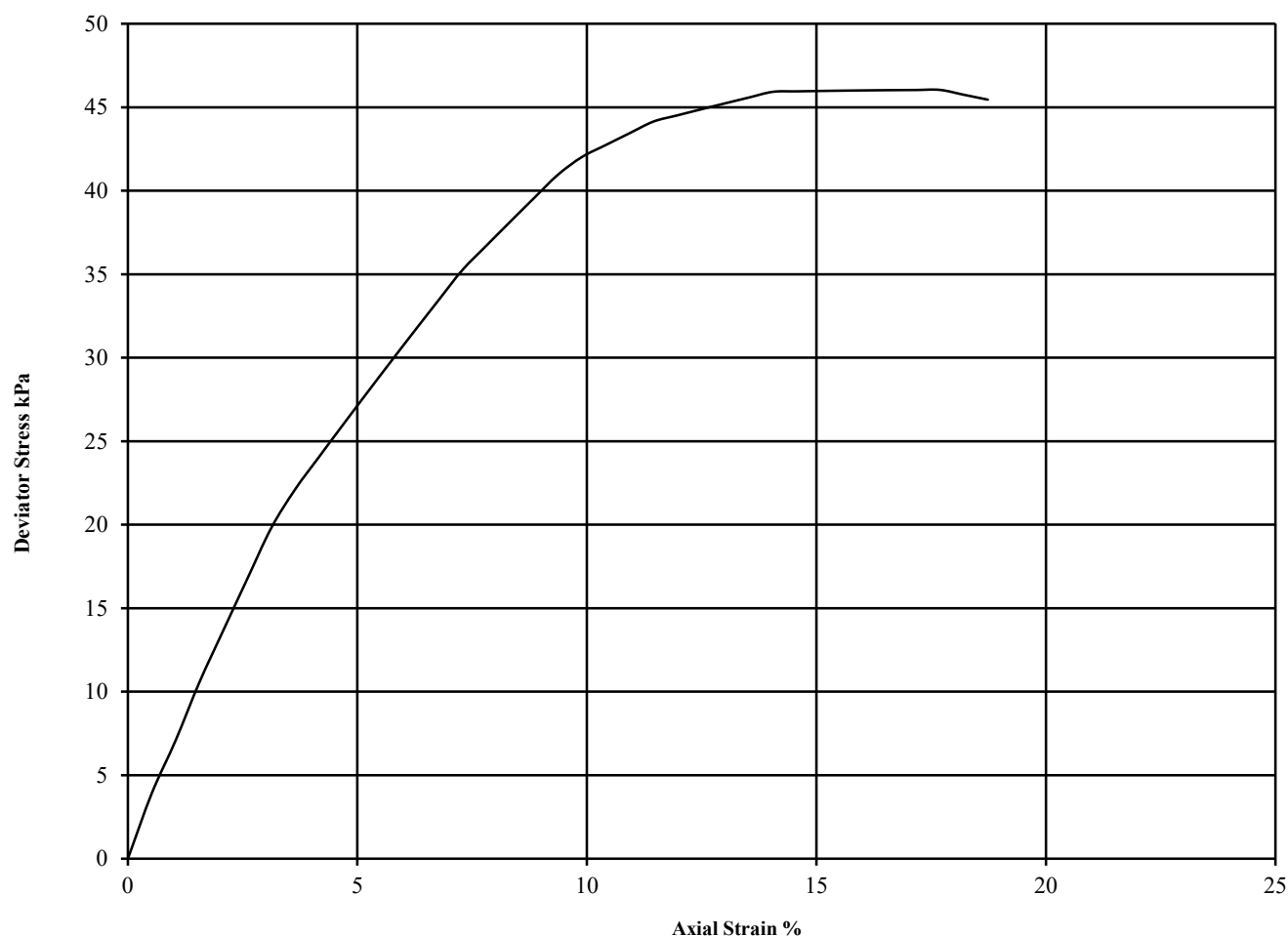
Hole Number: BH03

Top Depth (m): 5.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		102	Height (mm):		196	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	27	1.95	1.54	100	46	23	17.7	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

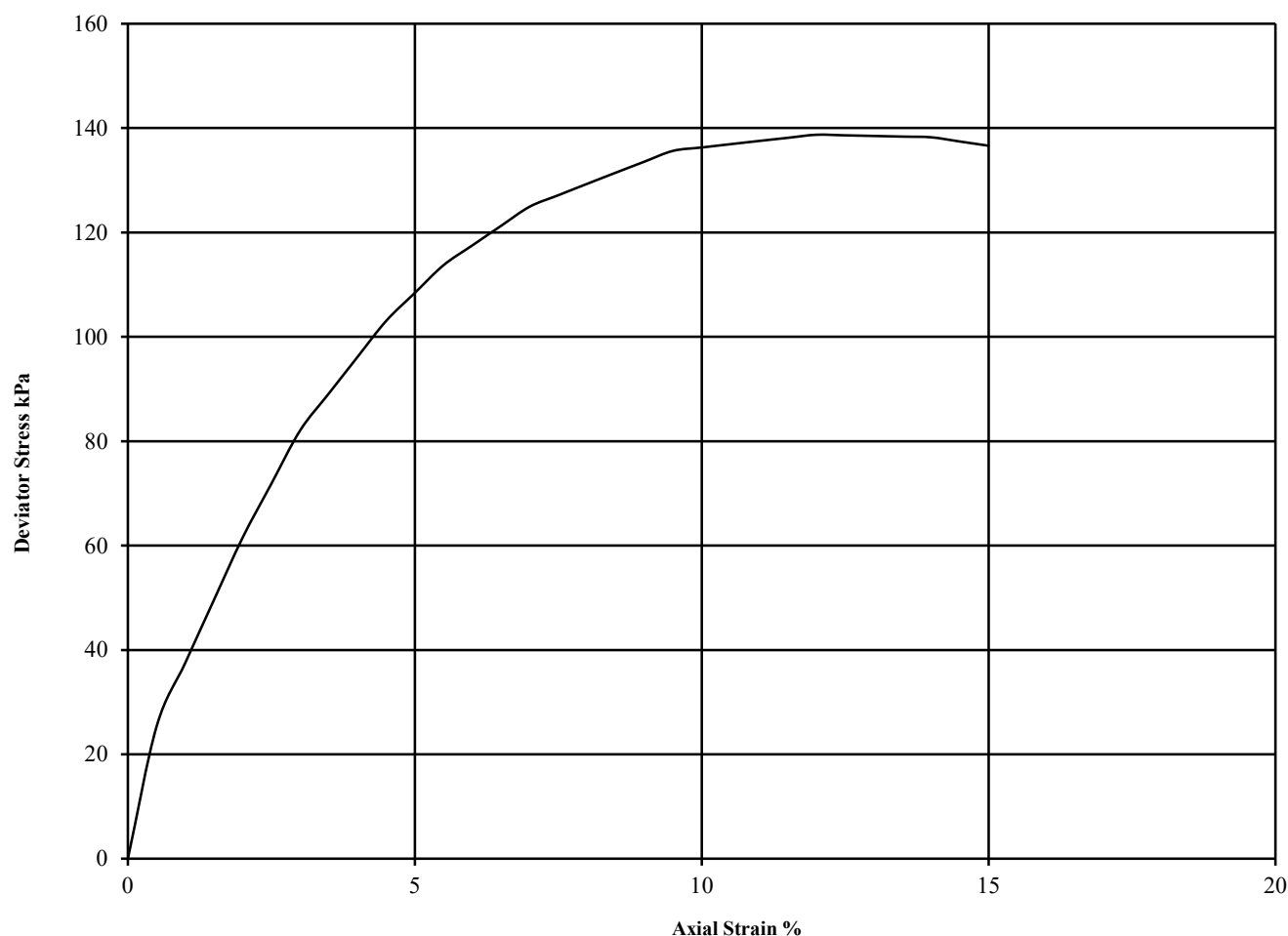
Hole Number: BH03

Top Depth (m): 9.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		38	Height (mm):		76	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.83 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	14	2.18	1.92	180	139	69	12.0	Plastic	



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

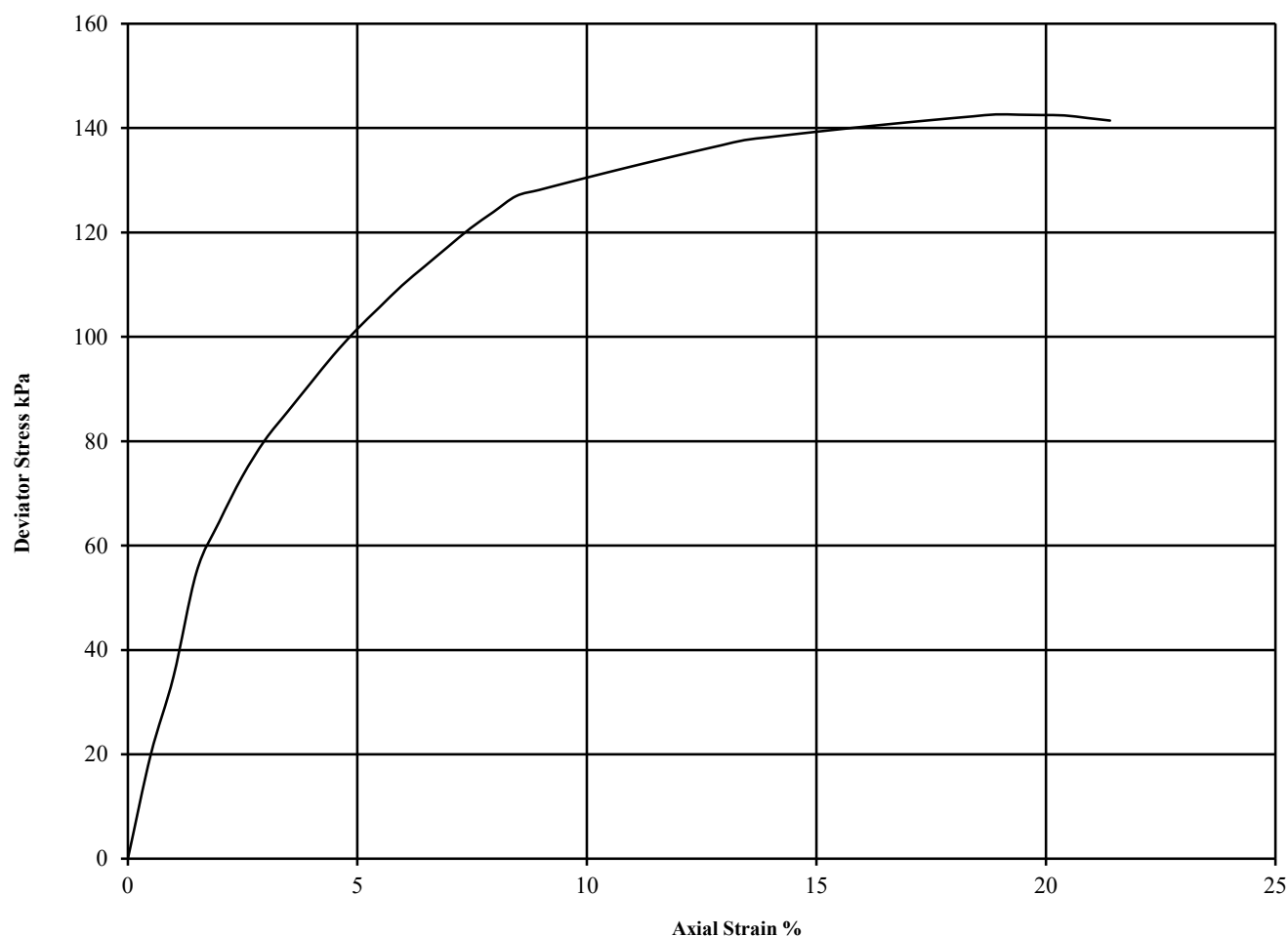
Hole Number: BH04

Top Depth (m): 17.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	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 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	26	1.99	1.58	340	143	71	18.9	Plastic	



