BROWNFIELD SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

ATRI7 6 LTD

Whitworth Street, Manchester

Phase II Geo-Environmental Assessment Report

AH/C5504/13745 Rev B

April 2026

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site is located along Whitworth Street West, Manchester, M1 5NZ. The site comprises a parcel of land currently used for storage and parking surfaced in made ground across the majority of the site with concrete across the centre and an access road along the western part of the site.
Ground Conditions	Generalised ground conditions from the ground investigation comprise (top down): • Made ground encountered from ground level to between 0.90m and 3.70m bgl. • Natural strata encountered from 0.90m bgl to between 2.20m and 3.90m bgl. • Solid geology encountered from 3.60m bgl to 32.00m bgl. • Groundwater recorded between 9.02m and 9.27m bgl.
Human Health - Soils Contamination	• Two minor exceedances of PAHs were identified within one sample (TP208). • As no soft landscaping is proposed, the risk is considered to be low and no remedial measures in respect to human health are required.
Controlled Waters – Surface and Groundwater Contamination	• The risk to controlled waters is considered to be low.
Ground Gas	Based on the monitoring, the site is classified as CS1 – No protection is required. Ground gas monitoring is complete.
Outline Remedial Strategy	• No remedial actions required at this stage due to proposed development not including soft landscaping and POS.
Waste	Made ground – majority is classified as non-hazardous. Some soils acceptable at an inert landfill and some at a non-hazardous landfill. Natural – classified as non-hazardous.
Foundations and Floor Slabs	Piled foundations are considered the most suitable foundation option. A 350mm diameter, 9m long pile embedded 5m into bedrock have an allowable load of 2.4MN increasing to 4.1MN for a 19m long pile embedded 15m into bedrock. A 600mm diameter, 9m long pile embedded 5m into bedrock have an allowable load of 4.8MN increasing to 7.6MN for a 19m long pile embedded 15m into bedrock. A 750mm diameter, 9m long pile embedded 5m into bedrock have an allowable load of 6.4MN increasing to 9.9MN for a 19m long pile embedded 15m into bedrock. Pile supported floor slabs may be adopted.
Concrete Classification	DS-1 AC-1 conditions are indicated within the natural superficial and bedrock stratums, while DS-2 AC-1 conditions are indicated within the made ground strata.
Highways Design	Made Ground CBR – 20% Superficial Strata CBR – cohesive/fine soils– 4% Superficial Strata CBR – granular/coarse soils– 20% The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Site Drainage	Drainage to soakaways is considered potentially suitable for this site. SuDS are indicated to be feasible with rates between $2.99x10^{-3}$ and $8.67x10^{-6}$.
Further Work	The following further works will be required to progress to the construction phase: • Detailed foundation design by a structural engineer. • Design of Remedial Strategy and confirmation with the Local Authority /EA / warranty provider (if required). • Production of Materials Management Plan (MMP) under the CL:AIRE DoWCo (if required). • Implementation of the Remedial Strategy and verification of the remedial works (if required).

This executive summary should be read in conjunction with the full report, reference AH/C5504/13745 Rev B and not as a standalone document. Report template version 4.5.

PROJECT QUALITY CONTROL DATA SHEET

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	A	25/03/2025	Update with completion of the gas monitoring programme.
	B	28/04/2026	Update following client comments.

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DRAWINGS

Drawing Number	Rev	Title
22987-2095-00	P01	Proposed Development Layout Plan
C5504/01	-	Site Location Plan
C5504/04	-	Site Features Plan
C5504/02	-	Exploratory Hole Location Plan
C5504/03		Foundation Pit Drawings

APPENDICIES

Appendix	Title
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Chemical Testing Results
Appendix D	Geotechnical Testing Results
Appendix E	Monitoring Results
Appendix F	Waste Assessment Report

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Atri7 6 Ltd on a site off Whitworth Street West, Manchester and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.

Definitions of terms and acronyms used within this report are presented in Section 11.0.

1.2 Proposed Development

The proposed development is for a residential end use comprising of a 38-storey purpose-built student accommodation (PBSA), drawing No. 22987-CWA-00-A-0207 P06 provided to BSL by the client.

1.3 Previous Reports

The following report, Desk Study completed by BSL (reference OH/C5504/13646 Rev A), has been produced for the site and should be read in conjunction with this assessment.

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

The factual and interpretive Phase II sections of this report are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Following the Desk Study, an exploratory intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The exploratory investigation was undertaken using trial pitting, window sampling, cable percussive drilling, rotary drilling, ground gas and groundwater monitoring, laboratory chemical and geotechnical testing, with reporting on the findings.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable.

Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, Atri7 6 Ltd. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care. This report may not be relied upon by the client or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

The recommendations in this report assume that ground levels will remain as existing, unless stated otherwise within the report. If there is to be any re-profiling (e.g. to create development platforms or flood defences) then the recommendations may not apply.

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

Asbestos in structures was not covered in this report. It should be noted that an asbestos demolition survey will be required prior to any demolition of structures. If asbestos is present in soils, these will need to be dealt with in accordance with the Control of Asbestos Regulations (CAR) 2012.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Whitworth Street West, Manchester, M1 5NZ, centred on National Grid Reference 383579, 397518 as shown on the Site Location Plan, Drawing No. C5504/01.

2.2 Site Description

A site reconnaissance survey was carried out at the site on 4th November 2024. The main site features and potential issues identified are detailed below and are shown on the Site Features Plan, Drawing No. C5504/02.

Feature	Description
Site Area	0.11 hectares.
Site Access	Access to the site is gained off Whitworth Street West to the north.
Current Land Use and Site Features	Sparse vegetation comprising grasses and small bushes along the north, east and south border of the site.
Potential Sources of Gross Contamination	The site is generally flat with a slight slope to the west onto the access road.
Vegetation / Ecology	The site is bordered by wooden fencing to the north, commercial buildings to the east and west, and a railway viaduct bridge to the south.
Topography	The site is set within a commercial area with a tram station to the north of the site alongside a number of bars and bordered by a railway bridge to the south.
Site Boundaries	All services have been grubbed out and the made ground underlying the site is compacted due to previous use as a piling mat.
Surrounding Area	Sparse vegetation comprising grasses and small bushes along the north, east and south border of the site.

3.0 SUMMARY OF PREVIOUS REPORTS

A summary of the relevant points from the Desk Study completed by BSL (reference OH/C5504/13646) is presented below:

- The site has had previous development since 1851 for industrial end use including a warehouse.
- Several works, mills, warehouses and railway lines were in close proximity of the site.
- Geology comprises glaciofluvial sheet deposits (Secondary (A)) over Chester Pebble Beds Formation (Principal Aquifer).
- No faults are within an influencing distance of the site.
- The nearest watercourse is the Rochdale Canal circa 25m to the north of the site.
- The risk to human health is considered to be moderate to low.
- The risk from ground gas is considered to be moderate to low and the site is not located in an area requiring radon protection measures.
- The risk to controlled waters is low .
- The site is located in the UXO moderate risk zone. A Detailed UXO Desk Study concluded a low risk.
- Recommendations were for an appropriate Phase II ground investigation to be carried out to confirm the identified risks and obtain information for preliminary design.

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken as per the recommendations of the Phase I Geo-Environmental Assessment.

The aim of the fieldwork was to:

- Investigate ground conditions on the site and the potential need for detailed investigation.
- Install standpipes to allow future monitoring.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation between the dates of 4th November and 8th November 2024.

Method	No.	Range Depths (m bgl)	Purpose
Trial pits – JCB 3CX	13	1.40 – 3.70	Establish general ground conditions and gain good coverage. Undertake hand shear vanes in cohesive strata to determine soil strengths for preliminary foundation design. SA201 to SA202A were undertaken for infiltration tests to be undertaken. TP201 to TP209 were undertaken to identify existing foundations.
Window sample boreholes – Tracked WS rig	27	0.30 – 4.29	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination and geotechnical and testing. Determine soil strengths/densities for preliminary foundation design. Installation of ground gas and water monitoring wells. BH201 and BH202 were rotary open holed and then rotary cored.
Rotary cored boreholes	2	30.00 – 32.00	Obtain rock core for geotechnical testing and parameters for preliminary foundation design. BH201 & BH202
Infiltration tests (in Trial Pits)	1	1.40	Obtain infiltration rates for drainage design. SA201A was the only suitable trial pit for an infiltration test.

TP207 and TP208 were undertaken 2.5m from the viaducts wall due to a drainage pipe identified within TP208 at 0.60m from the viaducts wall running parallel. 12No. window sample boreholes were proposed at the site, however due to obstructions a total of 27No. locations were attempted.

The approximate locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No C5504/02. The exploratory hole logs are presented in Appendix B.

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

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.

- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.
- BS EN ISO 14689:2018 Geotechnical investigation and testing – Identification and classification of rock.

4.3 Sampling Strategy

Representative samples were taken from exploratory holes at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance. The distribution of samples taken across the site is recorded on the exploratory logs.

Investigatory hole locations were determined by reference to the conditions identified in the preliminary risk assessment. No specific sampling statistics or grid were utilised in this instance.

4.4 Laboratory Testing

As part of the initial assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

In the absence of particularly contaminative processes on site and the lack of visual evidence of potential hydrocarbon impaction representative soil samples were screened for the following general suite of determinands at a UKAS approved laboratory:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	6
Petroleum Hydrocarbons (TPH CWG) inc BTEX and MTBE.	2
Asbestos Screen.	6
Waste Acceptance Criteria (WAC).	2

The Chemical Laboratory Testing Results are presented in Appendix C.

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' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil'.

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
pH Value.	8
Water Soluble Sulphate Contents.	8
SD1 BRE Full Suite.	2
Point Load Testing.	14
Unconfined Compressive Strength (UCS).	8

The Geotechnical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in a number of boreholes as detailed in the table further below.

A total of 6 monitoring visits were undertaken out of 6 proposed as part of the current scope, in line with the recommendations of BS8485.

All gas monitoring was undertaken using either a GA5000 or GFM436 infrared gas meter with integral electronic flow analyser.

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
BH201	50mm HDPE	6.00 – 13.00	Bedrock	Ground Gas & Groundwater
BH202	50mm HDPE	6.00 – 13.00	Bedrock	Ground Gas & Groundwater
WS202	35mm PVC	0.50 – 3.50	Made Ground	Ground Gas
WS207A	35mm PVC	0.50 – 3.50	Made Ground	Ground Gas
WS210	35mm PVC	0.50 – 1.50	Made Ground	Ground Gas

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Ground gas monitoring results are presented in Appendix E of this report.

5.0 GROUND CONDITIONS

5.1 Summary

A brief summary of the ground conditions encountered is presented in the table below:

Stratum	Range Depths - Top (m bgl)	Range Depths - Base (m bgl)	Range Thickness' (m)	Brief Description
Made Ground	00.00 – 0.05	0.90 – 3.70	0.60 – 3.70	Gravelly clayey sand.
	2.40	3.00	0.60	Gravelly sandy clay.
Natural Superficial Strata	0.90 - 1.40	2.00 – 2.20	0.60 – 1.30	Firm to very stiff sandy CLAY.
	1.40 – 3.60	2.20 – 3.90	0.10 - 2.10	Clayey gravelly SAND.
Solid Geology	3.60 – 3.90	3.94 – 32.00	0.29 – 0.84	Very weak to weak SANDSTONE.
	7.77 - 27.61	7.85 - 27.68	0.07 – 0.30	Very weak MUDSTONE.

Details are provided in the logs in Appendix B and the individual strata are described in the sections below.

5.2 Made Ground

Made Ground – General
Made ground was encountered within all the exploratory holes across the site and was observed from ground level to depths between 0.90m and 3.70m bgl.

Hardstanding surfacing of concrete was present across the western parts of the site recorded at 0.05m thick.

The composition of the made ground was fairly consistent across the site and represented demolition material comprising gravelly clayey sand. Cobbles of brick and concrete ranged from low to medium content.

Existing Foundations
In TP201 – TP206 and TP208 existing foundations were observed.

For full details on existing foundations see Foundation Drawings reference C5504/03. Photographs are also provided in that drawing.

5.3 Natural Superficial Strata

The natural strata underlying the site was generally gravelly clayey sand with occasional firm to very stiff clay with varying amounts of sand and gravel as minor constituents. The natural strata was generally a very thin veneer across the site, with some exploratory hole locations encountering made ground straight onto solid geology.

Shear vane readings in the cohesive soils indicate the clays are generally medium and high strength.

5.4 Solid Geology

Very weak becoming weak sandstone bedrock was encountered from depths of between 3.60m and 3.90m. This was proven to a maximum depth of 32.00m bgl across the site and is interpreted to represent the Chester Pebble Beds Formation.

The discontinuities described generally ranged from being very closely to closely spaced, rough, being horizontal to slightly sub-horizontal in orientation.

The overall percentage of Total Core Recovery (TCR) in sandstone over each core run within an individual borehole varied from 0% to 100%, although averaged at 95%. Similarly, Solid Core Recovery (SCR) ranged between 0% to 100% and averaged 90%.

Rock Quality Designation (RQD) percentages ranged between 0% up to 80%, although considerable variation in the RQD was recorded with depth but generally averaged 45%.

5.5 Groundwater

The depths to groundwater and locations present during site works are shown in the table below:

Location	Depth During Site Works (m)	Comments
BH201-BH202	-	NGW
SA201-SA202A	-	NGW
TP201-TP209	-	NGW
WS201-WS210	-	NGW

NGW – No Groundwater Encountered

Post-site works monitoring has revealed the following depths to groundwater:

Location	Depth During Monitoring Period (range) (m)	
	Min	Max
Overall min/max	NGW	9.27
BH201	8.02	9.27
BH202	88.01	9.25
WS202	2.40	NGW
WS207A	1.30	NGW
WS210	NGW	NGW

5.6 Observations

Contamination
During the works undertaken by BSL, observations for both visual and olfactory evidence of contamination were undertaken.

Stability of Excavations/Boreholes
The sides of the trial pits were generally stable however spalling of the natural strata was observed in TP01 and TP02 and collapsing of the made ground was observed in several trial pits.

The sides of the trial pits were generally unstable due to the presence of deep granular made ground across the site.

The borehole sidewalls were generally stable and window sampling progressed without the need to install casing.