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APPENDIX 6 - Interim Permanent Gas Monitoring Results

GROUNDTECH
CONSULTING

Pressure Trend:	Falling	Weather:	Rain			Equipment:	GFM 436	
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)		
Start	20.5	0.0	0.0	0.0	0.0	0.0		
Finish	20.6	0.0	0.0	0.0	0.0	0.0		

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
BH01	0.0	0.0	0.00	0.0	0.0	0.0	4.3	3.3	12.3	14.8	0.0	0.0	0.0	0.0	0.0043	0.0000	1008	-	N	4.00
BH02	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.3	17.0	17.1	0.0	0.0	0.0	0.0	0.0005	0.0000	1008	-	N	0.47
BH04	0.0	0.0	0.00	0.0	0.0	0.0	1.2	0.8	15.7	17.2	0.0	0.0	0.0	0.0	0.0012	0.0000	1008	-	N	0.86
Notes:																				



APPENDIX 7 - Plate Load Testing Results



LABORATORY REPORT



4043

Contract Number: PSL22/0517

Report Date: 25 January 2022

Client's Reference:

Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Rebecca Rowlinson

Contract Title: Pilsworth Road, Bury

Date Received: 24/1/2022

Date Commenced: 24/1/2022

Date Completed: 25/1/2022

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:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


T Watkins
(Senior Technician)

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

Page 1 of

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 24-Jan-22

Test Position: PBT 1

Depth (m): 0.50

Plate Area (m2): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

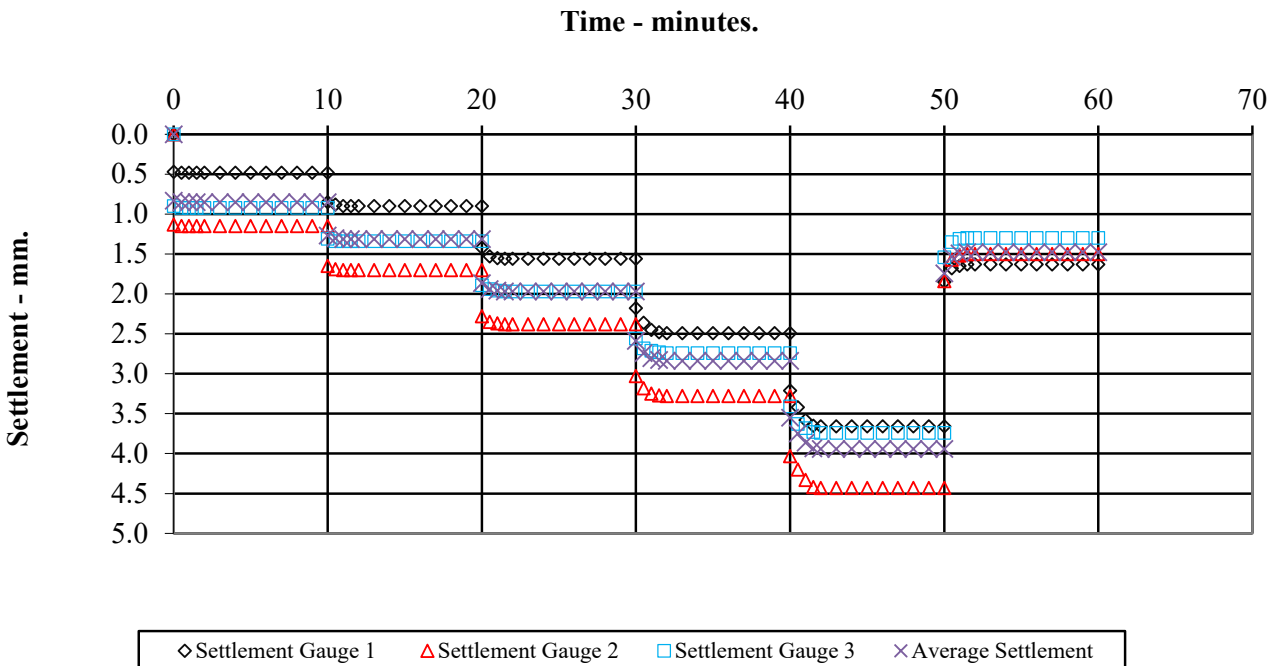
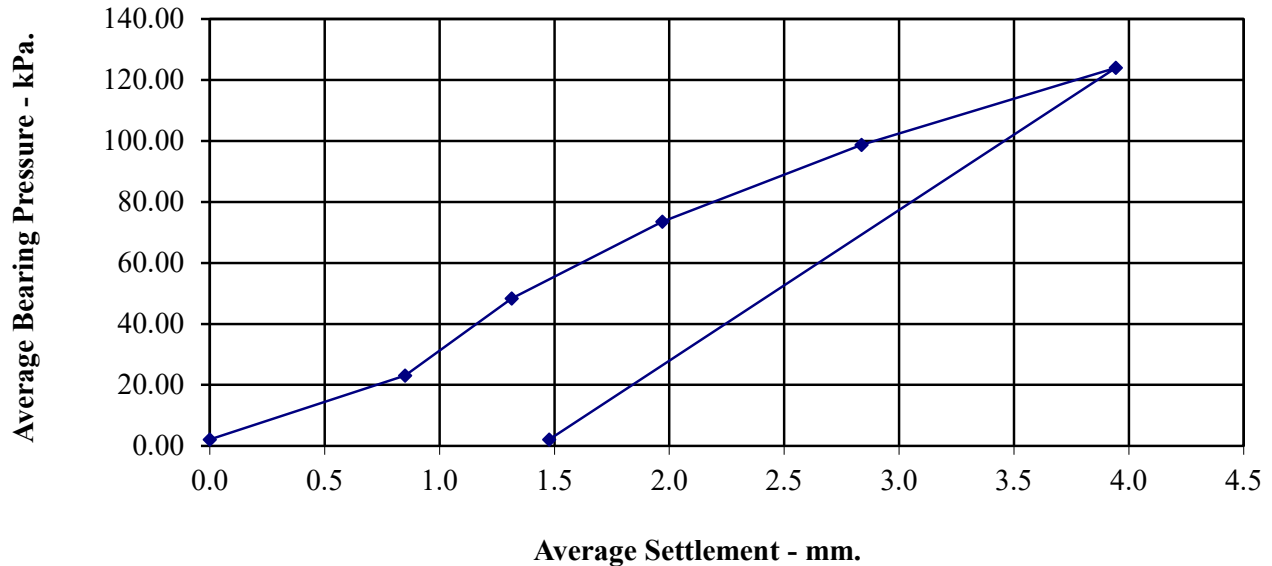
123.97

Maximum Deformation (mm):

3.94

Description:

Brown 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 24-Jan-22

Test Position PBT 1

Depth (m) 0.50

Description Brown CLAY.

Maximum Deflection 3.94 mm

Deflection required for CBR value 1.25 mm

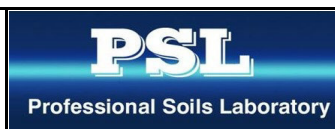
Load at 1.25mm 45 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 22.6 kN/m²/mm

CBR Value 2.1 %



Pilsworth Road, Bury

Contract No:

PSL22/0517

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 24-Jan-22

Test Position: PBT 2

Depth (m): 0.50

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

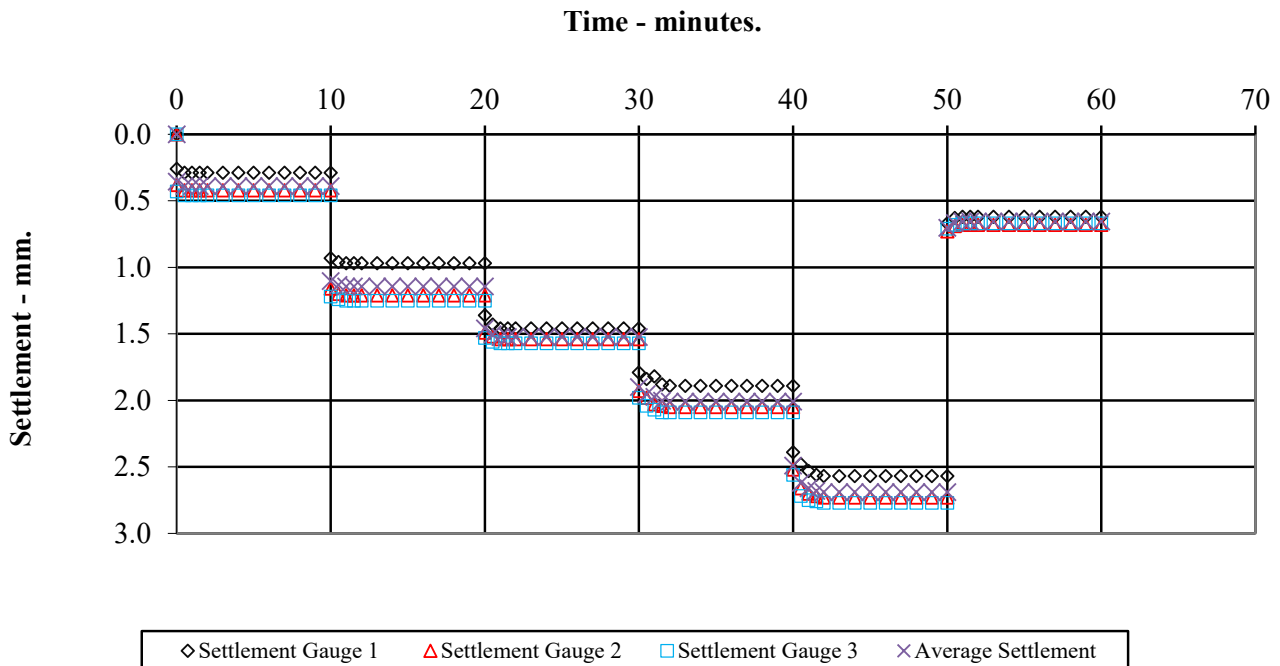
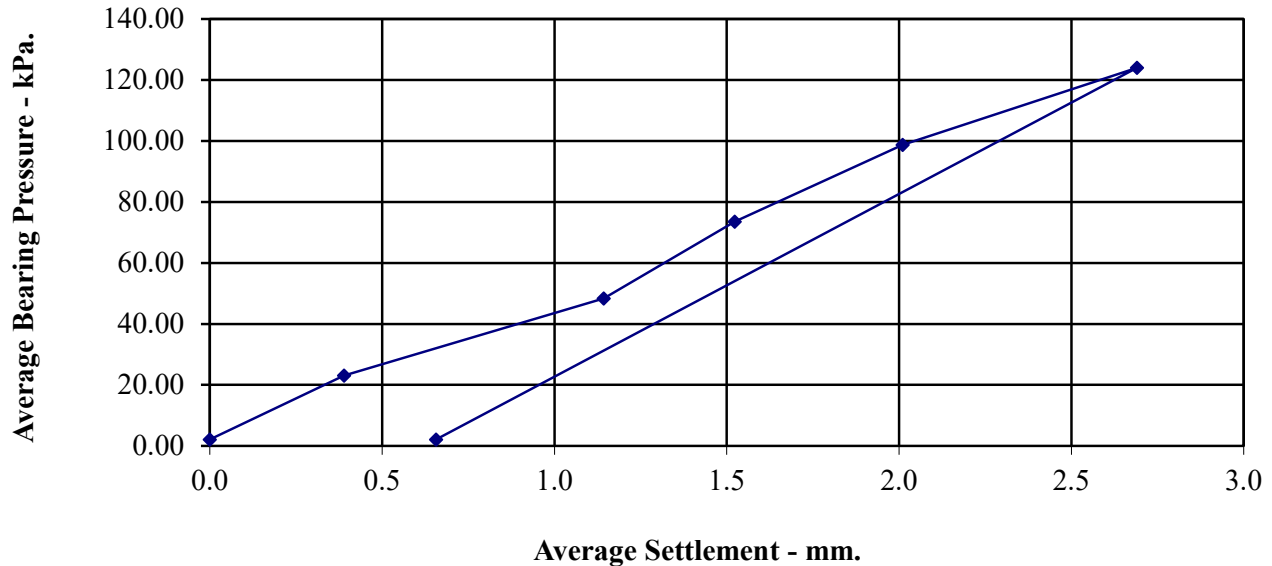
123.97

Maximum Deformation (mm):

2.69

Description:

Brown sandy CLAY.

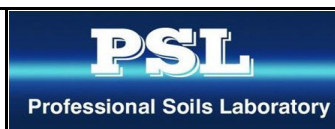


Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test	24-Jan-22		
Test Position	PBT 2		
Depth (m)	0.50		
Description	Brown sandy CLAY.		
Maximum Deflection	2.69	mm	
Deflection required for CBR value	1.25	mm	
Load at 1.25mm	55	kN/m ²	
Plate diameter	455	mm	
Conversion factor for plate diameter	0.629		
K ₇₆₂ (modulus of subgrade reaction) calculated using 1.25mm settlement	27.9	kN/m ² /mm	
CBR Value	3.1	%	



Pilsworth Road, Bury

Contract No:

PSL22/0517

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 24-Jan-22

Test Position: PBT 3

Depth (m): 0.50

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

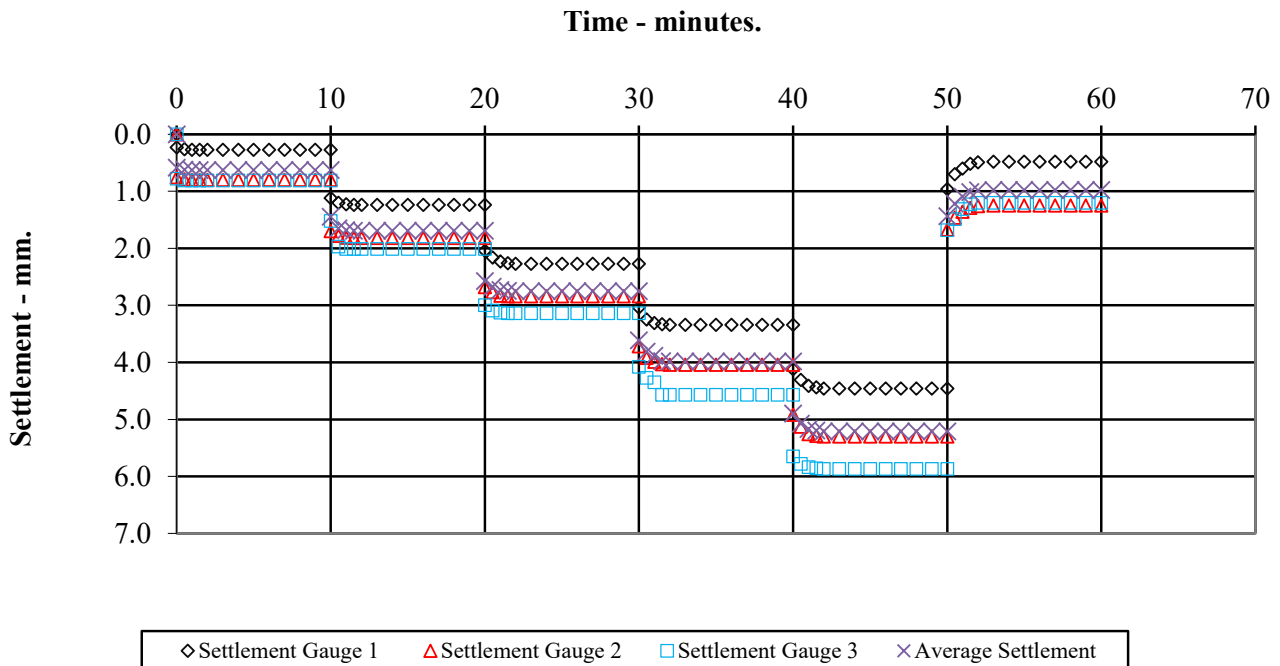
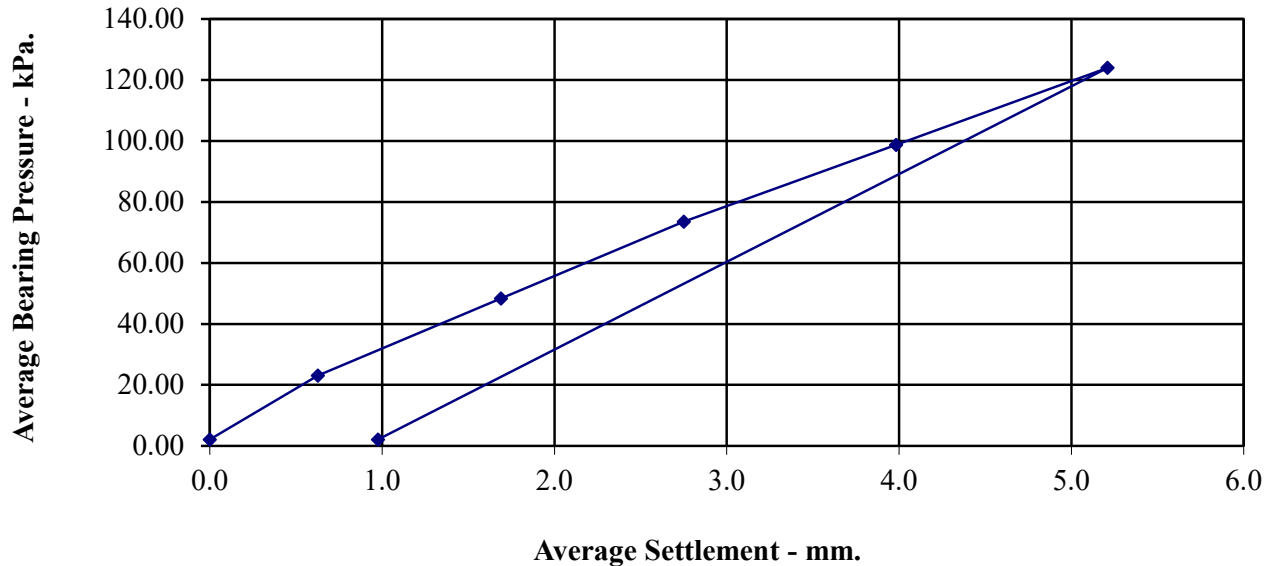
123.97

Maximum Deformation (mm):

5.21

Description:

Brown 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 24-Jan-22

Test Position PBT 3

Depth (m) 0.50

Description Brown CLAY.