Obstructions
There are numerous obstructions throughout the made ground on site. The obstructions identified are summarised in the table below:

Location	Depth (m bgl)	Comments
BH201	0.80	Concrete.
WS203, WS203A	0.30	Dense made ground.
WS203B	0.47	

Location	Depth (m bgl)	Comments
WS203C	0.35	
WS203D	0.40	
WS204	0.89	Concrete.
WS204A	0.30	Dense made ground.
WS204B	1.00	
WS205	0.50	
WS205A	0.40	
WS205B	0.45	
WS206, WS206A	0.50	
WS206B	0.40	
WS207	0.50	
WS209	0.50	
WS209A	1.35	
WS209B	0.40	
WS209C	0.50	

6.0 TEST RESULTS

6.1 Geotechnical Laboratory Testing

Unconfined Compressive Strength (UCS) and Point Load Index delete if not done
A summary of the information pertaining to the Unconfined Compressive Strength (UCS) of the intact rock material (not rock mass) related to sandstone bedrock at the site is shown in the table below. The point load index results have been used to derive the UCS using the relationship of UCS=24*IS50 for sandstone (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.05 – 0.20	0.07 – 0.26	-	Point load (Axial, Diametral and Irregular)	26
-		1.68 - 6.24	Point load correlation (ISRM)	14
-		11.9 – 20.2	UCS test	8

6.2 Aggressive Ground Conditions – Geotechnical Chemical Testing

The test results for the assessment of aggressive ground conditions are presented in Appendix D. The results are summarised and assessed within Section 7.6 of this report.

6.3 In Situ Geotechnical Testing

In Situ Hand Shear Vane Tests
Hand shear vane tests were carried out on suitable cohesive soils where possible. Each shear vane result recorded represents the mean value of three tests undertaken at the specified depth.

The results and distribution of the hand shear vane tests are recorded in kPa on the Exploratory Hole Logs which are presented in Appendix B.

In Situ Standard Penetration Tests
Standard Penetration Tests (SPTs) were carried out within the window sample boreholes at regular 1.0m intervals. The results of the individual blows and the N-values are recorded on the Exploratory Hole Logs in Appendix B.

All SPT N values are uncorrected. Density and strength descriptors are reported in accordance with the guidelines stated in BS 5930:2015+A1:2020, incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Soil Infiltration Test Results
One soil infiltration test was undertaken within a trial pit, with a summary of the results presented in the table below. This was carried out in general accordance with BRE Digest 365 (BRE 2016) where infiltration rates allow three test runs during a working day (or where there is no infiltration), but where low infiltration rates were encountered the available time may not have been sufficient to fully comply with the BRE test method.

Where less than three tests were possible in a particular location the results provided should be considered as indicative only. Further discussion concerning the suitability of infiltration testing at the site is provided in Section 7.8.

Location	Stratum Type	Depth (m)	Infiltration Rate (m/sec)		
			Test 1	Test 2	Test 3
SA201A	Granular made ground	1.30	$8.67x10^{-6}$	-	-

The full test results are presented in Appendix D.

Permeability Test Results (Boreholes)
The results of permeability testing in boreholes using falling head methods are presented in the table below. These were carried out in general accordance with BS 5930 & BS 22282.

Location	Stratum Type	Response Zone (m)	Hydraulic Conductivity (m/sec)		
			Test 1	Test 2	Test 3
WS202	Granular made ground	0.50 – 3.50	$5.23x10^{-3}$	$6.54x10^{-3}$	$2.99x10^{-3}$
WS210	Granular made ground	0.50 – 1.50	$1.95x10^{-5}$	$1.76x10^{-5}$	-
BH201	Sandstone	6.00 – 13.00	$3.57x10^{-4}$	$3.92x10^{-4}$	$2.63x10^{-4}$

The full test results are presented in Appendix D.

6.4 Geo-Environmental Testing

Chemical Laboratory Testing
The chemical test results for soils are presented in Appendix C. The results are summarised and assessed within Section 8.2 of this report.

Ground Gas Monitoring
Ground gas monitoring results are presented in Appendix E and are summarised and assessed within Section 8.6 of this report.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Ground Model

The site is currently used for storing building materials. There are known foundations associated with the previous uses at the site.

The ground conditions can be summarised as below (top down):

- Made ground generally comprising gravelly clayey sand from ground level to between 0.90m and 3.70m bgl.
- Natural superficial deposits comprising clayey gravelly sand proven to depths between 2.20m and 3.90m bgl. Fim to very stiff clay was also encountered in localised areas to depths between 2.00m bgl to 2.20m bgl.
- Solid geology comprising sandstone proven to depths ranging between 3.94m and 32.00m bgl.
- No groundwater encountered during site works.
- Post site works monitoring levels ranging between 8.02m and 9.27m bgl.

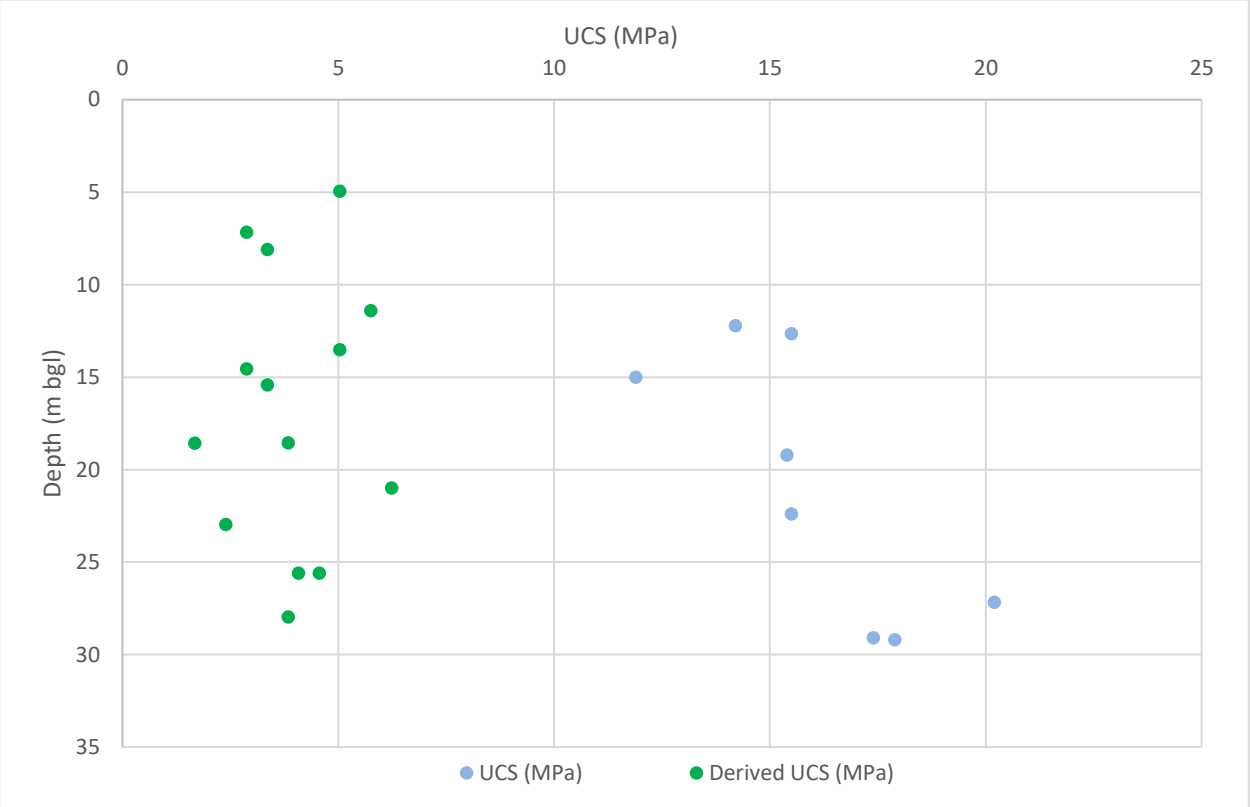
A large drain is indicated to run beneath the area parallel to the viaduct bridge. This will need to be taken into consideration for foundation design.

Numerous concrete and dense made ground obstructions throughout the made ground were identified across the site that will need removal during enabling works.

7.2 Design Soil Parameters

The relevant test results from the prior section have been evaluated to derive geotechnical soil parameters for the site.

The Unconfined Compressive Strength (UCS) was determined by laboratory testing and was also derived from laboratory point load testing using the relationship of UCS=24*IS50 for sandstone (ISRM). A graph showing the variation in UCS and derived UCS vs depth is presented below to provide a profile of the variation in UCS of the bedrock with depth.



The above graph shows a weak positive correlation between an increase in rock strength with depth. This trend is strengthened with the removal of the correlated Point Load Index results. There do not appear to be any significant or definitive lower strength zones, with the vast majority of results being above 4 MPa (weak rock) as can be expected of the Chester Formation, and all UCS testing data being above 10MPa. Note there is a tendency for bias within the UCS and point load data; UCS is typically undertaken on more intact samples, whereas lower strength area of rock tends to provide samples of rock unsuitable for UCS analysis, hence point load data is used as a proxy for UCS strengths. This should be considered during estimation of characteristic values.

Characteristic Values

Characterisation of the geotechnical parameters above has been undertaken to obtain characteristic values, which are a cautious estimate of the values affecting the occurrence of the limit state, taking into consideration typical minimum foundation depths for cohesive and granular soils.

Characteristic values for made ground are not presented due to the heterogeneity of the deposits and that they are not typically considered to be a suitable bearing stratum without some form of ground improvement. Characteristic values are also not presented for the natural superficial strata due to the thin veneer of deposits encountered and the lack of any skin friction that would be achieved through the minimum thickness of the strata, with some exploratory hole locations encountering no superficial deposits whatsoever.

Based on field strength descriptions, the laboratory testing and the above graph, the characteristic UCS values for the solid geology underlying the site has been derived and is summarised for a selection of depth in the table below:

Bedrock Strata	Depth (m)	Characteristic UCS values (MPa)	Characteristic RQD values (%)
Sandstone	14	6.6	47.5

Bedrock Strata	Depth (m)	Characteristic UCS values (MPa)	Characteristic RQD values (%)
	19	8.5	61.5
	24	9.4	45

7.3 Foundations

The development will comprise a thirty-eight storey PBSA building and is considered to be classed as Geotechnical Category 2 in accordance with Eurocode 7.

Preliminary design by calculation has been undertaken to determine the design resistance of the bearing strata in the following section. Note that the made ground, present to depths down to 3.70m bgl, is not considered to be a suitable bearing stratum.

Provisional proposed column loads of 14,000kN has been provided to inform the below assessment.

This assessment is based on the existing ground levels and does not take into consideration any cut/fill exercise, which should be considered at the detailed design stage.

Piles
In view of the variation in made ground thickness over the building footprint and the likely magnitude of the column loads expected to be imposed by the proposed development, shallow foundations will be unsuitable, and it is considered that piled foundations will be required.

Piles should be extended through the made ground and the superficial deposits. Depending on the structural loadings and design requirements, piles will likely utilise a combination of skin friction and end-bearing resistance, transferring the majority of the load to the underlying sandstone of the Chester Pebble Bed Formation .

Displacement piles such as driven pre-cast concrete or tubular steel piles, or replacement techniques such as bored piles with the use of casing or continuous flight auger (CFA) piles are all considered potentially suitable piling solutions for this site, with either pre-cast or cast in situ ground beams spanning between piles to support masonry walls.

It is understood that rotary bored piles with the use of casing are the preferred piling solution for this site. This method has the benefit of minimal ground disturbance and vibration where resulting risks to adjacent structures and property is. With this method there is also the ability to construct sockets into underlying rock.

However, the exact choice of piling system and the detailed design of piles are beyond the scope of this report and should be undertaken by a piling specialist. Preliminary calculations and recommendations are provided below as a guide at this stage. Appropriate modelling and settlement analysis will be required at the detailed design stage.

For piles socketed in bedrock, the ultimate shaft resistance for the portion of the pile embedded in the bedrock may be determined through the following equation:

$$q_s = k_1 p_{ref} \left(\frac{q_u}{p_{ref}} \right)^{k_2}$$

In this equation, q_s is the ultimate shaft resistance in kN/m^2, q_u is the UCS value of the bedrock, p_{ref} is a reference pressure of 100kPa and k_1 and k_2 are coefficients selected from the range presented in BS 8004 as 1.0 and 0.6 respectively.

The ultimate shaft resistance for the portion of the pile embedded in granular soil may be determined through the following equation:

$$q_s = K_s tan\delta \sigma'_v$$

In this equation, q_s is the ultimate shaft resistance in kN/m^2, K_s is an earth pressure coefficient conservatively assumed as 0.7 for preliminary design purposes, δ is the angle of interface friction 35°, and σ'_v is effective overburden pressure over the embedded length of the pile.

The frictional contribution of the made ground has been omitted from these calculations due to the variability and generally loose nature. Additionally, pile designs should be based on the final ground level, if any excavation is proposed, rather than the current ground elevations.

The ultimate end bearing resistance of the competent bedrock has been determined using the following equation:

$$q_b = k_3 p_{ref} \left(\frac{q_u}{p_{ref}} \right)^{k_4}$$

In this equation, q_b is the ultimate base resistance in kN/m^2, q_u is the UCS value of the bedrock, p_{ref} is a reference pressure of 100kPa and k_3 and k_4 are coefficients identified in BS 8004 as 15 and 0.5 respectively for cemented materials. The design base resistance may be limited by the compressive strength of the concrete used to construct the pile or the structural capacity of the pile itself.

Based on the available information and methodology outlined above, preliminary calculations were undertaken to provide estimated factored allowable loads for a singular circular concrete pile, to be socketed into sandstone bedrock of variable lengths and a variety of diameters (based on standard rotary pile boring equipment). A global factor of safety of 3 has been used in this assessment. The preliminary allowable loads are shown in the table below. Note these recommendations are provisional and subject to review at the detailed design stage.

Pile Length (m)	Embedment into Rock (m)	Allowable Loads (MN) for Specified Pile Diameters		
		350mm	600mm	750mm
9	5	2.4	4.8	6.4
14	15	3.3	6.2	8.2
19	20	4.1	7.6	9.9

As stated above, these calculations are preliminary, should be used only as a guide and reviewed at the detailed design stage. Information gained from this ground investigation should be assessed by experienced piling contractors and suitably qualified structural engineers such that appropriate piles are selected and designed given the site conditions that have been encountered.

Information gained from this ground investigation should be assessed by an experienced piling contractor such that appropriate piles are selected and designed given the site conditions that have been encountered.