Maximum Deflection 5.21 mm

Deflection required for CBR value 1.25 mm

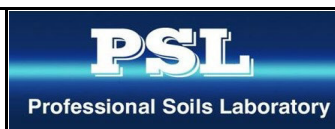
Load at 1.25mm 38 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 19.1 kN/m²/mm

CBR Value 1.6 %



Pilsworth Road, Bury

Contract No:

PSL22/0517

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 24-Jan-22

Test Position: PBT 4

Depth (m): 0.70

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

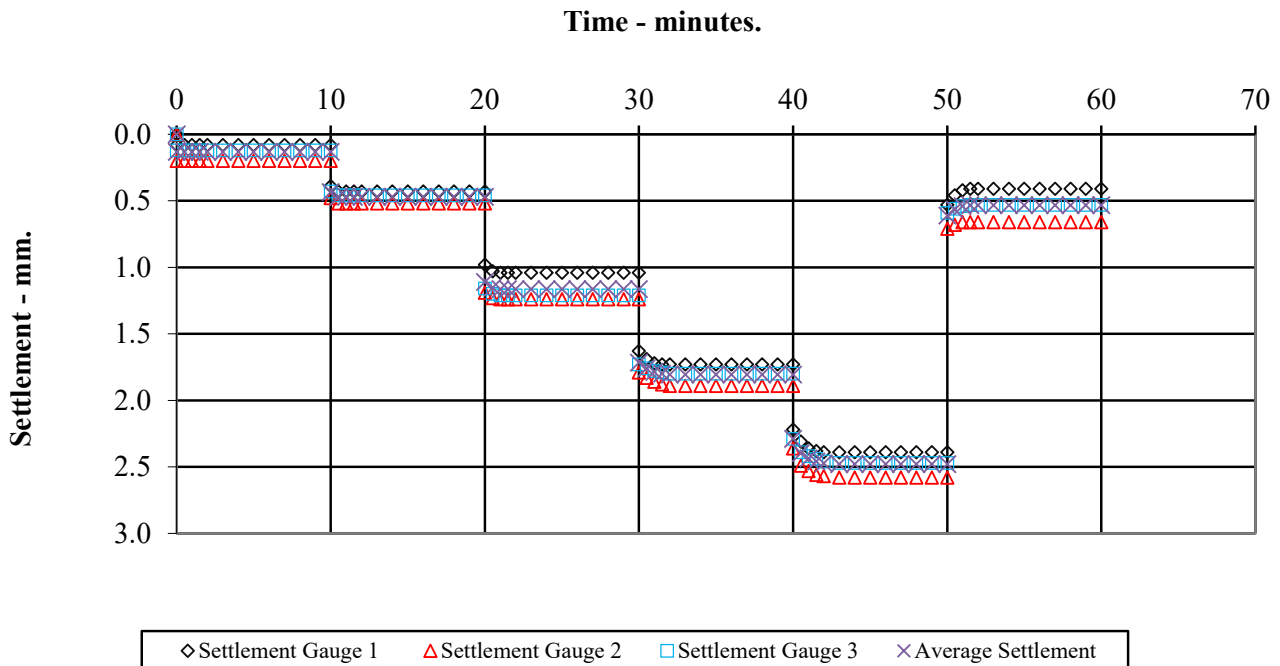
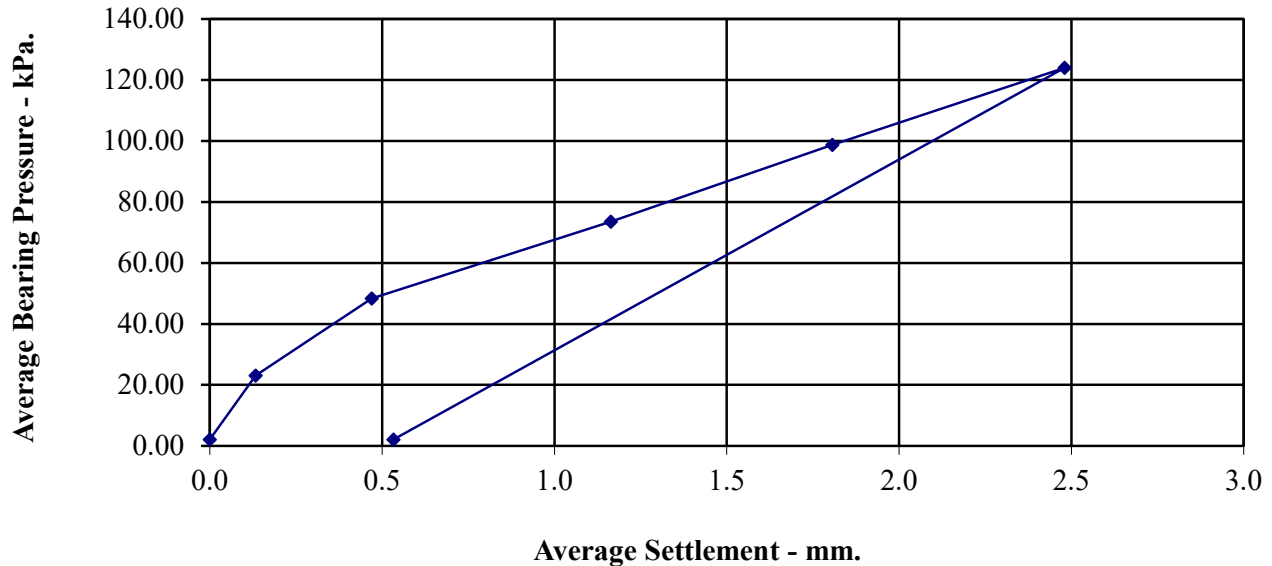
123.97

Maximum Deformation (mm):

2.48

Description:

Brown sandy CLAY.

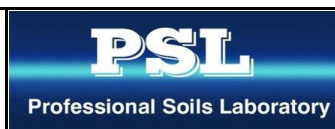


Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test	24-Jan-22	
Test Position	PBT 4	
Depth (m)	0.70	
Description	Brown sandy CLAY.	
Maximum Deflection	2.48	mm
Deflection required for CBR value	1.25	mm
Load at 1.25mm	77	kN/m ²
Plate diameter	455	mm
Conversion factor for plate diameter	0.629	
K ₇₆₂ (modulus of subgrade reaction) calculated using 1.25mm settlement	38.7	kN/m ² /mm
CBR Value	5.4	%



Pilsworth Road, Bury

Contract No:

PSL22/0517

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 24-Jan-22

Test Position: PBT 5

Depth (m): 0.60

Plate Area (m2): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

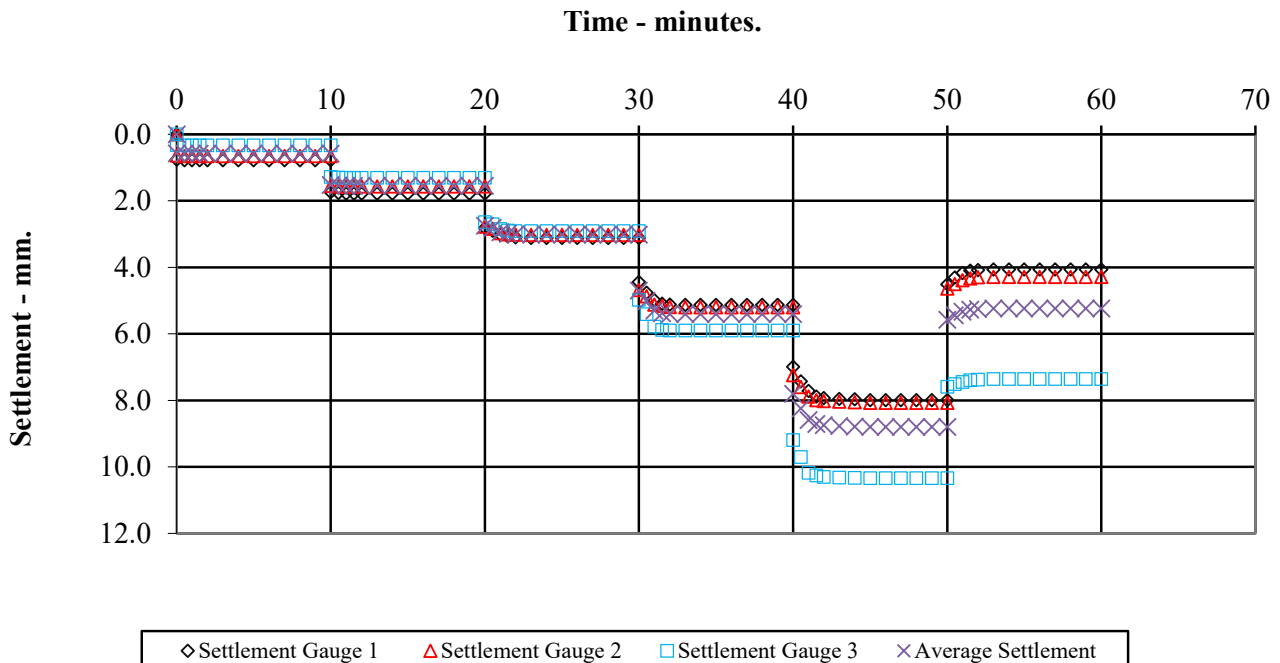
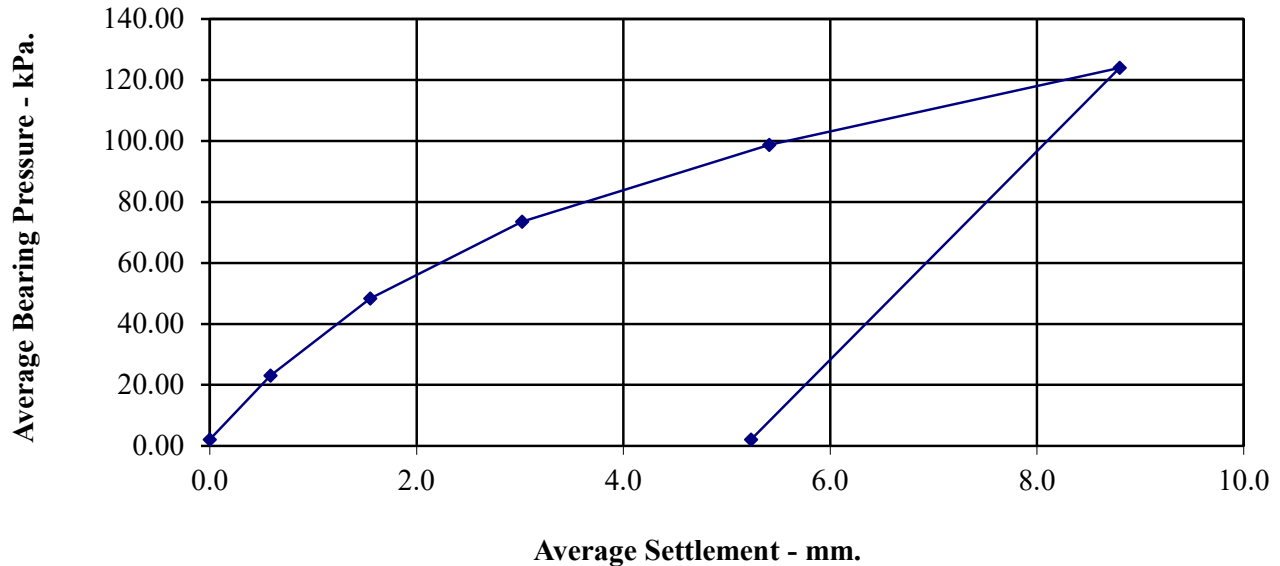
123.97

Maximum Deformation (mm):

8.80

Description:

Brown 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 24-Jan-22

Test Position PBT 5

Depth (m) 0.60

Description Brown CLAY.

Maximum Deflection 8.80 mm

Deflection required for CBR value 1.25 mm

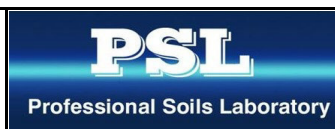
Load at 1.25mm 40 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 20.3 kN/m²/mm

CBR Value 1.8 %



Pilsworth Road, Bury

Contract No:

PSL22/0517

Client Ref:



APPENDIX 8 - Soil Percolation Testing Results

NEW OFFICE BLOCK, BURY
GRO-21438
AVID

SOIL PERCOLATION TEST



Sheet 1 of 2

Date of Test: 25/01/2022

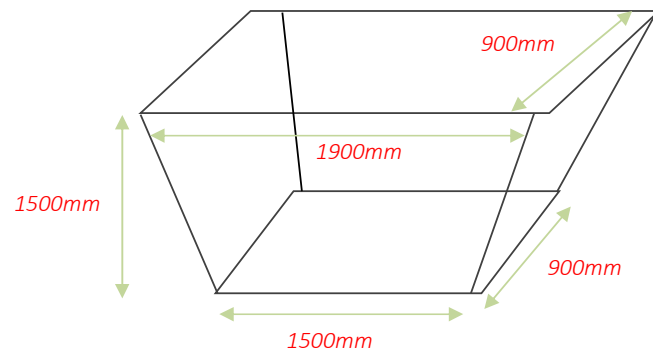
POSITION: SuDS1
TEST 1

Weather: Sunny, clear

Engineer: R Rowlinson

Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1210
1	1210
2	1210
3	1220
4	1220
5	1230
10	1270
20	1320
40	1390
60	1430
75	1500

Pit Depth (mm): 1500

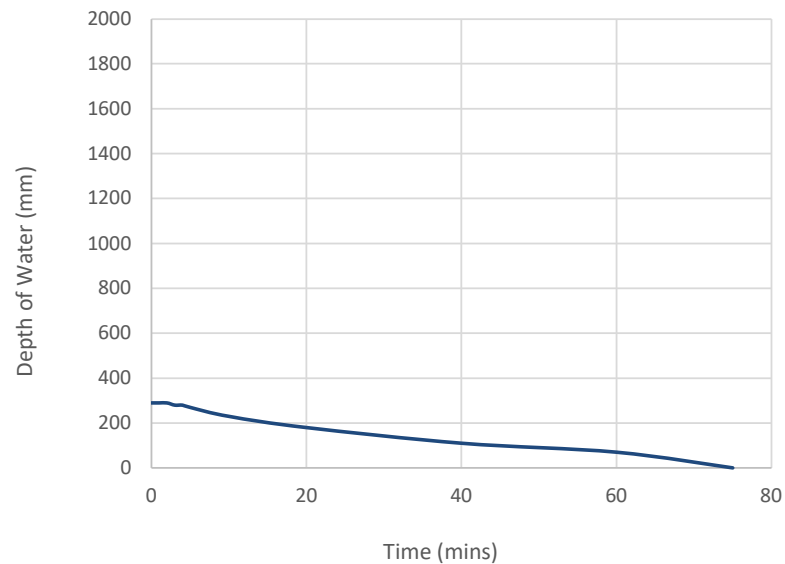
Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

POSITION: SuDS1
TEST 1

Depth vs Time



Volume of Pit (m ³)	2.565
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.4959

Compliance Check:

Water Level at 75% effective depth (mm)	217.5
Water Level at 25% effective depth (mm)	72.5

Compliant with BRE 365

Soil Infiltration Rate Calculation

Water Level 1	290
Water Level 2	0
Time to Drain from Level 1 to Level 2 (mins)	75
Volume of water discharged (m ³)	0.4959

Discharge Area (m ²)	2.522
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Soil Infiltration Rate (m/min)	0.0026217
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Soil Infiltration Rate (m/sec)	4.37E-05
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NEW OFFICE BLOCK, BURY
GRO-21438
AVID

SOIL PERCOLATION TEST



Sheet 1 of 2

Date of Test: 26/01/2022

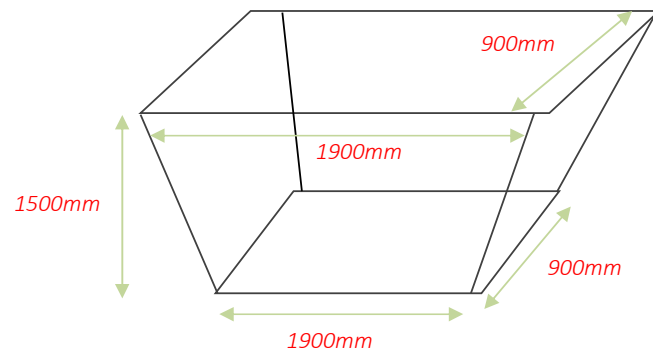
POSITION: SuDS1
TEST 2

Weather: Sunny, clear

Engineer: R Rowlinson

Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1160
1	1160
2	1160
3	1160
4	1170
5	1170
10	1190
20	1230
40	1260
60	1270
80	1330
100	1410
120	1500

Pit Depth (mm): 1500

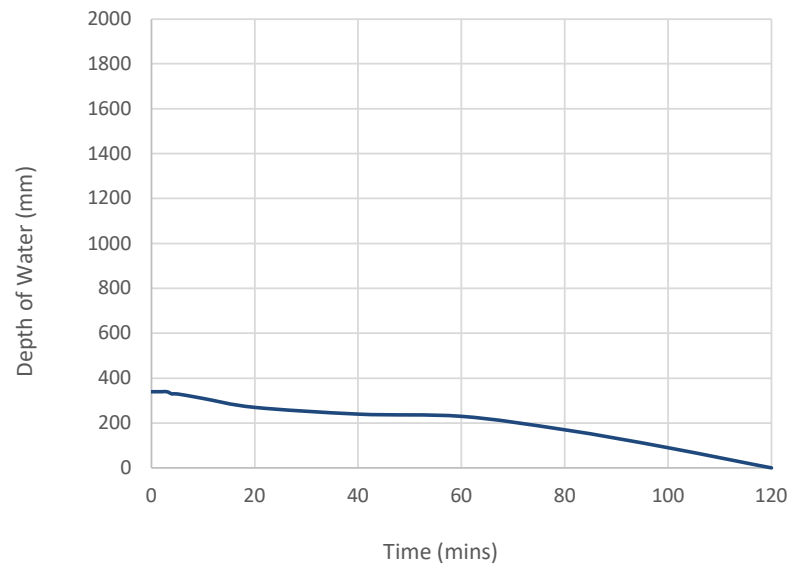
Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

POSITION: SuDS1
TEST 2

Depth vs Time



Volume of Pit (m ³)	2.565
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.5814

Compliance Check:

Water Level at 75% effective depth (mm)	255
Water Level at 25% effective depth (mm)	85

Compliant with BRE 365

Soil Infiltration Rate Calculation

Water Level 1	340
Water Level 2	0
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.5814

Discharge Area (m ²)	2.662
----------------------------------	-------

Soil Infiltration Rate (m/min)	0.0018201
--------------------------------	-----------

Soil Infiltration Rate (m/sec)	3.03E-05
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NEW OFFICE BLOCK, BURY
GRO-21438
AVID

SOIL PERCOLATION TEST



Sheet 1 of 2

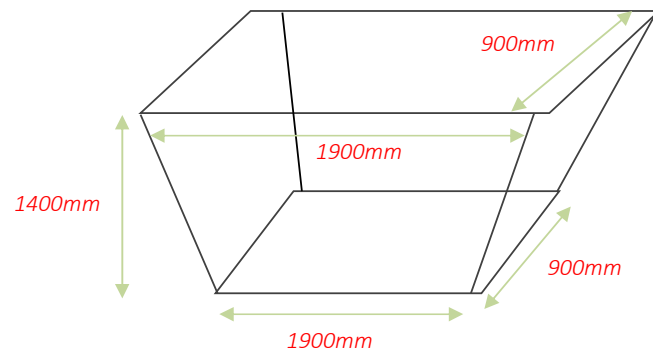
Date of Test: 25/01/2022

POSITION: SuDS1
TEST 3

Weather: Sunny, clear

Engineer: R Rowlinson
Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1220
1	1230
2	1240
3	1250
4	1250
5	1250
10	1270
20	1330
40	1330
60	1330

Pit Depth (mm): 1400

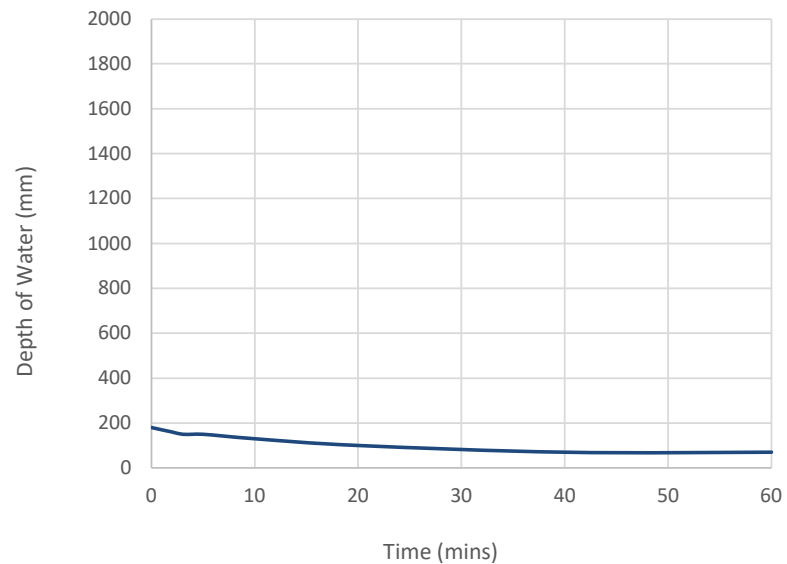
Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

POSITION: SuDS1
TEST 3

Depth vs Time



Volume of Pit (m ³)	2.394
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.3078

Compliance Check:

Water Level at 75% effective depth (mm)	135
Water Level at 25% effective depth (mm)	45