Whilst detailed design is beyond the scope of this report, the following should be taken into consideration during the detailed design stage by a suitably competent contractor/engineer:

- Piles should extend a minimum of five pile diameters into the bearing stratum to fully mobilise end-bearing resistance and shaft resistance.
- Higher allowable loads than those listed in the table above could be achieved by increasing the diameter of the piles or by using pile groups.
- Obstructions in the ground (e.g. relict foundations) could cause piles to stop shallower than their anticipated design depth, or deviate from the vertical, therefore reducing their capacity.
- As groundwater was observed during the boring of the intrusive holes and monitoring, temporary casing may be required for bored piles.
- Bored piles through coarse soils will likely result in loosening, with resultant reduced shaft friction.
- Discussions should be made with the pilling contractor regarding the suitability of driven piles due to the levels of disruption to the adjacent residential and commercial properties.
- CFA piles are likely to be a suitable alternative to driven piles to reduce noise levels, although there will be additional costs associated with disposal of excess soils.
- The construction of a basement structure should also be taken into account for foundation and pile design.
- Driven piling work should be undertaken in accordance with BS EN 12699:2015 'Execution of Special Geotechnical Work - Displacement piles', replacement piles should be carried out in accordance with BS EN 1536:2010(+A1:2015) 'Execution of Special Geotechnical Works - Bored Piles'.
- In accordance with Eurocode 7 it would be prudent to verify the compressive resistance of the strata and the pile design by static load testing on working piles to at least 1.5 times the characteristic load on more than 1% of working piles.

Working Platform

Prior to the commencement of penetrative works (piling/vibro), a working platform will be required for tracked plant. This should be designed and installed in accordance with BR470 (BRE 2004) based on the plant requirements, data and rig loadings.

Piling Risk Assessment

A risk assessment is likely to be necessary for piling and/or the installation of VSCs, as there is a possibility that this could lead to creation of new pathways for migration of contamination.

7.4 Floor Slabs

Given the thickness of made ground present (generally >600mm), suspended floor slabs should be adopted at the site in accordance with LABC standards.

Ground bearing slabs may also be adopted providing the following criteria are satisfied:

- Any other compressible or unsuitable materials (topsoil containing vegetation and organic matter, including tree roots, are excavated and either improved or removed and replaced with suitable materials.
- Any fill beneath the slab is suitable, well-compacted granular material placed in an appropriate thickness in accordance with a suitable specification (e.g. SHW Series 600) designed and supervised by an appropriately qualified engineer, with the end performance validated.
- The slab is adequately reinforced.
- Regular construction joints and ties are provided to allow for differential settlement.

The final floor slab design should be of sufficient thickness and sufficiently reinforced to accept the envisaged applied loads, without unacceptable total or differential movement.

Vertical elements within the structure, such as columns and walls will need to be isolated from the ground bearing slab in order to allow for the slab to expand against them without resulting in cracking.

Prior to the placement of the founding materials and the construction of a ground bearing floor slab, the sub-formation and formation will need to be inspected and checked by a geotechnical engineer to ensure the ground conditions are as expected. If soft spots or hard spots are identified at the formation level, they should be reported to the Geotechnical Engineer immediately and remedial actions agreed.

Incorporation of geogrid reinforcement at formation level, before granular material is placed and compacted, will likely minimise required excavation depths and help provide a suitable foundation for the ground bearing slab.

7.5 Site Preparation and Construction

The existing structures will need to be demolished and relict foundations/infrastructure grubbed out. Topsoil and subsoil should be removed from beneath all proposed buildings and hardstanding areas.

The majority of the services across the site have previously been grubbed out, however, a drain along the southern boundary of the site was observed during the site works. To allow remediation and construction, all services will need to be disconnected and any suspected dead services are confirmed as dead by testing.

Instability of excavations through natural soils is should be accounted for due to the granular nature of the deposits. Instability of the made ground should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.

Collapsing of the trial pit sides was observed in the natural strata and temporary shoring maybe required. Otherwise the foundation excavations will be significantly wider than anticipated and costs will be incurred for additional volumes of concrete.

Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360^{o} or similar) is recommended to maintain the build programme. Breaking equipment may also be required locally to penetrate old foundations associated with former construction and intact rock quality strata.

The presence of substantial depths of made ground across the site may result in settlement of newly installed drainage. This should be taken into consideration during the design of drainage, which may include flexible joints to allow for some differential settlement.

It should be noted that undertaking treatment locally or using deepened foundations (i.e. focussing only on the footprint of structures) means that the surrounding areas (roads, gardens and landscaping) are likely to settle relative to the structures if disturbed. This risk can be mitigated by undertaking more widespread ground improvement through techniques such as dynamic compaction, surcharging or excavation and re-compaction.

Recorded post site works groundwater levels ranged between 9.24m and 9.27m bgl and therefore will be encountered within likely excavation depths. Based on the exploratory holes logs and monitoring, it is considered that methods such as sump pumping are likely to be sufficient to deal with anticipated flows. Further guidance is provided in CIRIA C750 "Groundwater Control: Design and Practice". It should be noted that groundwater levels will vary seasonally and the timing of construction may influence requirements.

7.6 Concrete Classification

The soluble sulphate and pH test results have been assessed in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in the table below.

For the purposes of this assessment, the made ground and natural strata is considered to be relatively permeable, therefore the groundwater has been classed as mobile.

Stratum	No. Samples	Characteristic SO_4 (g/l)	Characteristic pH	DS Class	ACEC Class
Made Ground	6	1440	8.4	DS-2	AC-1
Natural Superficial Strata	3	138	7.7	DS-1	AC-1
Solid Geology - Sandstone	10	200	6.7	DS-1	AC-1

Based on the above, the results of laboratory pH and sulphate content, alongside the BRE full suite tests, indicate that sulphate class DS-1 and ACEC Class AC-1 conditions are required for natural superficial strata and bedrock rock strata and DS-2 and AC-1 conditions are required within the made 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.

7.7 Highways

Equilibrium CBR values are likely to be 2% within the made ground, which will be encountered at likely formation levels across the entirety of the site.

If natural strata is encountered at formation levels, based on Table 5.1 from DMRB IAN 73/06 Rev 1 equilibrium CBR values of 20% are likely to be achieved in undisturbed natural granular soils and 4% for natural clays soils for pavement design purposes, unless proven otherwise by in-situ testing at formation level by a specialist geotechnical engineer.

Where the CBR is found to be less than 2%, the sub-grade is unlikely to be suitable for both the trafficking of site plant and as a permanent highway foundation without improvement of the soils.

To achieve the required design CBR value, improvement works should be carried out in accordance with DMRB IAN 73/06 Rev 1 Chapter 5 and may include proof rolling, excavation and re-engineering / replacement of weaker soils, the inclusion of a geogrid or use of stabilisation techniques such as the addition of hydraulic binders (e.g. cement/lime).

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

Care should be taken to ensure the stratum at formation level is protected against inclement weather, as this is likely to lead to surface deterioration and a decrease in soils strengths.

7.8 Site Drainage

The tests undertaken across the site indicate good drainage conditions, particularly in the deeper made ground and bedrock stratums. Based on the infiltration rates obtained, predominantly on the order of 10^{-3} m/s to 10^{-6} m/s, it is likely that drainage to soakaways will be feasible at the site. We recommend the

design of soakaway drainage is carried out in accordance with BRE 365 and CIRIA C753. Consideration should also be given to future maintenance, where infiltration capacity can be reduced as a result of blinding through ingress of fines.

Note the base of any soakaway incorporated into the future development of the site is required to be at least 1m above the water table. Observed groundwater levels ranged between 8.02m and 9.27 mbgl in deep boreholes across the site. Shallow groundwater was recorded in WS207A and WS02 at 1.30m and 2.40m bgl respectively.

If drainage to soakaways is to be considered, it is suggested that this is discussed with the Local Authority at the earliest opportunity, to confirm the adequacy of proposed testing and to allow their inspection of any test results.

8.0 GEO-ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

The samples were tested for an assessment of the chemical contamination that may pose a risk to human health. The results were examined with reference to a selection of guidance documents as detailed in Appendix A. In this case the LQM/CIEH S4ULs and DEFRA C4SLs for a residential end use without homegrown produce has been adopted as Tier 1 generic screening values.

The apparent exceedance of the relevant screening value is taken as indicating further detailed assessment or remedial action is required.

A summary assessment sheet is presented in Appendix C alongside the chemical test results. Results are discussed in detail in the sections below.

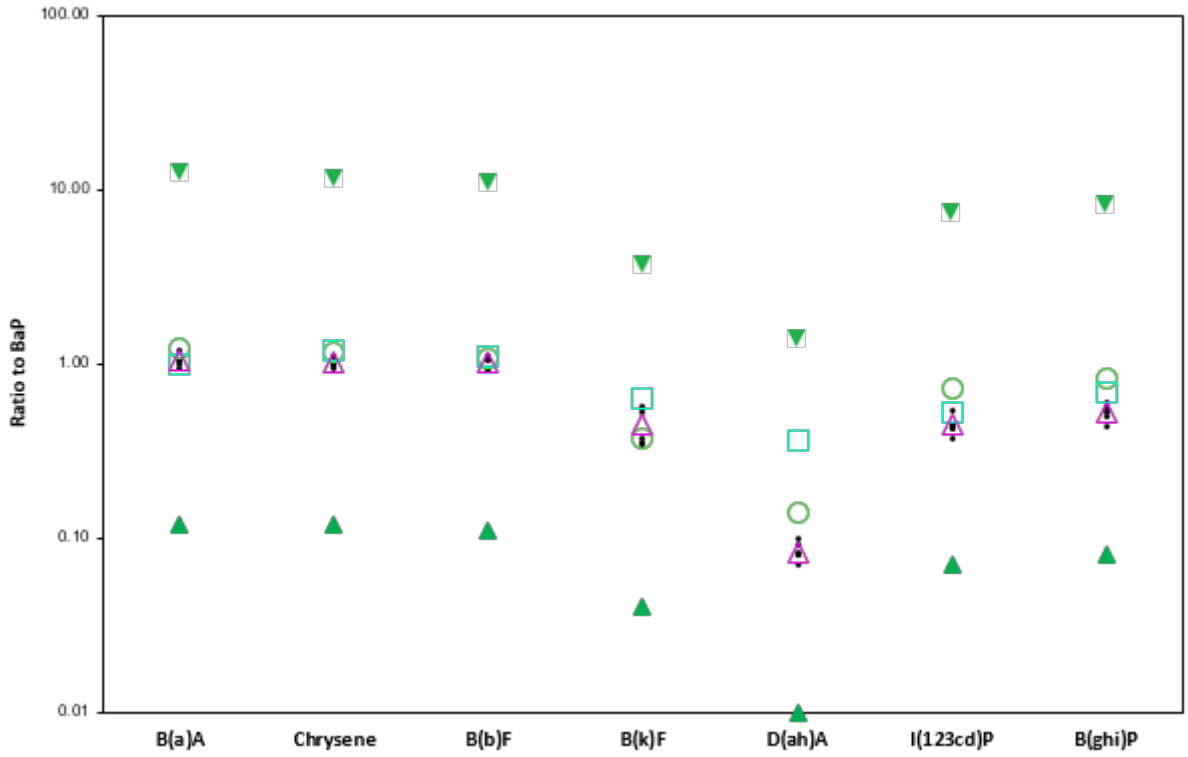
8.2 Soils Test Results and Risk Assessment – Human Health

Metals
No metals have been detected above the adopted screening criteria.

Asbestos
No asbestos fibres have been detected in any of the six samples screened.

Poly Aromatic Hydrocarbons (PAHs)
BSL consider the main risk drivers for PAHs to be benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P being one of the most toxic of the PAHs, and naphthalene the most volatile and soluble. Category 4 Screening Levels (C4SLs) suggest the potential use of B(a)P as a surrogate marker for carcinogenic PAHs, if PAH mixtures fall within appropriate limits, since the risk from other non-carcinogenic PAHs are considered negligible. Given the difference in chemical properties between the two, naphthalene will be treated separately using the LQM S4ULs. Further guidance on this approach is presented in Appendix A.

PAHs and B(a)P as a Surrogate Marker
Based on the above approach, the graph below summarises the site data with respect to how the ratios of carcinogenic PAHs relate to B(a)P, within the confidence limits provided in the PHE documents.



Key:

- Ratio to B(a)P for all data
- Mean ratio to B(a)P from all data at the site
- Upper and Lower limits (order of magnitude from Culp data)
- Mean ratio to B(a)P for Culp data
- Mean ratio to B(a)P for UK data presented by PHE

All the data points that could be used to calculate ratios fall inside the upper or lower limits (order of magnitude above or below that of the study material). Based on this distribution of data it is considered that B(a)P can be used as a surrogate marker for carcinogenic PAHs and the C4SL criteria is suitable for this dataset.

Based on the above, elevated PAHs were recorded in one location to date. The location(s) and elevated species of PAH's are shown in the table below:

Exploratory Hole	Depth (m)	Stratum	Species	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
TP208	0.00-1.00	Made Ground	B(a)P	9.10	5
		Topsoil	Naphthalene	7.10	5.6

* Based on Soil Organic Matter content

Total Petroleum Hydrocarbons (TPH CWG)
No petroleum hydrocarbons have been identified above the adopted screening criteria.

BTEX and MTBE
No BTEX or MTBE compounds have been identified above the adopted screening criteria.

8.3 Summary – Human Health Risk Assessment

Based on the testing and assessment undertaken it would appear that there is localised contamination within the made ground in the form of PAHs within the made ground strata.

The above pose a risk to human health and will require further consideration.

8.4 Soil, Water and Leachate Test Results – Controlled Waters

Soils

No significant contaminants were identified in soils as an indicator of potential impaction on groundwater.

8.5 Controlled Waters Risk Assessment

Groundwater/surface water testing has not been carried out based on the preliminary CSM risk assessment and the site is not considered to pose a significant risk to controlled water for the following reasons:

- No significant gross or mobile contamination has been identified on site in soils based on the results obtained as a potential indicator of groundwater contamination.
- There is no indication under present conditions of significant pollution of controlled waters and conditions following development of the site will not be any worse, indeed they may improve with increased hard cover and water retaining imported soft landscaping soils.
- For the made ground, the preparation of samples for leachability analysis has not been undertaken as this is an aggressive methodology and provides theoretical values which are unlikely to be representative of existing site conditions, real site leaching concentrations will be reduced significantly from that indicated by the laboratory testing, furthermore this would not be representative of post construction conditions, which will significantly reduce infiltration.
- There are no potable (sensitive) water abstractions within 2000m.

8.6 Permanent Ground Gas and Vapours Results

A total of 6 ground gas monitoring visits have been carried out between the dates of 19th November and 7th February 2025. The gas monitoring programme is complete. Results are summarised in the table below:

	CH_4 (%)		CO_2 (%)		O_2 (%)		CO (ppm)		H_2S (ppm)		TVOC (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	-0.4	0.1	0.1	3.2	7.2	20.6	0.0	0.0	0.0	0.0	-	-	0.0	3.1
Steady	-0.3	0.1	0.1	1.0	8.0	20.5							0.0	0.0

Notes: CH_4=methane; CO_2= Carbon dioxide; O_2= Oxygen; CO= Carbon Monoxide; H_2S= Hydrogen Sulphide; TVOC (PID)= Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm= Parts Per Million.

The highest carbon dioxide concentrations were recorded in BH201 (3.2% v/v) on the fifth visit. The maximum flow of 3.1 l/hr was recorded in WS202 on the first visit.

The atmospheric pressure ranged between 982mb and 1029mb over the monitoring period, of which visits were conducted over a range of falling and rising pressure trends.

8.7 Ground Gas Risk Assessment

Basis of Assessment

In order to assess the ground gas situation and the requirement for ground gas precautionary measures at the site, guidance was taken from BS8485:2015+A1:2019 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CL:AIRE Technical Bulletin TB17 'Ground Gas Monitoring and 'Worst-Case' Conditions'.

Rationale and Suitability of Dataset
As per the Phase I Geo-Environmental Assessment report in accordance with BS8485 and as set out in Appendix A of this report, the ground gas generation potential is considered to be **very low** (sources as made ground). The sensitivity of the development is **moderate** on account of the proposed 38-storey apartment building.

In line with current guidance, it is recommended gas monitoring should comprise 6 visits over a 3-month period.

Assessment of Data
Derivation of a Gas Screening Values (GSV) has been undertaken based on the guidance with BS8485 using the following equation: (max gas concentration / 100) x maximum steady flow.

A maximum steady flow of 0.1l/hr has been used to derive the worst credible GSVs. The GSV's for the site are presented below.

Ground Gas	Adopted Typical Steady Flow Rate (l/hr)	Max Concentration (% v/v)	Worst Credible GSV (l/h)	Classification based on GSV	Typical Threshold Concentration Exceeded
Methane	0.1	0.0	<0.7	CS1	No – CS1
Carbon Dioxide	0.1	3.2	<0.7	CS1	No – CS1

The GSVs place the site the site into Characteristic Situation 1 (CS1), however due to concentrations of carbon dioxide greater than 5% v/v being recorded at the site then guidance states ***consideration*** should be given to increasing the site classification as part of assessment; monitoring is now complete.

8.8 Qualitative Risk Assessment

The CSM has been revised based on the findings of the site investigation and laboratory testing results and these are presented overleaf. Unless stated otherwise, in respect to off-site sources, only risks that are assessed as moderate and above within the preliminary CSM have been carried forward to this section, or where a previously unidentified potential source, pathway and / or receptor has been identified from the recent site works.

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made ground associated with previous development and former warehouse PAHs.	Root uptake, ingestion, direct contact, inhalation of dusts	End-users/ Structure	Unlikely	Medium	Low	Given the Industrial heritage of the site, associated contaminants were tested. The test results identified two minor exceedances of PAHs within one sample (TP208). Given that this sample is taken of a made ground only observed in this location the contamination is indicated to be minimal and localised. However, no areas of soft landscaping or POS are indicated on the proposed development plan and therefore end users have a low likelihood of being in contact with these contaminants, this area of the site is external to the building footprint but will be surfaced in hardstanding, as such the risk is considered to be low and no remedial actions are required. .
On site Made ground Ground gases (carbon dioxide and methane)	Migration into confined spaces, inhalation	End-users/ Structure	Unlikely	Medium	Low	Made ground was encountered up to 3.70m bgl across the site and during the ground gas monitoring programme methane concentrations were encountered up 0.1% and carbon dioxide concentrations up to 3.2%. Therefore, minimal ground gas generation associated with the made ground occurred, and a low risk is considered.
Off site Factories, works, mills, warehouses Heavy metals, hydrocarbons, PAHs, asbestos, VOC, detergents, degreasers, inorganic compounds, organic solvents	Root uptake, ingestion, direct contact, inhalation of dusts	End users	Unlikely	Medium	Low	Testing has identified minor localised exceedances of PAHs, this is considered to be attributed to the previous onsite industrial uses. The proposed development also indicates no areas of soft landscaping or POS limiting the risk to end users. Therefore, a low risk is considered.
Off site Gas works Heavy metals, PAHs, petroleum hydrocarbons, BTEX, SVOCs, cyanides	Root uptake, ingestion, direct contact, inhalation of dusts	End users	Unlikely	Medium	Low	Testing has identified minor localised exceedances of PAHs, this is considered to be attributed to the previous onsite industrial uses. The proposed development also indicates no areas of soft landscaping or POS limiting the risk to end users. Therefore, a low risk is considered.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAHs, Metals	Overland flow, / migration through saturated zone	Rochdale Canal 25m away (Surface waters)	Unlikely	Medium	Low	The Rochdale Canal is indicated to be located 25m from the site, it is considered contaminants associated with the made ground and other past industrial uses are unlikely to impact the Rochdale Canal due to the distance of the canal from the site and the associated contaminants are not considered to have significant mobility. Furthermore, canals are considered to be man made structures which are typically clay-lined and not in hydraulic continuity with the underlying aquifers. Therefore, a low risk is posed to the canal from the made ground.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary A Aquifer (Groundwater)	Unlikely	Medium	Low	Chemical testing at the site did not reveal any exceedances of significantly mobile contamination that are considered to pose a potential risk to the underlying aquifers. The proposed development comprises building footprint in the majority with a new surface water drainage system installed which will further reduce the risk to controlled waters. The risk is considered to be low.
	Migration through saturated zone	Principal Aquifer (Groundwater)	Unlikely	Medium	Low	Chemical testing at the site did not reveal any exceedances of significantly mobile contamination that are considered to pose a potential risk to the underlying aquifers. There is a groundwater abstraction 468m north-west and a Source Protection Zone 132m east. The site is currently partially surfaced in hardstanding and will have building footprint or hard surfacing across the entirety of the site, with a new surface water drainage system installed which will reduce the risk to controlled waters. Therefore, a low risk is considered.

8.9 Outline Remedial Measures

No soft landscaping is proposed at this stage and therefore a cover system is not required. The piling mat currently present across the site is assumed to remain as the proposed development does not include a basement level and therefore extensive excavations of the site are unlikely. Should this change then this should be re-assessed and remedial measures may be required.

Utilities and Placement of 'Clean' Service Corridors
The level of protection for the clean potable water supply pipes should be determined using the local water company risk assessment criteria in accordance with UKWIR. A water pipeline risk assessment has been carried out which identified that a standard polyethylene pipe (PE) would be suitable for the site. This is as the made ground will be removed. Service corridors should be placed by over-excavation and replacement of materials with "clean" validated backfill during the earthworks in accordance with the utility providers' requirements.

Waste Arisings / Stockpile Management
Due to the absence of significant earthworks required at the site, it is only envisaged that waste arisings will be generated through piling and the installation of drainage. Given the constraints onsite, it is likely that these will be loaded directly into waiting wagons. However, should material need to remain onsite until appropriate disposal routes have been confirmed then these will be placed in an appropriate laydown area onto a seperate Visqueen/impermeable membrane for made ground and natural arisings to prevent cross contamination. The stockpiles should be segregated from any other stockpiles, and once at the intended size, stockpiles should be "sealed" to ensure no excess materials are placed and mixed into the stockpile to prevent cross-contamination. Segregation of materials and stockpiles should be maintained, and accurate records kept to avoid the potential for cross-contamination. Good site practice for stockpile management includes, but is not limited to:

- Damping down of the site surface, excavations and stockpiles to prevent the generation of dust.
- Stockpiles sizes should be kept to a minimum to reduce 'wind whip' causing potentially hazardous material to be blown from the pile.
- Once at the intended size, stockpiles should be "sealed" to ensure no excess materials are placed and mixed into the stockpiled to prevent cross contamination.
- Appropriate loading of plant to prevent spillages.
- Appropriate signage should be displayed so that site workers/visitors are aware of the intended use and are alerted to the potential hazards associated with the material to be stored on site.

Site won material shall be tested to confirm its chemical suitability. Contaminated material for disposal should be tested to define the most economical disposal route. Once removed from site waste transfer notes shall be provided. These may include, but are not limited to, Muckaway, grab-hire or the use of a six wheeled wagon. In addition, any material to be imported to the site shall be tested and its suitability demonstrated prior to it being brought to the site.

Ground Gas Protection Systems
Based on the ground gas monitoring results, no mitigation measures are required and no radon protection is required for new buildings at this location.

8.10 Health and Safety Issues

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:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground (PAHs)	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Likely	Mild	Moderate/low
Made Ground (Ground Gas)	Inhalation	Construction workers and end users	Likely	Mild	Low

The risk from made ground will be mitigated by standard PPE including gloves. Welfare facilities should be made available to wash before hand to mouth activities.

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.

9.0 WASTE SOIL CLASSIFICATION & ASSESSMENT

9.1 Summary

BSL have undertaken a preliminary assessment of potential excavation waste to arise from the site during redevelopment to:

- Classify the excavation waste to arise as either hazardous or non-hazardous.
- Identify the most sustainable options for the wastes to arise in accordance with the waste hierarchy.
- Provide a written description of the waste required as part of the Duty of Care.
- Provide details of "hazardous properties" to complete hazardous waste consignment note (where applicable).
- Be able to provide a basic classification report to a landfill operator (where waste is destined for landfill disposal).

It should be noted that testing requirements for contaminated land risk assessment differ to those for waste classification purposes. Unless otherwise stated, the assessment in this section has been carried out to provide initial indications in respect to disposal of waste soils, however this may not be fully compliant with waste testing requirements or frequencies, with further testing potentially required.

9.2 Soils Waste Classification Procedure

As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. It is the responsibility of the waste producer to classify this waste. The classification process is described in the 'Guidance on the classification and assessment of waste' WM3 and aims to determine whether the waste is Hazardous or Non-Hazardous to human health and the environment.

Waste classification should be based on soils analyses that are representative of the actual waste load. At the stage of ground investigation, the materials that will become waste have generally not been defined yet, however test data can provide a useful guide to the likely waste classification before it is generated.

Further guidance is provided in Appendix A.

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste, Decision 2003/33/EC and Landfill Regulations 2005) led to the establishment of a methodology for classifying wastes. Wastes first need to be classified based on their total concentrations and classified as either hazardous or non-hazardous waste. WAC testing is only required if the end disposal route is a landfill and WAC analysis must not be used for waste classification.

Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. A waste must comply with the WAC limits for the relevant landfill, otherwise the soil will need to be pre-treated. There are three different WAC criteria, these are:

- Inert waste.
- Stable Non-Reactive Hazardous Waste (SNRHW).
- Hazardous waste.

Details of how material should be classified for waste disposal are presented in the BSL Methodology and Guidance in Appendix A and are summarised in the table below:

	PRIOR TO LEAVING SITE			
Classification based on Total Concentrations[1]	**Non-Hazardous Waste**		**Hazardous Waste**	
	IF SOILS CANNOT BE RE-USED ELSEWHERE AND MUST GO TO LANDFILL			
WAC testing	Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values[4]	> WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Inert Waste
The possibility of automatic inert classification of the naturally occurring "clean" soils should be explored in accordance with Section 4.3 of the EA guidance document. See Appendix A for further guidance.

9.3 Waste Classification and Waste Acceptance Criteria (WAC)

We have reviewed the testing results and assessed them through a waste classification database (HazwasteOnline™) which allows users to code and classify waste as defined in the EWC (European Waste Catalogue) 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 -Technical Guidance").

The samples tested were screened against assessment criteria within WM3 using the HazWasteOnline tool to assess whether they contained any contaminants in the hazardous range.

The Waste Classification Report and WAC testing results are presented in Appendix F. Locations of hazardous soils are presented in the table below, alongside the WAC analysis test results.

Location	Depth (m)	Stratum	Waste Classification	WAC Analysis	Landfill	Comments
TP208	0.00-1.00	MADE GROUND	Non-hazardous	Exceeds Inert WAC	Non-Hazardous Landfill	
WS205D	0.00-1.00	MADE GROUND	Non-hazardous	Does Not Exceed Inert WAC	Inert Landfill	

Based on the waste classification database assessment, the majority of the made ground soils have been classified as **non-hazardous.**

Note that further testing of the soils (WAC testing) may be required on the actual arisings in order to satisfactorily categorise the soil for its suitability for disposal to landfill.

Waste Containing Asbestos
Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	<0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

General
Following the classification of waste materials, the options available for the waste can be considered in the context of the waste hierarchy as below:

- Onsite re-use (with or without prior treatment) under suitable exceptions/permits.
- Offsite processing for recycling or recovery e.g. screening.
- Offsite disposal (with or without prior treatment) i.e. landfill.

Where feasible, efforts should be made to retain soils for onsite re-use to minimise costs and maximise the sustainability of projects.

If any gross hydrocarbon 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.

Where it is necessary to dispose material off site it is recommended that materials are segregated and sufficient time is allowed to further classify the actual soil arisings that constitute the waste, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is illegal to dilute and mix soils without a suitable permit.

Where possible, the option that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route should be explored.

9.4 Re-use of Soils

By definition in law, any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a “waste”) is then placed on another part of the development site (or used on another development site) without an appropriate materials management plan, permit or exemption being in place, by law this material is defined as “illegally deposited waste”.

In order to comply with UK legislation and avoid excessive costs, if the re-use of soils is proposed on site, this should be done in accordance with the relevant exemptions or permits in place.

Soils Re-use Under DoWCoP

One of the main industry mechanisms for allowing the re-use of soils in construction is the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE DoWCoP) also known as a Materials Management Plan (MMP). Further guidance is provided in the BSL Methodology and Guidance in Appendix A.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
- The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
- There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
- Quantity (the quantity of materials used should be known).

Information on existing site levels, proposed levels, volumes generated (e.g. foundation / drainage excavation arisings) would need to be known in order to complete the MMP.

If the DoWCoP is the chosen route, the MMP should be in place and declared by a Qualified Persons (QP) before works commence, otherwise excavated soils could constitute an illegal deposit of waste and enforcement action could be taken by the EA and HMRC.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Re-use of soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CAR-SOIL™) and CAR 2012.

In terms of the re-use of brick/concrete crush materials, the DoWCoP does cover aggregates, but only on the site of origin, and the EA WRAP aggregate Quality Protocol might best apply to ensure quality standards, which are discussed further below.

Soils Re-use under Exemptions and Permits

Other potentially suitable re-use mechanisms may include U1 Exemptions, WRAP quality protocols (for aggregates) or Waste Framework Directive (WFD) Exclusions, amongst other mechanisms. Further details are provided in Appendix A.

10.0 CONCLUSIONS

10.1 Geo-Environmental

Geo-Environmental – Human Health – Soils
Testing of the made ground at the site did not reveal any exceedances of heavy metals, petroleum hydrocarbons, BTEX or MTBE compounds.

However, minor exceedances of naphthalene and benzene (a) pyrene were identified within one sample positioned to the rear of the proposed building in an area of proposed hard surfacing.

As no soft landscaping is proposed, the risk is considered to be low and no remedial measures in respect to human health are required.

Geo-Environmental – Ground Gases and Vapours
Ground gas monitoring has revealed a maximum peak carbon dioxide concentration of 3.2%v/v and methane concentrations of <0.1%v/v. Based on the gas monitoring the site is classified as Characteristic Situation 1 and ground gas protection measures are not required.