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	180
Water Level 2	70
Time to Drain from Level 1 to Level 2 (mins)	60
Volume of water discharged (m ³)	0.1881

Discharge Area (m ²)	2.41
----------------------------------	------

Soil Infiltration Rate (m/min)	0.0013008
--------------------------------	-----------

Soil Infiltration Rate (m/sec)	2.17E-05
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Sheet 1 of 2

Date of Test: 18/01/2022

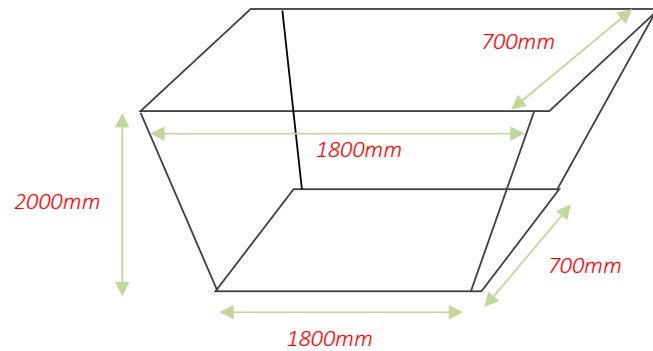
POSITION: SuDS2
TEST 1

Weather: Sunny, clear

Engineer: R Rowlinson

Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1100
1	1100
2	1100
3	1100
4	1100
5	1100
10	1100
18	1100
30	1100
64	1102
108	1102
120	1102

Pit Depth (mm): 2000

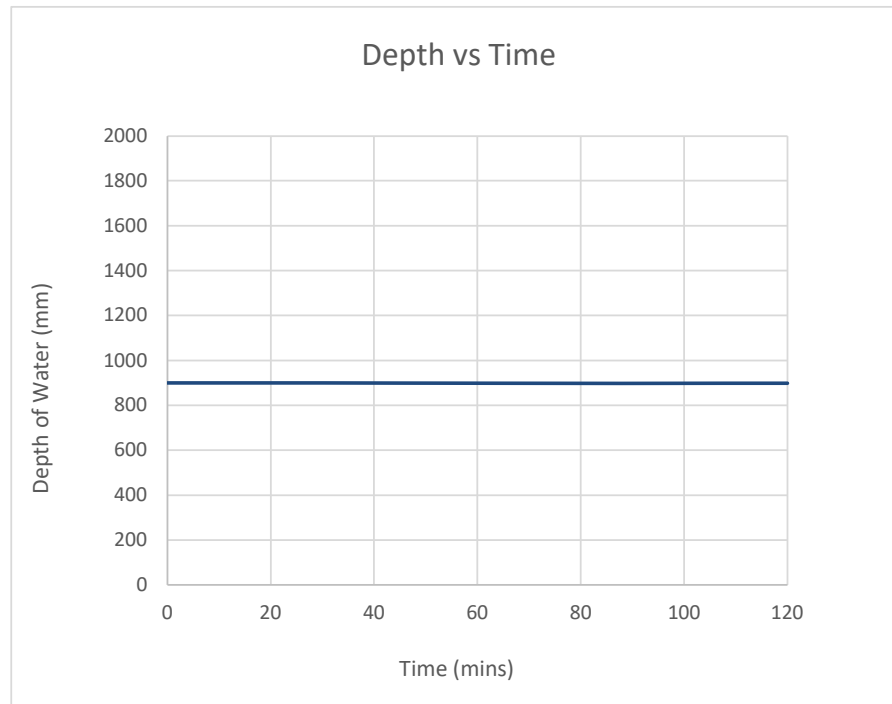
Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

Sheet 2 of 2

POSITION: SuDS2
TEST 1



Volume of Pit (m ³)	2.52
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	1.134

Compliance Check:

Water Level at 75% effective depth (mm)	675
Water Level at 25% effective depth (mm)	225

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	900
Water Level 2	898
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.00252

Discharge Area (m ²)	5.76
----------------------------------	------

Soil Infiltration Rate (m/min)	3.646E-06
--------------------------------	-----------

Soil Infiltration Rate (m/sec)	6.08E-08
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Sheet 1 of 2

Date of Test: 18/01/2022

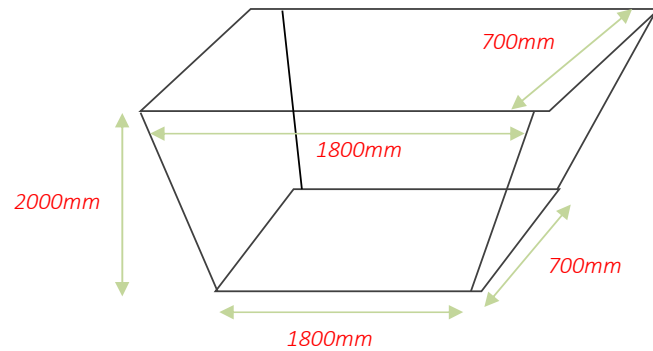
POSITION: SuDS2
TEST 2

Weather: Sunny, clear

Engineer: R Rowlinson

Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1002
25	1004
65	1005
105	1005
120	1005

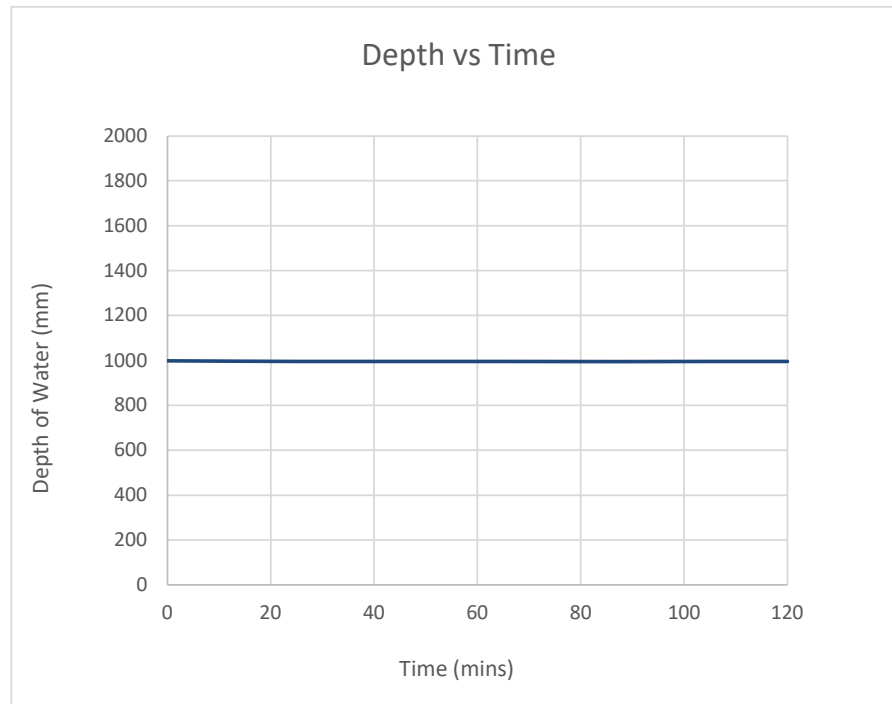
Pit Depth (mm): 2000

Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

POSITION: SuDS2
TEST 2



Volume of Pit (m ³)	2.52
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	1.25748

Compliance Check:

Water Level at 75% effective depth (mm)	748.5
Water Level at 25% effective depth (mm)	249.5

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	998
Water Level 2	995
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.00378

Discharge Area (m ²)	6.25
----------------------------------	------

Soil Infiltration Rate (m/min)	5.04E-06
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Soil Infiltration Rate (m/sec)	8.40E-08
--------------------------------	----------

TURPINS HOLLOW, BOWDON
GRO-21404
MR RIZWAN ALI

SOIL PERCOLATION TEST



Sheet 1 of 2

Date of Test: 30/11/2021

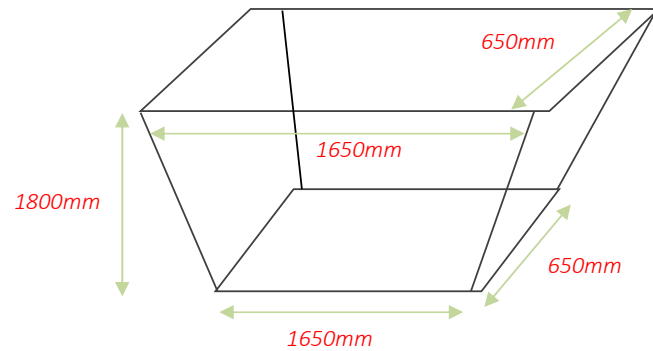
POSITION: SuDS2
TEST 3

Weather: Sunny, clear

Engineer: L Harrison

Checked: R Wyatt

Trial Pit Measurements



Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	640
60	640.5
120	641

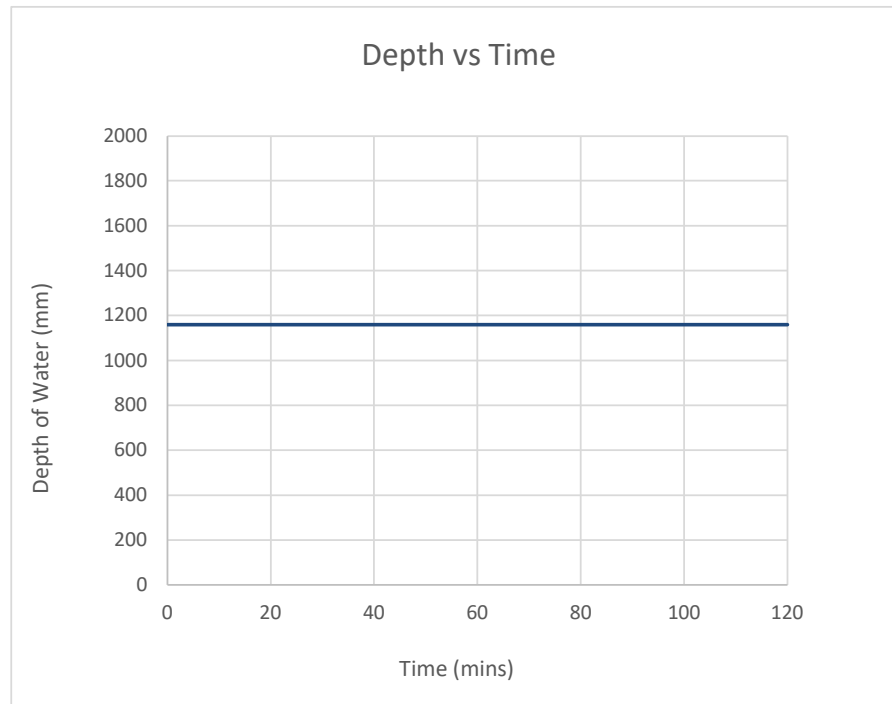
Pit Depth (mm): 1800

Pit Details: Open with no stone filling

Groundwater Level: NGW

SOIL PERCOLATION TEST

POSITION: SuDS2
TEST 3



Volume of Pit (m ³)	1.9305
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	1.2441