Geo-Environmental – Controlled Waters
The overall risk to controlled waters is considered to be low and no further action is required.

Waste
Waste classification for the made ground at the site has revealed the majority of the soils to be non-hazardous with some soils suitable for disposal at an inert landfill and some at a non-hazardous landfill. Further testing of waste arisings is likely to be required to determine the most appropriate accepting landfill.

10.2 Geotechnical

Foundations
A 350mm diameter, 9m long pile embedded 5m into bedrock has an allowable load of 2.4MN increasing to 4.1MN for a 19m long pile embedded 15m into bedrock.

A 600mm diameter, 9m long pile embedded 5m into bedrock has an allowable load of 4.8MN increasing to 7.6MN for a 19m long pile embedded 15m into bedrock.

A 750mm diameter, 9m long pile embedded 5m into bedrock has an allowable load of 6.4MN increasing to 9.9MN for a 19m long pile embedded 15m into bedrock.

Floor slabs
Ground bearing slabs supported by piles may be adopted.

Concrete classification
DS-2 AC-1 within the made ground strata and DS-1 AC-1 within the natural superficial and bedrock stratums.

Highways
20% CBR values are indicated for granular superficial deposits, 4% CBR values are indicated within cohesive superficial deposits, and 20% CBR values are indicated within the made ground strata.

Drainage (SuDS)
SuDS are indicated to be feasible with rates between $2.99x10^{-3}$ and $8.67x10^{-6}$.

10.3 Further Work

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

- Detailed foundation design by a structural engineer.
- Design of Remedial Strategy and confirmation with the Local Authority /EA / warranty provider (if required).
- Production of Materials Management Plan (MMP) under the CL:AIRE DoWCo (if required).
- Implementation of the Remedial Strategy and verification of the remedial works (if required).

11.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	**Definition**
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Desk Study). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental health Officer.
EQS	Environmental Quality Standard.

GLOSSARY	
Term / Abbreviation	**Definition**
GAC	Generic Assessment Criteria.
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.

GLOSSARY	
Term / Abbreviation	**Definition**
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	**Definition**
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m^2)
$KN/m^2/mm$	Kilo Newton per metered squared per millimeter
kN/m^2	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m^2)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M^2/MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m^3	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

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DRAWINGS

WHITWORTH STREET

CAMERON STREET

Proposed Building Footprint

3450

3430

HEWITT STREET

SOURCES OF INFORMATION

CONTEXT

RoT:
Mishcon de Reya - Report on Title - 10-12 Whitworth Street West - Manchester

MEASURED SURVEY:
EDI SURVEYS Ltd - 22184/U/01-01
SURVEY OPERATIONS - 15A117/001-002

DEEDS:
Official Copy (Deed of easement) 10.06.1992 - GM892546
Official Copy (Deed of easement) 10.06.1992 - GM892546
Official Copy (Deed) 10.06.1992 - GM877243
Official Copy (Deed) 21.03.2017 - GM877243
MAN288572-OC-154 - DEED OF VARIATION - 18-MARCH-2022 - MANCHESTER
MAN288572-OC-154 - DEED OF VARIATION - 19-MAY-2023 - MANCHESTER
MAN288572-OC-154-NT - LAND AT HEWITT STREET - MANCHESTER
MAN288572-OC-154-NT - RAILWAY ARCHES AND LAND AT HEWITT STREET - MANCHESTER

LAND REGISTRY:
FH-10-12 Whitworth Street West-Plan-GM892546
Official Copy (Title Plan) - MAN333858
Official Copy (Title Plan) - GM877243
Official Copy (Title Plan) - LA263331
Official Copy (Title Plan) - MAN288572

Information from GIA Chartered Surveyors.
Refer to GIA No.20231

NORTH

0 1.0 2.0 3.0 4.0 5.0 10.0m

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Rev.	Description	Date	Drawn	Chk.
06	Issue for Information	24.04.26	JP	NI
05	Issue to Network Rail	15.04.26	JP	NI
04	Application boundary amended following Client comments	02.04.26	AR	AR
03	Boundary Issue following Comments	01.04.26	JP	NI
02	Updated following comments	31.03.26	JP	NI
01	Application Boundary Issue	30.03.26	JP	NI

Proposed Application Boundary

Site Ownership Boundary

Client:
Fusion Group

Project:
Whitworth Street, Manchester

Drawing Title
Proposed Boundary Definition

Drawing Status
INFORMATION

Corstorphine & Wright

Birmingham Studio
Alpha Building, Suffolk Street Queensway, Birmingham, B1 1TT
0121 737 8350
corstorphine-wright.com

Drawing No. 22987-CWA-00-A-0207
Revision 06

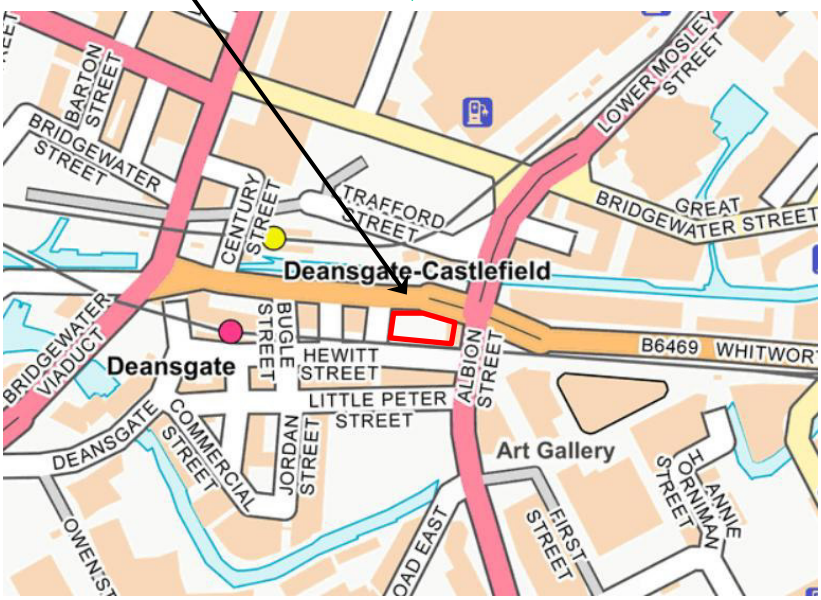
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JP	AR	A2	1 : 200	30/03/2026



SITE LOCATION

NEAREST POSTCODE: M1 5NZ

SITE ENTRANCE WHAT3WORDS: ///PROOF.BUTTER.POETIC



REV	DATE	DESCRIPTION	BY	CKD

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

CLIENT
ATRI7 6 LTD

PROJECT TITLE
WHITWORTH ST, MANCHESTER

DRAWING TITLE
SITE LOCATION PLAN

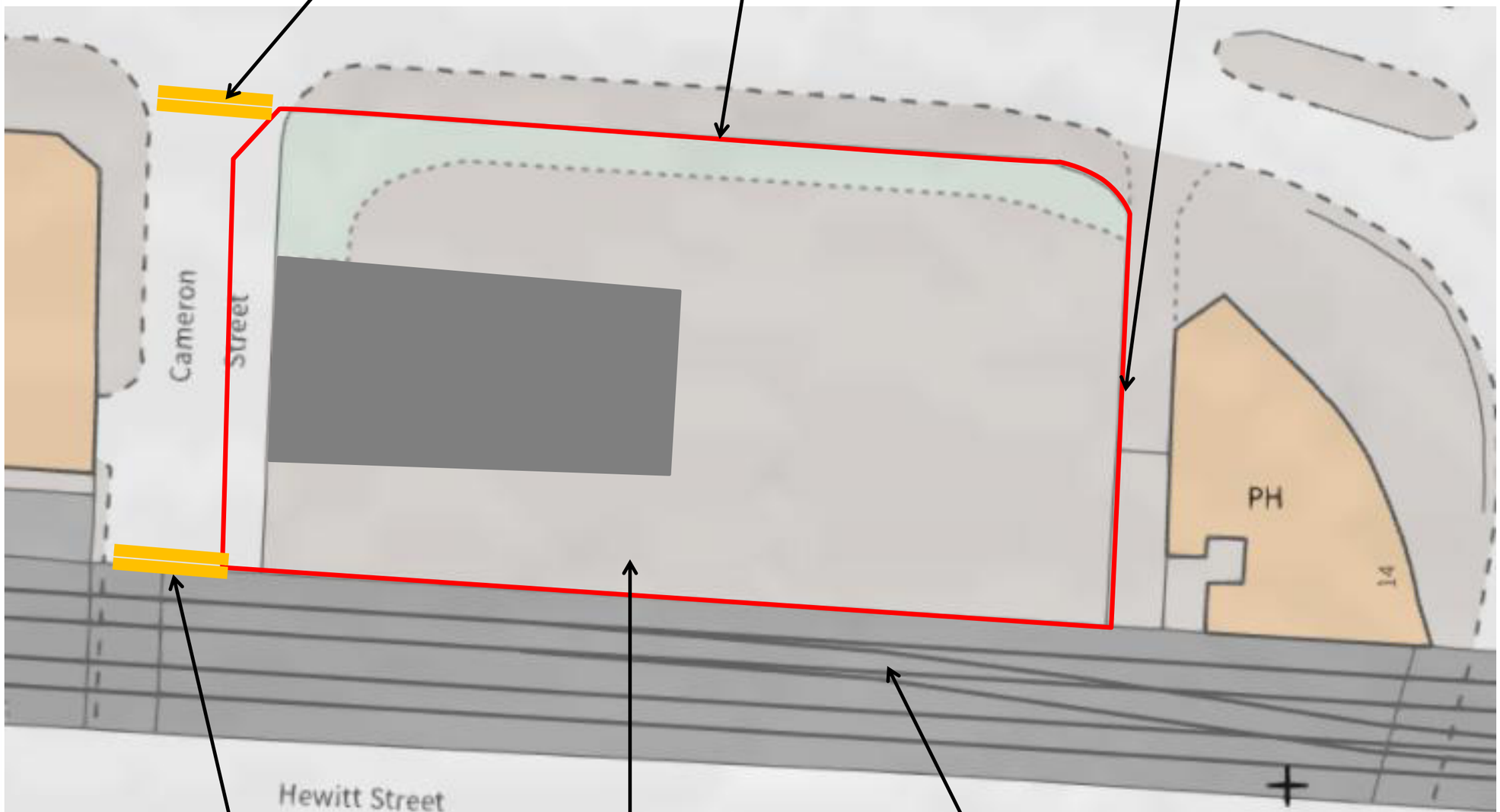
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C5504/01	-	NTS	17/12/24

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SD	NS

VEHICULAR SITE ACCESS

WOODEN HOARDING ENCLOSING THE SITE FROM THE NORTH

HERAS FENCING ENCLOSING THE SITE FROM THE EAST



VEHICULAR SITE ACCESS

SITE USED FOR STORAGE OF BUILDING MATERIALS

RAILWAY VIADUCT

KEY

APPROXIMATE SITE BOUNDARY

VEHICULAR SITE ACCESS

CONCRETE HARDSTANDING

NOTES

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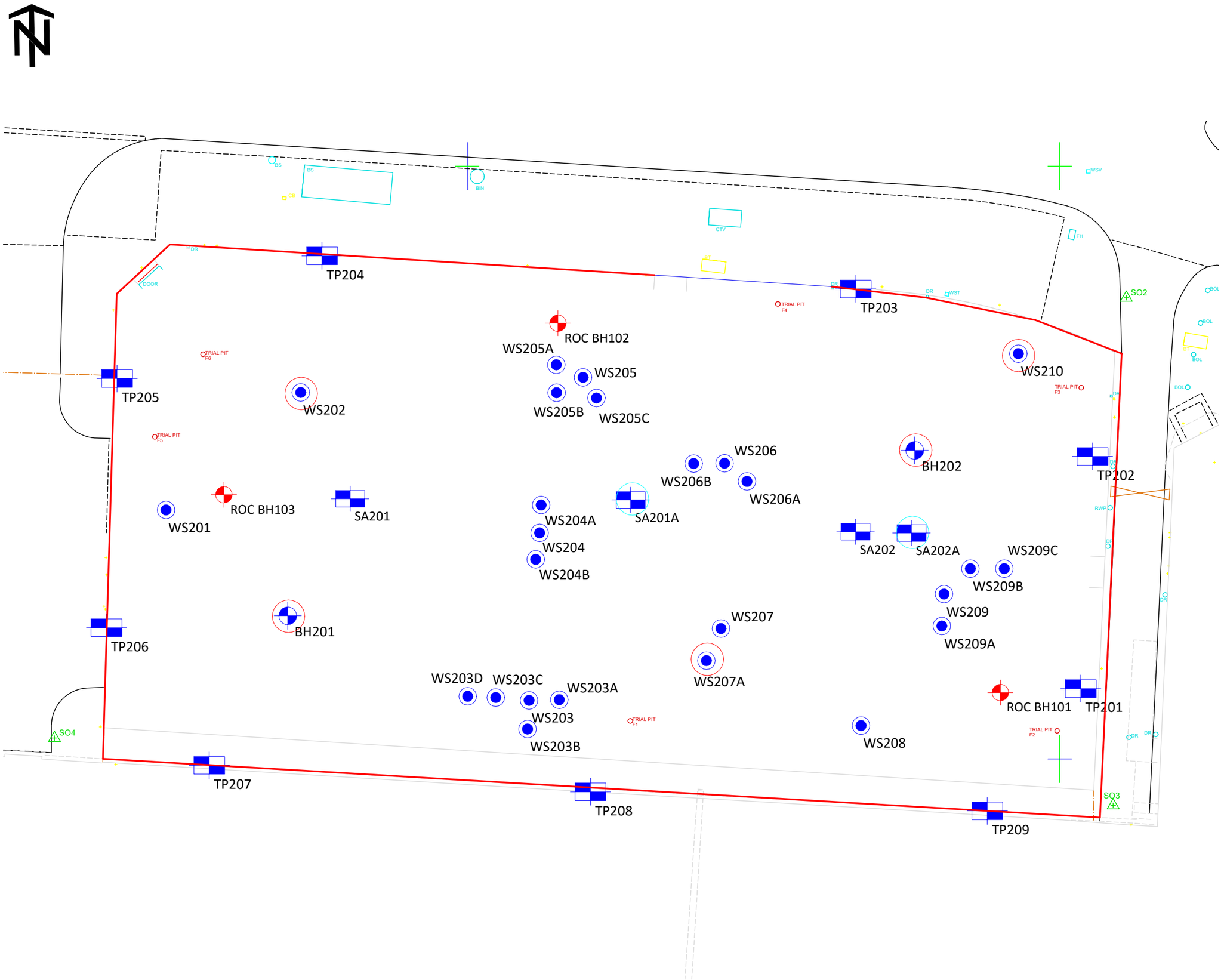
CLIENT
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PROJECT TITLE
WHITWORTH ST, MANCHESTER