Compliance Check:

Water Level at 75% effective depth (mm)	870
Water Level at 25% effective depth (mm)	290

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	1160
Water Level 2	1159
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0010725

Discharge Area (m ²)	6.4085
----------------------------------	--------

Soil Infiltration Rate (m/min)	1.395E-06
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Soil Infiltration Rate (m/sec)	2.32E-08
--------------------------------	----------

APPENDIX 9 - Generic Screening Values (Commercial End Use)

Generic Tier I Generic Assessment Criteria (GAC)									
Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source	
SOM	%	1	2.5	6	1	2.5	6		
Arsenic	mg/kg	32	32	32	640	640	640	SGVs	
Beryllium	mg/kg	1.7	1.7	1.7	12	12	12	LQM S4ULs	
Boron (water soluble)	mg/kg	290	290	290	240000	240000	240000	LQM S4ULs	
Cadmium	mg/kg	10	10	10	230	230	230	SGVs	
Chromium (Total)	mg/kg	910	910	910	8600	8600	8600	LQM S4ULs	
Chromium (VI)	mg/kg	21	21	21	49	49	49	DEFRA C4SLs	
Copper	mg/kg	2400	2400	2400	68000	68000	68000	LQM S4ULs	
Lead	mg/kg	200	200	200	2300	2300	2300	DEFRA C4SLs	
Organic Mercury	mg/kg	1.2	1.2	1.2	26	26	26	LQM S4ULs	
Nickel	mg/kg	130	130	130	980	980	980	LQM S4ULs	
Selenium	mg/kg	350	350	350	13000	13000	13000	SGVs	
Vanadium	mg/kg	410	410	410	9000	9000	9000	LQM S4ULs	
Zinc	mg/kg	3700	3700	3700	730000	730000	730000	LQM S4ULs	
Aliphatic EC 5 - 6	mg/kg	42	78	160	3200 (304) ^{sol}	5900 (558) ^{sol}	12000 (1150) ^{sol}	LQM S4ULs	
Aliphatic EC 6 - 8	mg/kg	100	230	530	7800 (144) ^{sol}	17000 (322) ^{sol}	40000 (736) ^{sol}	LQM S4ULs	
Aliphatic EC 8 - 10	mg/kg	27	65	150	2000 (78) ^{sol}	4800 (190) ^{sol}	11000 (451) ^{vop}	LQM S4ULs	
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vop}	330 (118) ^{vop}	760 (283) ^{vop}	9700 (48) ^{sol}	23000 (118) ^{vop}	47000 (283) ^{vop}	LQM S4ULs	
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	59000 (24) ^{sol}	82000 (59) ^{sol}	90000 (142) ^{sol}	LQM S4ULs	
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) ^{f, sol}	92000 (21) ^{f, sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs	
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) ^{f, sol}	92000 (21) ^{f, sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs	
Aromatic EC 5 - 7	mg/kg	70	140	300	26000 (1220) ^{sol}	46000 (2260) ^{sol}	86000 (4710) ^{sol}	LQM S4ULs	
Aromatic EC 7 - 8	mg/kg	130	290	660	56000 (869) ^{vop}	110000 (1920) ^{vop}	180000 (4360) ^{vop}	LQM S4ULs	
Aromatic EC 8 - 10	mg/kg	34	83	190	3500 (613) ^{vop}	8100 (1500) ^{vop}	17000 (3580) ^{vop}	LQM S4ULs	
Aromatic EC 10 - 12	mg/kg	74	180	380	16000 (364) ^{sol}	28000 (899) ^{sol}	34000 (2150) ^{sol}	LQM S4ULs	
Aromatic EC 12 -16	mg/kg	140	330	660	36000 (169) ^{sol}	37000	38000	LQM S4ULs	
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Benzene	mg/kg	0.33	0.33	0.33	95	95	95	SGVs	
Toluene	mg/kg	610	610	610	4400	4400	4400	SGVs	
Ethyl Benzene	mg/kg	350	350	350	2800	2800	2800	SGVs	
Xylene - o	mg/kg	250	250	250	2600	2600	2600	SGVs	
Xylene - m	mg/kg	240	240	240	3500	3500	3500	SGVs	
Xylene - p	mg/kg	230	230	230	3200	3200	3200	SGVs	
MTBE (methyl tert-butyl ether)	mg/kg	49	84	160	7900	13000	24000	CL:AIRE 2010	
Acenaphthene	mg/kg	210	510	1100	84000 (57) ^{sol}	97000 (141) ^{sol}	100000	LQM SAULs	
Acenaphthylene	mg/kg	170	420	920	83000 (86.1) ^{sol}	97000 (212) ^{sol}	100000	LQM S4ULs	
Anthracene	mg/kg	2400	5400	11000	520000	540000	540000	LQM S4ULs	
Benz(a)anthracene	mg/kg	7.2	11	13	170	170	180	LQM S4ULs	
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	35	35	77*	DEFRA C4SL*/LQM	
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	44	44	45	LQM S4ULs	
Benzo(ghi)perylene	mg/kg	320	340	350	3900	4000	4000	LQM S4ULs	
Benzo(k)fluoranthene	mg/kg	77	93	100	1200	1200	1200	LQM S4ULs	
Chrysene	mg/kg	15	22	27	350	350	350	LQM S4ULs	
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	3.5	3.6	3.6	LQM S4ULs	
Fluoranthene	mg/kg	280	560	890	23000	23000	23000	LQM S4ULs	
Fluorene	mg/kg	170	400	860	63000 (30.9) ^{sol}	68000	71000	LQM S4ULs	
Indeno(123-cd)pyrene	mg/kg	27	36	41	500	510	510	LQM S4ULs	
Naphthalene	mg/kg	2.3 ^f	5.6 ^f	13 ^f	190 ^f (76.4) ^{sol}	460 ^f (183) ^{sol}	1100 ^f (432) ^{sol}	LQM S4ULs	
Phenanthrene	mg/kg	95	220	440	22000	22000	23000	LQM S4ULs	
Pyrene	mg/kg	620	1200	2000	54000	54000	54000	LQM S4ULs	

APPENDIX 10 - CIRIA Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ➡ Hazard Assessment ➡ Risk Estimation ➡ Risk Evaluation

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- **High likelihood:** There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- **Likely:** There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- **Low likelihood:** There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;
- **Unlikely:** There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- **Severe:** Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

- **Medium:** Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;
- **Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.
- **Minor:** harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- **Very high:** There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;
- **High:** Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;
- **Moderate:** It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;
- **Low:** It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;
- **Very Low:** There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX 11 - JIWG Receptor Decision Tool

Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Loose fibrous asbestos debris	3
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not firmly linked in a matrix	2
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Chrysotile alone	0
Sub-total		9
Hazard ranking		Low

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.



Stage 2	
Emission Factors	Score
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Very Low quantities - 0.001 to 0.01 %wt/wt 1
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Medium 3
Activity type and effect on deterioration of ACMs	Low disturbance, minimal deterioration expected 2
Best description of primary host material matrix	Coarse to Fine Gravel 3
Sub-total	9
Exposure ranking	Low

Stage 3 Pathway and Receptor Sensitivity		Score
Receptor category	Construction	No score required
Age of Receptor	Infant (under 5)	4
Duration of exposure/site occupancy	> 1hr <10 hr daily exposure (e.g. part-time to full time occupational exposure or extended daily recreational exposure)	3
Receptor ranking		7 High
Combined hazard, exposure and receptor ranking		Medium
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4
Pathway: Depth to impacted material	Material buried at shallow depth, potential to be disturbed by excavation	C
Pathway ranking		4C Low
Overall ranking	Low	



Joint Industry Working Group
Asbestos in Soil and Construction & Demolition Materials

Project Reference	
Site Name	NEW OFFICE BLOCK, BURY
Client	
Run by	CALLUM HOLDEN
Date	23-Mar-22
Reviewed by	
Characterisation of scenario being evaluated	
Interpretation of scenario ranking by DST	



APPENDIX 12 - Waste Classification Report

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



8SSFK-H0JF0-HOEN2

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in **pale yellow**.

Job name

22-37451_HWOL_Results

Description/Comments

Project

GRO-21438

Site

NEW OFFICE BLOCK, BURY

Classified by

Name: **Bradley Massey**
Date: **28 Feb 2022 08:49 GMT**
Telephone: **01618 201368**
Company: **Groundtech Consulting Limited**
First Floor, Lloyd House, Orford Court,
Greenfold Way
Leigh
WN7 3XJ

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

Course
Hazardous Waste Classification

Date

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01---0.25		Non Hazardous		2
2	TP01---0.70		Non Hazardous		4
3	TP02---0.35		Non Hazardous		6
4	TP03---0.55		Non Hazardous		8
5	BH01---0.50		Non Hazardous		10
6	BH02---1.00		Non Hazardous		12
7	BH03---1.00		Non Hazardous		14
8	BH04---0.50		Non Hazardous		16

Related documents

#	Name	Description
1	22-37451_HWOL_Results.hwol	.hwol file used to create the Job

Report

Created by: Bradley Massey

Created date: 28 Feb 2022 08:49 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	18
Appendix B: Rationale for selection of metal species	19
Appendix C: Version	20