DRAWING TITLE
SITE FEATURES PLAN

DRAWING No.	REVISION	SCALE	DATE
C5504/04	-	NTS	18/12/2024

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AH	NS



KEY	
	APPROXIMATE SITE BOUNDARY
TPXX	TRIAL PIT
WSXX	WINDOW SAMPLE BOREHOLE
BHXX	ROTARY CORED BOREHOLE
	SOAKAWAY INFILTRATION TEST
	BOREHOLE INSTALLATION

RoC CONSULTING (2016)	
BHXX	ROTARY CORED BOREHOLE

NOTES

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PROJECT TITLE

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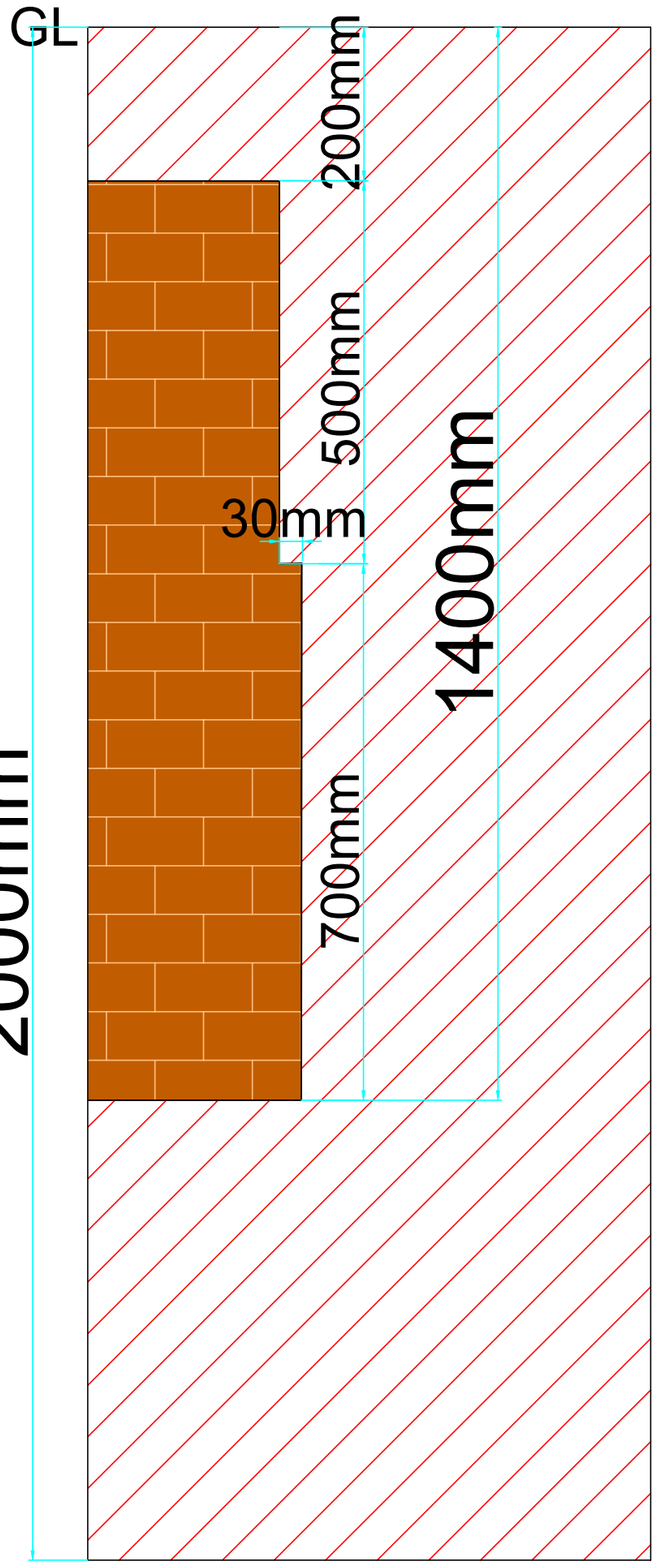
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EXPLORATORY HOLE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5504/02	-	NTS	27/11/24

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NS	NS

TP201









KEY	
	BRICK
	MADE GROUND

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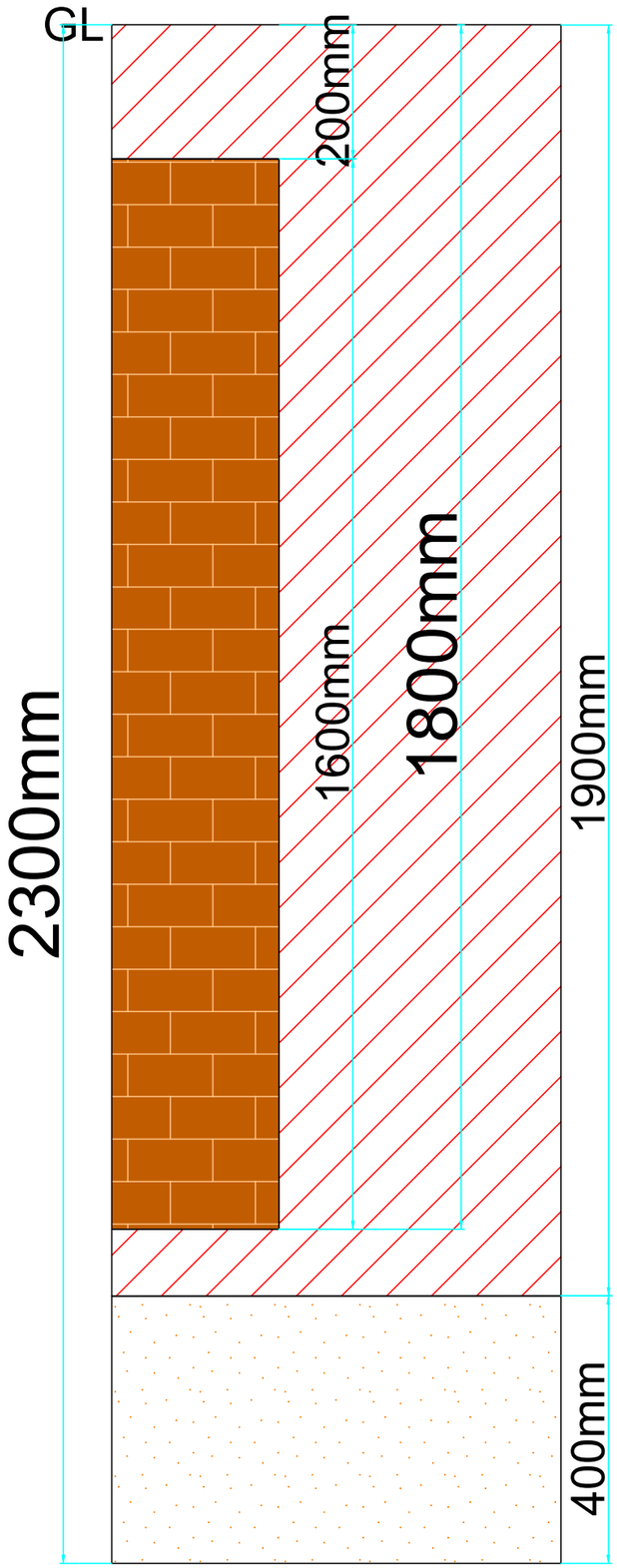
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C5504/03		NTS	19/11/2024

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TP202









KEY

	BRICK
	MADE GROUND
	SAND

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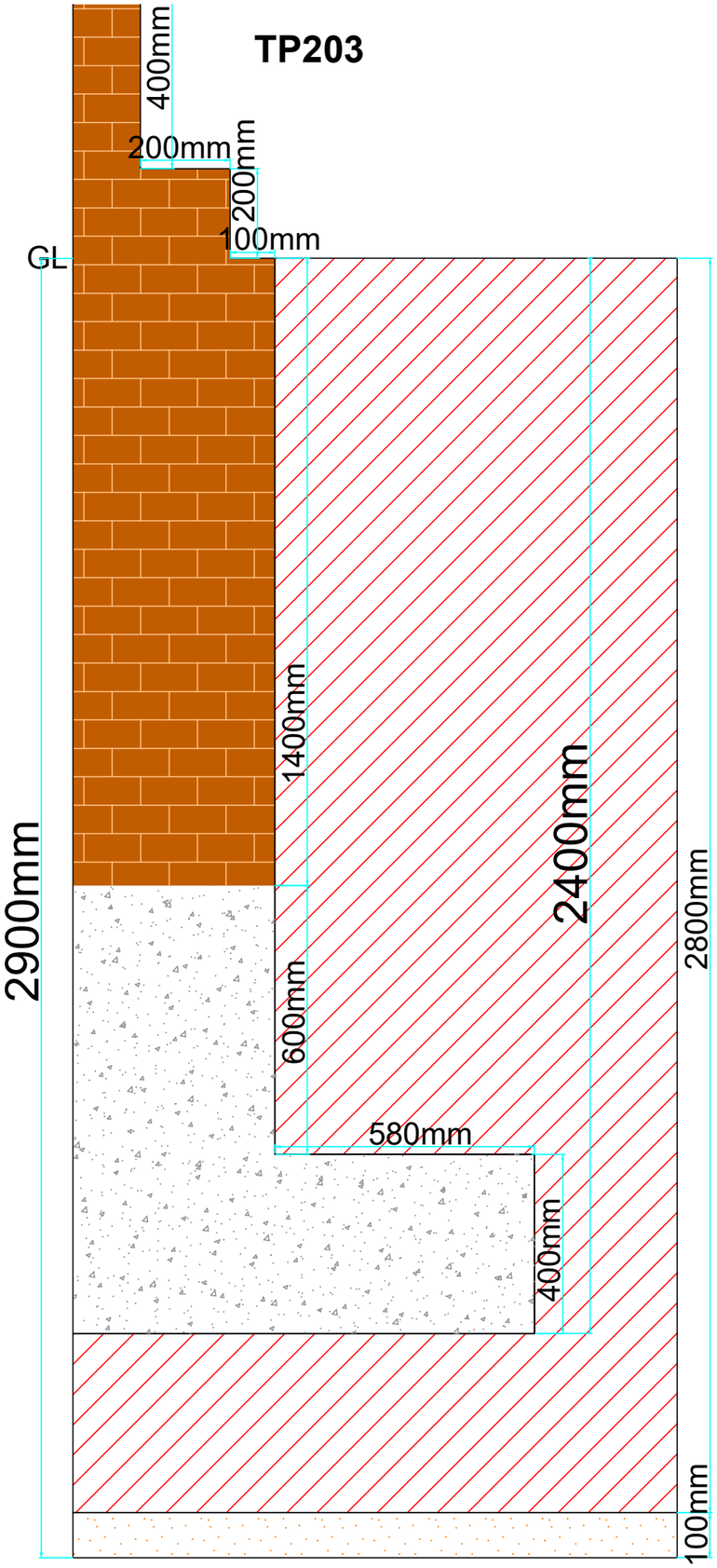
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C5504/03		NTS	19/11/2024

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KEY	
	BRICK
	CONCRETE
	MADE GROUND
	SAND

NOTES

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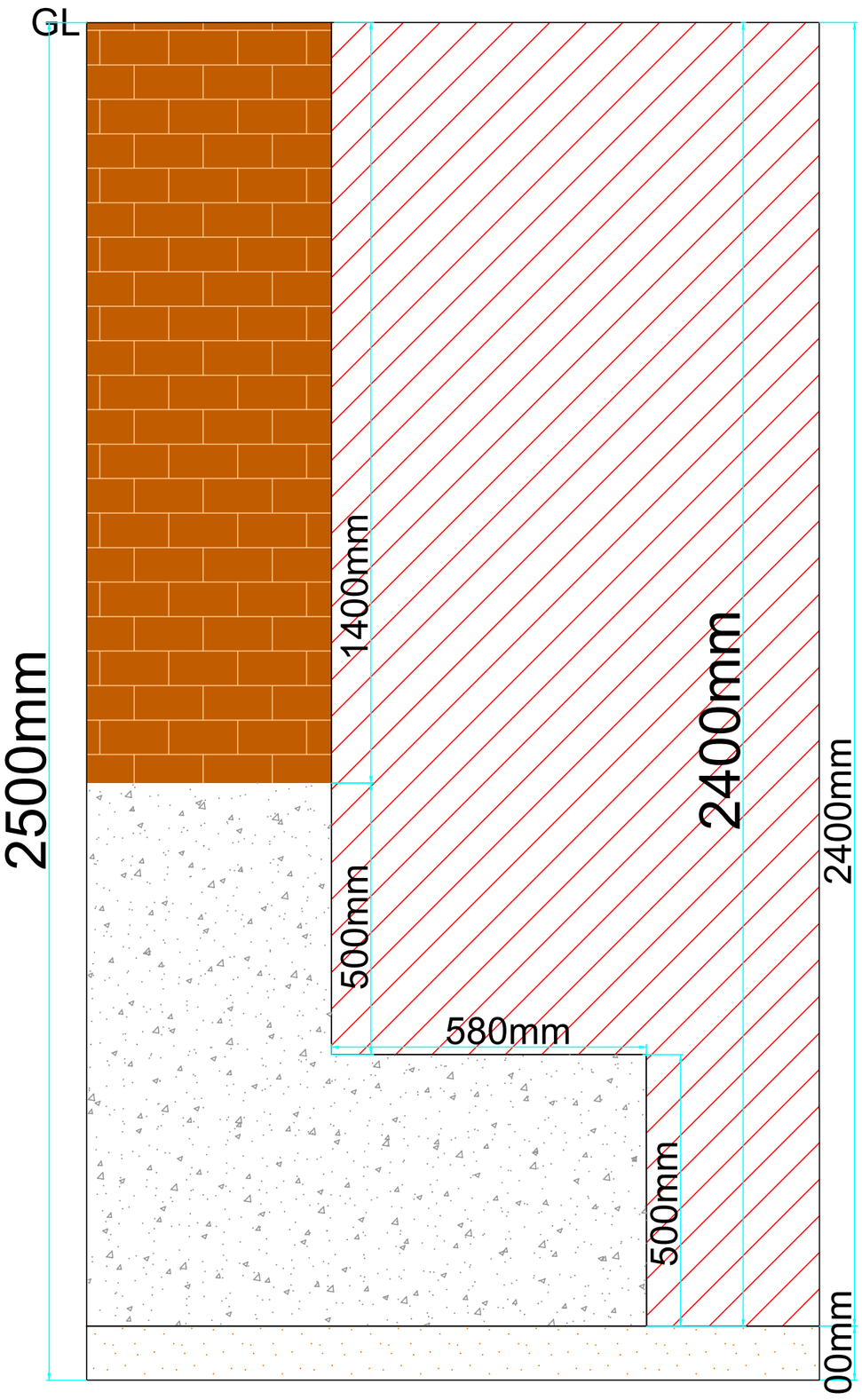
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TP204









KEY	
	BRICK
	CONCRETE
	MADE GROUND
	SAND

NOTES

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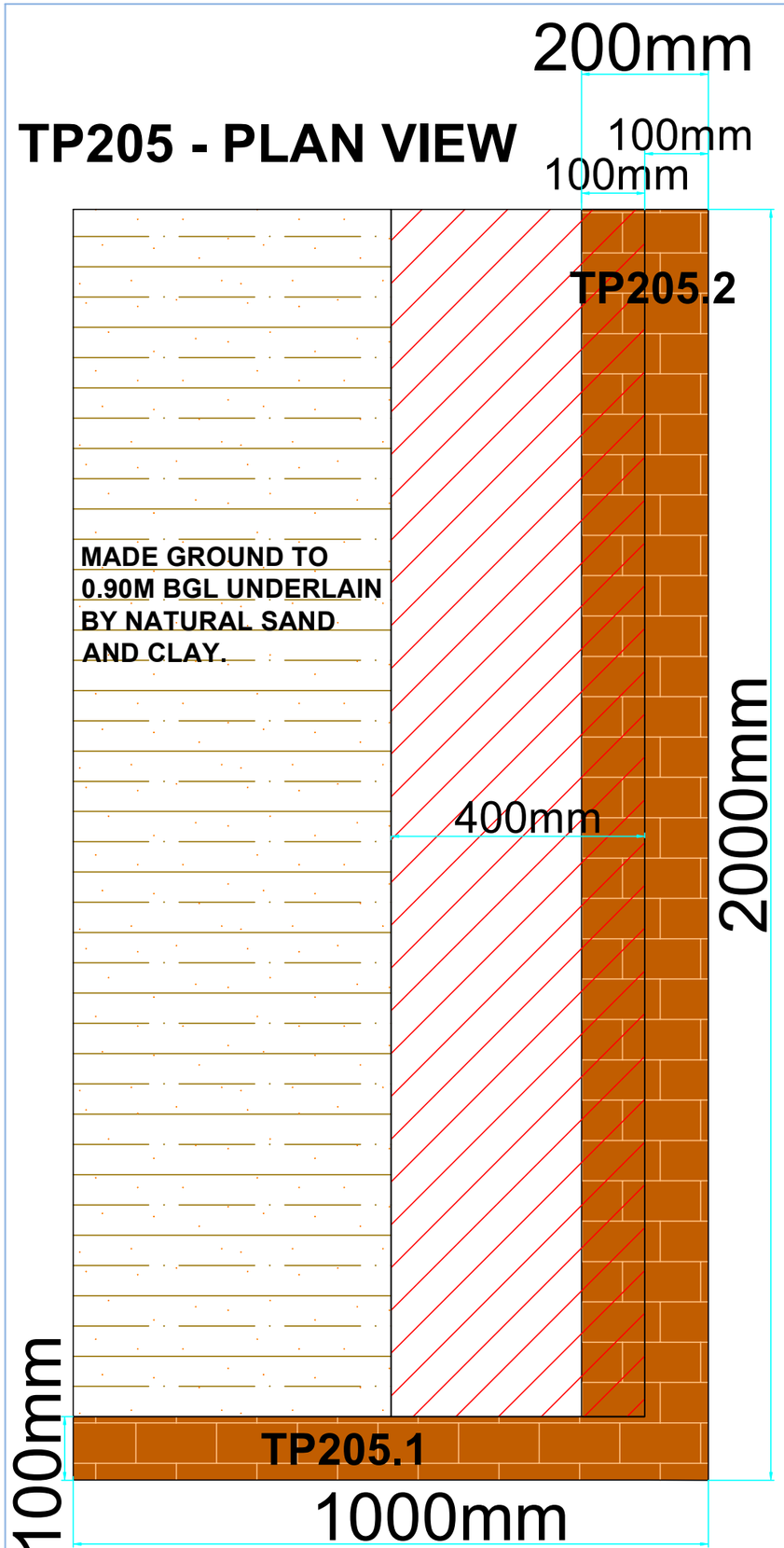
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C5504/03		NTS	19/11/2024

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TP205 - PLAN VIEW







KEY	
	BRICK
	MADE GROUND
	CLAY
	SAND

NOTES

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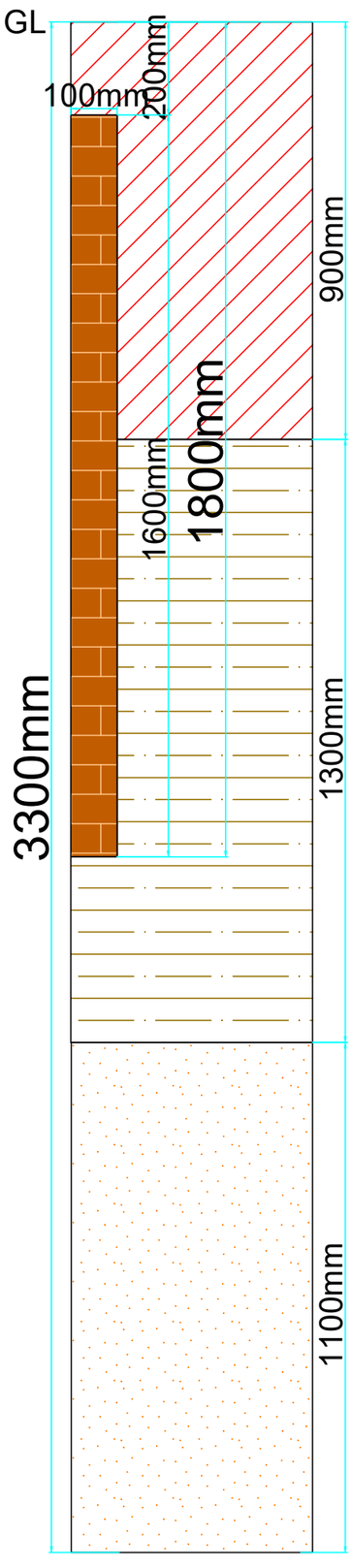
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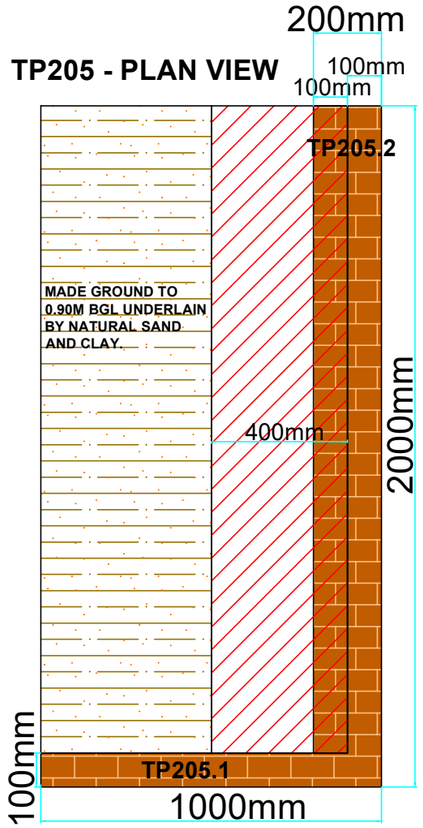
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C5504/03		NTS	19/11/2024

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TP205.1



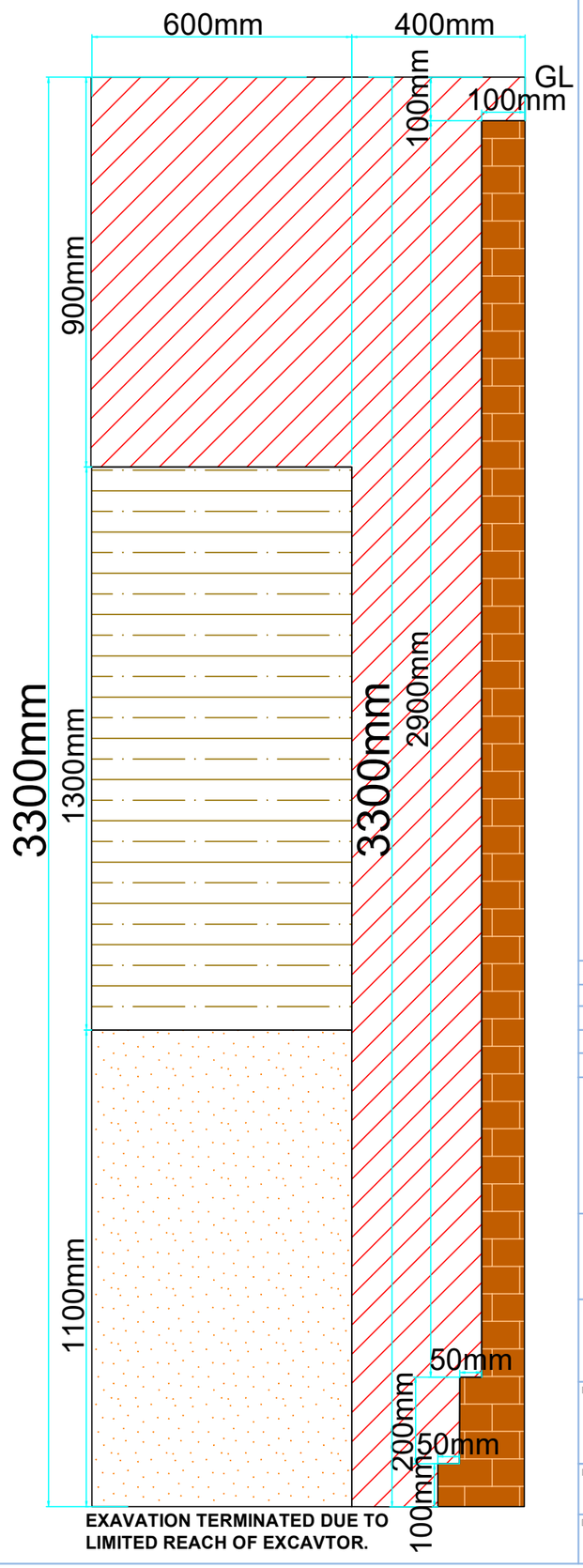
TP205 - PLAN VIEW







TP205.2



EXAVATION TERMINATED DUE TO LIMITED REACH OF EXCAVTOR.

KEY

	BRICK
	MADE GROUND
	CLAY
	SAND

NOTES

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PROJECT TITLE

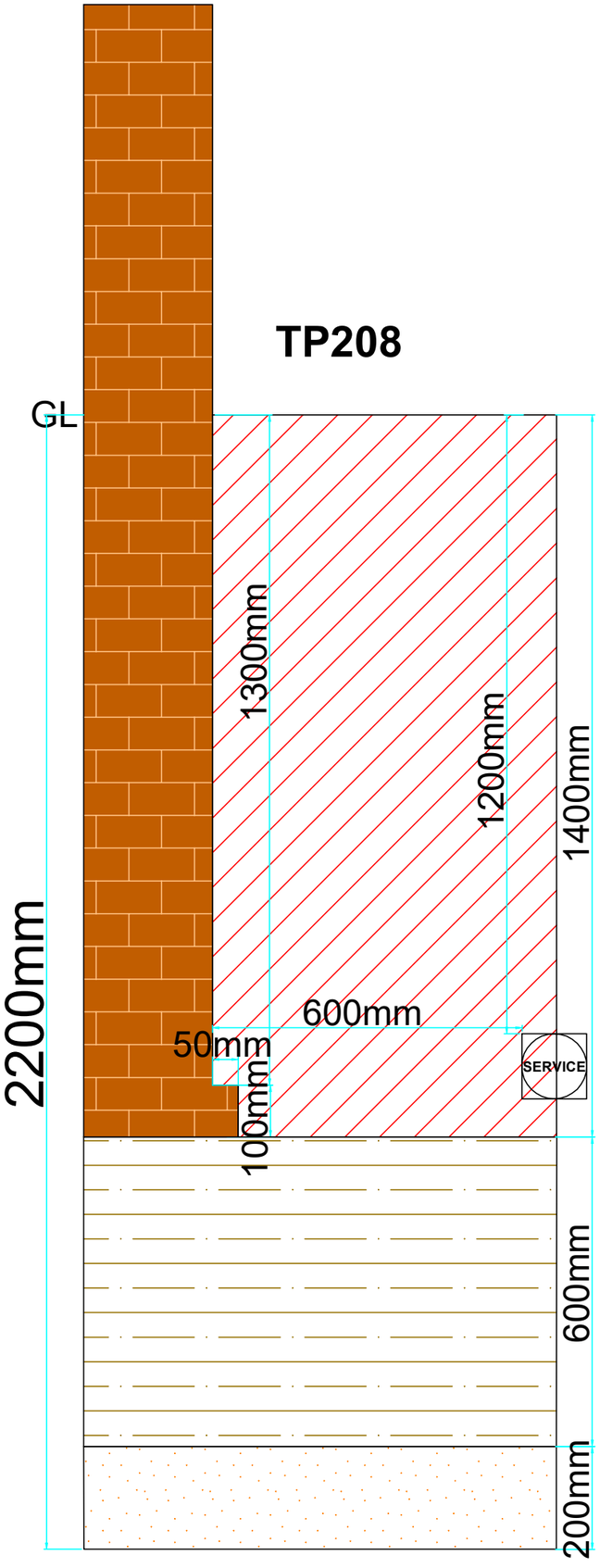
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FOUNDATION INSPECTION PIT DRAWING - TP205

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KEY	
	BRICK
	MADE GROUND
	CLAY
	SAND

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PROJECT TITLE

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APPENDIX A

BSL Methodology and Guidance

BSL Phase I & II Geo-Environmental Assessment Reports - Methodology and Guidance

Background

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial **Conceptual Site Model (CSM)**. From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In the case of the geotechnical hazard identification, this is referred to as the **Ground Model.**

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

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 Statutory Guidance, DEFRA – April 2012.
- The Contaminated Land (England) Regulations 2006.
- The Contaminated Land (England) Amendment Regulations 2012.
- Water Resources Act.
- Water Framework Directive.
- Environmental Damage Regulations.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

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, and the impact of that migration on the source e.g. attenuation.
Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused.



Where any one of the “pollution linkages” between the above is absent there is deemed to be no risk.

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 S-P-R 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:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Groundwater Protection https://www.gov.uk/government/collections/groundwater-protection
- UK Technical Advisory Group (UKTAG) - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

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 Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- 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).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017).
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) – latest version.