Classification of sample: TP01---0.25

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP01---0.25	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7.6% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 7.6% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				10.8	pH		10.8	pH	10.8 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				0.29	mg/kg		0.268	mg/kg	0.0000268 %	✓	
		201-469-6	83-32-9									
6	fluorene				0.29	mg/kg		0.268	mg/kg	0.0000268 %	✓	
		201-695-5	86-73-7									
7	phenanthrene				2.5	mg/kg		2.31	mg/kg	0.000231 %	✓	
		201-581-5	85-01-8									
8	anthracene				0.63	mg/kg		0.582	mg/kg	0.0000582 %	✓	
		204-371-1	120-12-7									
9	fluoranthene				3.8	mg/kg		3.511	mg/kg	0.000351 %	✓	
		205-912-4	206-44-0									
10	pyrene				3.5	mg/kg		3.234	mg/kg	0.000323 %	✓	
		204-927-3	129-00-0									
11	benzo[a]anthracene				2	mg/kg		1.848	mg/kg	0.000185 %	✓	
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				1.4	mg/kg		1.294	mg/kg	0.000129 %	✓	
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				2.1	mg/kg		1.94	mg/kg	0.000194 %	✓	
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				1	mg/kg		0.924	mg/kg	0.0000924 %	✓	
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				1.3	mg/kg		1.201	mg/kg	0.00012 %	✓	
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				9.4	mg/kg	1.895	16.455	mg/kg	0.00165 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				34 mg/kg	2.683	84.282 mg/kg	0.00843 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				14 mg/kg	5.324	68.875 mg/kg	0.00689 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	53 mg/kg	1.57	76.881 mg/kg	0.0049 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				130 mg/kg	4.398	528.279 mg/kg	0.0528 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	benzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
26	ethylbenzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
27	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
28	toluene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
29	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
		215-160-9	1308-38-9							
30	benzo[bk]fluoranthene				2.96 mg/kg		2.735 mg/kg	0.000274 %	✓	
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
31	xylene				<2 µg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0806 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
🧪	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP01---0.70

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP01---0.70	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
13% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.6	pH		7.6	pH	7.6 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				0.44	mg/kg		0.383	mg/kg	0.0000383 %	✓	
		201-469-6	83-32-9									
6	fluorene				0.22	mg/kg		0.191	mg/kg	0.0000191 %	✓	
		201-695-5	86-73-7									
7	phenanthrene				0.62	mg/kg		0.539	mg/kg	0.0000539 %	✓	
		201-581-5	85-01-8									
8	anthracene				0.23	mg/kg		0.2	mg/kg	0.00002 %	✓	
		204-371-1	120-12-7									
9	fluoranthene				0.93	mg/kg		0.809	mg/kg	0.0000809 %	✓	
		205-912-4	206-44-0									
10	pyrene				0.8	mg/kg		0.696	mg/kg	0.0000696 %	✓	
		204-927-3	129-00-0									
11	benzo[a]anthracene				0.48	mg/kg		0.418	mg/kg	0.0000418 %	✓	
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				0.36	mg/kg		0.313	mg/kg	0.0000313 %	✓	
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				0.43	mg/kg		0.374	mg/kg	0.0000374 %	✓	
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				0.24	mg/kg		0.209	mg/kg	0.0000209 %	✓	
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				0.26	mg/kg		0.226	mg/kg	0.0000226 %	✓	
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				11	mg/kg	1.895	18.131	mg/kg	0.00181 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.6 mg/kg		0.522 mg/kg	0.0000522 %	✓	
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				27 mg/kg	2.683	63.018 mg/kg	0.0063 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				15 mg/kg	5.324	69.482 mg/kg	0.00695 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	75 mg/kg	1.57	102.436 mg/kg	0.00653 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				86 mg/kg	4.398	329.053 mg/kg	0.0329 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
		215-160-9	1308-38-9							
26	benzo[bk]fluoranthene				0.74 mg/kg		0.644 mg/kg	0.0000644 %	✓	
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
Total:								0.0589 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP02---0.35

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP02---0.35	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
12% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				9.6	pH		9.6	pH	9.6 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				0.66	mg/kg		0.581	mg/kg	0.0000581 %	✓	
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				0.83	mg/kg		0.73	mg/kg	0.000073 %	✓	
		205-912-4	206-44-0									
10	pyrene				0.82	mg/kg		0.722	mg/kg	0.0000722 %	✓	
		204-927-3	129-00-0									
11	benzo[a]anthracene				0.43	mg/kg		0.378	mg/kg	0.0000378 %	✓	
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				0.41	mg/kg		0.361	mg/kg	0.0000361 %	✓	
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				0.41	mg/kg		0.361	mg/kg	0.0000361 %	✓	
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				7.1	mg/kg	1.895	11.837	mg/kg	0.00118 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				15 mg/kg	2.683	35.412 mg/kg	0.00354 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				13 mg/kg	5.324	60.91 mg/kg	0.00609 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	110 mg/kg	1.57	151.966 mg/kg	0.00968 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				79 mg/kg	4.398	305.744 mg/kg	0.0306 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17 mg/kg	1.462	24.846 mg/kg	0.00248 %		
		215-160-9	1308-38-9							
26	benzo[bk]fluoranthene				0.56 mg/kg		0.493 mg/kg	0.0000493 %	✓	
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
Total:								0.0552 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP03---0.55

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP03---0.55	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
5.9% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 5.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				9.6	pH		9.6	pH	9.6 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0									
10	pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0									
11	benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				7.3	mg/kg	1.895	13.014	mg/kg	0.0013 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.4 mg/kg		0.376 mg/kg	0.0000376 %	✓	
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				28 mg/kg	2.683	70.685 mg/kg	0.00707 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				36 mg/kg	5.324	180.366 mg/kg	0.018 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	24 mg/kg	1.57	35.455 mg/kg	0.00226 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				93 mg/kg	4.398	384.876 mg/kg	0.0385 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	benzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
26	ethylbenzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
27	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
28	toluene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
29	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				28 mg/kg	1.462	40.924 mg/kg	0.00409 %		
		215-160-9	1308-38-9							
30	benzo[bk]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
31	xylene				<2 µg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0726 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH01---0.50

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH01---0.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
12% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				8	pH		8	pH	8pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0									
10	pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0									
11	benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				6.9	mg/kg	1.895	11.504	mg/kg	0.00115 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				24 mg/kg	2.683	56.66 mg/kg	0.00567 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				15 mg/kg	5.324	70.281 mg/kg	0.00703 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	14 mg/kg	1.57	19.341 mg/kg	0.00123 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				60 mg/kg	4.398	232.21 mg/kg	0.0232 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14 mg/kg	1.462	20.462 mg/kg	0.00205 %		
		215-160-9	1308-38-9							
26	benzo[bk]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
Total:								0.0416 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH02---1.00

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH02---1.00	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.8	pH		7.8	pH	7.8 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0									
10	pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0									
11	benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				6.9	mg/kg	1.895	11.111	mg/kg	0.00111 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				17 mg/kg	2.683	38.766 mg/kg	0.00388 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				10 mg/kg	5.324	45.257 mg/kg	0.00453 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	15 mg/kg	1.57	20.016 mg/kg	0.00128 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				31 mg/kg	4.398	115.885 mg/kg	0.0116 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10 mg/kg	1.462	14.616 mg/kg	0.00146 %		
		215-160-9	1308-38-9							
26	benzo[bk]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
Total:								0.0251 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH03---1.00

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH03---1.00	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7.4% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 7.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				8.9	pH		8.9	pH	8.9 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0									
10	pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0									
11	benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				3.4	mg/kg	1.895	5.965	mg/kg	0.000596 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				12 mg/kg	2.683	29.811 mg/kg	0.00298 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				13 mg/kg	5.324	64.094 mg/kg	0.00641 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	42 mg/kg	1.57	61.056 mg/kg	0.00389 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				52 mg/kg	4.398	211.769 mg/kg	0.0212 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	benzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
26	ethylbenzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
27	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
28	toluene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
29	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				12 mg/kg	1.462	17.539 mg/kg	0.00175 %		
		215-160-9	1308-38-9							
30	benzo[bk]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
31	xylene				<2 µg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0381 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH04---0.50

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH04---0.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
9.5% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				8.9	pH		8.9	pH	8.9 pH		
2	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
3	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
4	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
5	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
6	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
7	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									
8	anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7									
9	fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0									
10	pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0									
11	benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
12	chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
13	benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5									
15	dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
16	benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2									
17	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				6.6	mg/kg	1.895	11.316	mg/kg	0.00113 %	✓	
	033-005-00-1											

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.5 mg/kg		0.453 mg/kg	0.0000453 %	✓	
	048-001-00-5									
19	copper { copper(II) chloride dihydrate }				23 mg/kg	2.683	55.842 mg/kg	0.00558 %	✓	
		231-210-2	10125-13-0							
20	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
21	nickel { nickel diiodide }				37 mg/kg	5.324	178.284 mg/kg	0.0178 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
22	lead { lead di(acetate) }			1	21 mg/kg	1.57	29.836 mg/kg	0.0019 %	✓	
	082-005-00-8	206-104-4	301-04-2							
23	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
24	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				96 mg/kg	4.398	382.092 mg/kg	0.0382 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
25	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				28 mg/kg	1.462	40.924 mg/kg	0.00409 %		
		215-160-9	1308-38-9							
26	benzo[bk]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9							
Total:								0.0701 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

■ pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

■ acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

■ acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

■ fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

■ benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **cadmium compounds, with the exception of cadmium sulposelenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex**

GB MCL index number: 048-001-00-5

Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

• **copper(II) chloride dihydrate** (EC Number: 231-210-2, CAS Number: 10125-13-0)

Description/Comments: C&L for copper (II) chloride (anhydrous) CAS 7447-39-4

Data source:

Data source date: 03 Nov 2016

Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 4; H302 , Eye Dam. 1; H318 , Acute Tox. 4; H312 , STOT SE 3; H335 , Eye Irrit. 2; H319 , Acute Tox. 3; H301 , Acute Tox. 4; H332 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **lead di(acetate)** (EC Number: 206-104-4, CAS Number: 301-04-2)

GB MCL index number: 082-005-00-8

Description/Comments: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2.

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

• **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **benzo[bk]fluoranthene** (EC Number: [1] 205-911-9 [2] 205-916-6, CAS Number: [1] 205-99-2 [2] 207-08-9)

Description/Comments: Combined data from harmonised entries in CLP for benzo[b] and benzo[k]fluoranthene; C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Carc. 1B; H350 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case scenario

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case scenario

cadmium {cadmium compounds, with the exception of cadmium sulposelenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Worst case scenario

copper {copper(II) chloride dihydrate}

Worst case scenario

mercury {mercury difulminate}

Worst case scenario

nickel {nickel diiodide}

Worst case scenario

lead {lead di(acetate)}

Worst case scenario

selenium {nickel selenate}

Worst case scenario

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

Worst case scenario

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case scenario

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2022.25.4995.9469 (25 Jan 2022)

HazWasteOnline Database: 2022.25.4995.9469 (25 Jan 2022)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021



APPENDIX 13 - Contaminated Land Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused;
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;



APPENDIX 14 - Limitations

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2022, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous



properties and as investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