Contaminated Land Risk Assessment Approach

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:



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. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:
https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

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, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

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.
Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

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.
Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

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.
Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.
Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. 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
	Negligible	Negligible Risk / No Linkage			

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.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'negligible risk' and 'no linkage' in the summary table, which give rise to an overall **negligible** risk category and no further action is required.

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General
The purpose of using generic Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake remedial action based on the data to hand is cost effective.

Human Health
Current UK guidance on risks to human health is provided by DEFRA and the Environment Agency (EA). Under the land use planning system where the aim is to demonstrate 'suitability for use' the key will usually be to confidently determine that the level of contamination of the land is low relative to some appropriate measure of risk at a particular critical connection.

Publications forming part of the guidance include the CLEA Model and toxicological reports collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values or Generic Assessment Criteria (GACs) for soils contamination based on standard land uses and soil assumptions. The critical concentrations referred to above can be the relevant GAC.

CLEA guidance has gone through a number of revisions over time. Tier 1 generic S4UL values (or GACs) have been published using the CLEA 1.06 Model by CIEH/LQM. These are the third set of generic assessment criteria generated by CIEH and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

C4SL values for six determinands including lead were published by DEFRA/CL:AIRE in December 2014. Additional determinands were added in 2021. They represent a low risk as opposed to minimal risk, however they are still strongly precautionary. These screening values were published by DEFRA for Part 2A use, although DEFRA have also confirmed acceptability for use under planning. However, S4ULs remain the first reference point for BSL due to the broader range of end uses scenarios and the availability of a wide array of determinands with various soil organic contents.

As part of Tier 1 assessments, the following data sources are used in the order of preference given below, unless further justification is provided to adopt less conservative criteria:

- CIEH S4UL values (derived by CIEH/LQM).
- DEFRA/CL:AIRE C4SL's https://www.claire.co.uk/projects-and-initiatives/category-4-screening-levels
- CL:AIRE GAC values.
- Guidance from other European countries.
- Guidance from the outside Europe.

Dependent on requirements, test results may be divided into representative data sets for assessment against the above referenced screening criteria, based on the conceptual model and taking into account such characteristics as variation in soil properties, historical, existing or proposed land uses. The soils in these areas are considered likely to form the ground cover in critical receptor areas (e.g. gardens, soft landscaping etc)

where pathways may exist. The critical part of the soil column is typically taken as the upper metre in terms of contact with end users of a development site for the purposes of initial assessment.

The screening criteria adopted by BSL are presented overleaf.

Further Assessment
When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and assessment to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway. In some cases, dependant on the Conceptual Site Model (CSM), no action may be required.

PAHs and B(a)P as a Surrogate Marker for Adoption of C4SLs
As stated above, S4ULs remain the first reference point as screening levels unless further justification is provided. In order to determine if the C4SL can be adopted, benzo(a)pyrene (B(a)P), the following guidance within SP1010 Appendix E for B(a)P and Public Heath England (PHE) may be adopted with our assessments where appropriate.

Guidance states that benzo(a)pyrene is considered to be one of the most potent PAHs, and it would be appropriate to assume the cancer risk in a mixture is proportional to the concentration of a surrogate marker PAH (benzo(a)pyrene) in the mixture. The ratio of PAHs within the mixture can be assessed to ensure that the profile is similar to that seen for the test material (coal tar mixtures) in the toxicological study by Culp et al. The International Programme on Chemical Safety (IPCS) considered that the PAH profile of the soil sample may deviate from the average profile by about an order of magnitude (up or down).

A more recent study by Bull et al (2013) which analysed PAH concentrations in soil samples from 274 sites, showed that the levels of PAH relative to B(a)P showed little variability and were similar to that recorded for the coal tar mix used in the Culp et al study. Given this, it was concluded that benzo(a)pyrene is a suitable surrogate marker to represent mixtures of PAH in soil.

In order to risk assess the PAH mixture for site specific soil samples using human health guideline values, notably the C4SLs, as detailed in SP10101 the ratio of the seven genotoxic PAHs as shown below, relative to B(a)P, should be calculated to ensure it is similar to the test material used in the Culp study (PHE 2010). To be considered sufficiently similar, the ratio relative to B(a)P should fit within the upper and lower limits (representing an order of magnitude above and below the mean ratio to B(a)P of test material used in the Culp et al study). In such cases B(a)P is considered an adequate surrogate marker and the Low Level of Toxicological concern (LLTC) for B(a)P (i.e., the C4SL) may be used in the risk assessment.

Statistical Analysis on Soils
Guidance on the use of statistics is taken from the CL:AIRE publication "Comparing Soil Contamination Data with a Critical Concentration" 2020, the basis of which in statistics is termed Central Limit Theorem (CLT), which says "*The distribution of sample means converges to a normal distribution as the sample size increases*".

If the critical concentrations have been exceeded, as part of a further assessment, statistical analysis may be undertaken on a dataset to demonstrate that the mean concentration on the site (or a particular area) is actually below the critical concentration. The true mean concentration of a contaminant is never known because all the site soil has not been tested. An estimation of the true mean can be obtained from the samples tested during the investigation. The greater the number of samples tested, the closer the mean of these values is to the true mean.

As discussed above, test results are typically divided into representative data sets for assessment and may be referred to as 'averaging areas' to which statistics can be applied, although several statements need to be satisfied before applying the guidance:

- Averaging areas have been defined based on the CSM.
- Sample locations – random/grid sampling adopted as opposed to targeted investigation.
- Samples are evenly spread and not clustered.

- Analysis do not suggest a hotspot/outlier or cluster established by histogram or other means.
- Samples are of same/similar depth and taken from one population (e.g. just topsoil).
- Analyses do not show a spatial trend or other spatial pattern across that zone.
- The number of samples has been shown to be sufficient for statistical analysis.

Once the above have been satisfied, when undertaking statistical analysis, the question "*are mean soil concentrations within the averaging area equal to, or greater than, the GAC*?" is being asked. Typically, outliers or "hotspots" are treated as separate zones or averaging areas. The sampling strategy and assessment should also take into account uncertainty (for example, spatial heterogeneity) in contaminant concentrations. There is the assumption that sampling was random or stratified and systematic (e.g. on a grid) and not targeted at specific sources; data from such targeted areas should be omitted from the statistical analysis. Data should be from one population (i.e. the same materials).

The statistical test that is carried out is used to demonstrate that there is a certain probability that the true mean falls below the critical concentration (typically the GAC in a screening exercise). The main tool used to draw conclusions based on the 2020 guidance is a comparison of a 2-way confidence interval with the critical concentration. A confidence interval consists of two sets of numbers; an interval i.e. a range of values plus a pre-determined level of confidence e.g. 80%. A common interpretation of a confidence interval of say 80% is that "*there is an 80% chance that the true mean concentration level of the contaminant in a sampling zone lies between X concentration and Y concentration*".

The current guidance for planning says that the site has to be "safe" which suggests we should use a large confidence interval such as 95% or higher to make a decision. This means that there is a 95% chance of the true mean concentration lying in this interval, there is also a 5% chance it lies outside this interval. One could then conclude that the requirements of planning have been met if the 95% confidence interval lies below the critical concentration.

The guidance recommends that at least two confidence levels are used such as 90% and 99% or 80% and 95%. By using two differing confidence intervals, we can use the smaller confidence interval (e.g. 80% confidence interval) to say "*we think the mean is most likely to be inside this range*" and the larger confidence interval (e.g. 95% confidence interval) to say "*we think the mean is most unlikely to be outside this range*".

If the confidence interval extends to above the critical concentration, then further action may be required.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards (Water Quality Targets – WQTs) for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 and The Private Water Supplies (England) Regulations 2016. SI 2016 / 618). In Scotland, the Public Water Supplies (Scotland) Regulations 2014 apply. The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impaction of contamination on controlled waters are Environmental Quality Standards (EQS). These cover a large number of compounds. EQS are available for inland surface waters (freshwater) and other surface waters (transitional and marine).

Several EQS are based on bioavailable metal proportions (i.e. copper, lead, manganese, nickel and zinc). A software tool (M-BAT) is available from the Water Framework Directive - UK TAG website for calculating the bioavailable fraction. Where this tool has been used, the bioavailability has been taken into account by calculating site-specific $PNEC_{dissolved}$ (Predicted No Effect Concentration) values. These enable the dissolved concentration data to be compared with the PNEC as if it were an EQS.

UK Drinking Water Standards (DWS) apply to waters abstracted for human consumption. Where no UK or EU drinking water standard exists, reference is made to the World Health Organisation criteria (2011).

The DWS apply to groundwater or to surface water used for abstraction and the EQS apply to surface water where the aquatic ecosystem is the receptor. Where the most appropriate water quality target cannot be determined with certainty, the lowest one is adopted in line with the precautionary principle.

In some instances, the laboratory detection limits (LODs) may be greater than the water quality target it is being screened against, but it should be noted that these comparisons are an initial screening assessment. It may be the case that lower LODs could be obtained using a more specialised technique, but it would be disproportionately expensive to adopt the more costly specialist technique for initial screening exercises.

The preference of BSL is to have testing carried out on actual samples of ground/surface water rather than theoretical values obtained from leachate testing, which is considered to often be highly conservative. Data from water samples obtained or from leachate analysis is then compared against the screening criteria adopted by BSL, which are presented overleaf.

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and detailed quantitative risk assessment (DQRA) to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway.

Ground Gas Risk Assessment

BS8485:2015+A1:2019, BS 8576:2013, CL:AIRE RB17, and NHBC 'Hazardous Ground Gas - An essential guide for housebuilders' 2023, are the current guidance which gives up-to-date advice on all aspects of permanent ground gas risk. BS8576 alongside CIRIA C682 also provides guidance on assessment of hydrocarbon vapour intrusion.

The CL:AIRE publication 'Good Practice for Coal Mine Gas Emissions" 2021 provides guidance on the assessment of risks from mine gas sources.

The above all outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination. The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework
BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land.*

Generation Potential of Sources

BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	• Natural carbonate soil and strata, e.g. chalk and limestone. • Natural soil strata with a low degradable organic content, e.g. alluvium, peat. • In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. • Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). • Mine workings shallow or shaft (where there is clear evidence that they are flooded). • Inert landfill sites (and pre -1945 landfills).
Low	• Natural soil strata with a high degradable organic content (DOC). • Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). • Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). • Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	• Sewage sludge. • Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). • Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).
High	• Landfill mid 1960s to early 1990s. • Mine workings – unflooded – less than 50 years since last worked.
Very High	• Municipal landfill sites. • Landfill early 1990s onward.

Frequency and Duration of Monitoring

BS8576 notes to determine where and how to monitor ground gases requires consideration of credible pathways of possible exposure of the receptors, taking into account what is known about the geology and hydrogeology, building construction and services layout, foreseeable events such as flooding, changes in groundwater level, climate change, extreme weather conditions, the closure of mines, and possible changes to the gas regime caused by future development.

The monitoring period for a specific site should cover the “worst case” scenario. A “worst case” scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with ground gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 “Ground Gas Monitoring and ‘Worst-Case’ Conditions” provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Notes

1 Generation potential of sources based on descriptions within BS 8576:2013.

2 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

Gas Risk Assessment

Within BS8485:2015+A1:2019 a semi-quantitative method is set out for the assessment of risk.

This method (Modified Wilson and Card) uses the concept of Gas Screening Values (GSVs) and typical threshold concentrations of carbon dioxide and methane to identify levels of risk. Sites are then classified into a 'Characteristic Situation' or 'CS' from CS1 where no mitigation is required and CS2 increasing up to CS6 where protection measures are required.

The NHBC guide 'Hazardous Ground Gas - An essential guide for housebuilders' 2023 provides further assessment tools for ground gas monitoring data, including the use of ternary plots to determine ground gas sources.

A separate approach to assessment without monitoring data is discussed under the RB17 header further below.

CIRIA C682 and BS 8576:2013 provide guidance on assessment of VOC intrusion risk.

Ground Gas Mitigation

Where a risk is determined to be present by assessment, BS8485:2015+A1:2019 provides guidance for the design of protection systems based on a points scoring system depending on the characteristic situation, structure type, structural barrier types, ventilation and a gas resistant membrane. Source removal can also be considered.

The design requires the structures to be categorised into one of four building types: Type A, Type B, Type C or Type D, related to the construction and end use of the building, together with the control of future structural changes and maintenance.

CIRIA C748 provides advice on the use of membranes as VOC vapour barriers.

CIRIA C735 sets out the approach for verification of installed mitigation measures. Note that if a membrane is installed it must be verified in accordance with CIRIA C735 or it will score zero points and assumed to not afford any protection.

RB17 Approach
CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Radon
Advice on radon protection in England is provided by the UK Health Security Agency, https://www.ukradon.org/information/ukmaps and by the BRE (BR 211 (Scivyer 2023).

Areas of the country can be categorised according to the percentage of existing homes where radon is present above the Action Level:

- 0-1% lower probability.
- 1-3% and 3-10% intermediate probability.
- >10% higher probability.

Basic radon protection measures are required in new buildings and extensions in areas of England and Wales where 3-10% of properties exceed the Action Level and full radon protection measures where >10% exceed the Action Level.

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Geotechnical Guidance

A preliminary risk assessment of geotechnical hazards is carried out at the desk study stage and confirmed (or amended) at the ground investigation stage.

The CD 622 'Managing Geotechnical Risk' guidance document defines the technical approval and certification procedures to be used to ensure that the risk associated with the geotechnical activities are appropriately managed.

The desk-based stage may also include the requirements for a Coal Mining Risk Assessment (CMRA) which specifically assesses the risks from mining induced instability and related issues in high risk development areas: https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments.

In order to establish the requirements of a project, the Geotechnical Category which is based on a consideration of project complexity, proposed geotechnical activities, presence of geo-hazards and severity of geotechnical risks, shall also be considered. These range from Category 1 (small/simple structures) to Category 3 (very large, unusual or complex activities/structures, such as tunnels). It is envisaged most projects typically fall into Category 2, including conventional types of geotechnical structures, earthworks and activities.

In the case of the geotechnical hazard identification at the intrusive investigation stage, this is referred to as the **ground model**.

The geotechnical sections of the report contain the factual information on the geology and relevant site data, including both in situ and laboratory testing, with a geotechnical evaluation of the information stating the assumptions made in the interpretation of the data.

Derived values of geotechnical parameters are obtained from test results by theory (book values), correlation or empiricism in general accordance with BS EN 1997-2:2007 (EC7).

Where derived geotechnical parameters are to be used in designs in accordance with EC7, the selection of characteristic values for geotechnical parameters using the derived values is carried out by well-established experience.

The characteristic value is a cautious estimate of the value affecting the occurrence of the limit state. For any particular material type there may be more than one characteristic value for each parameter because there may be more than one limit state.

The second stage is the selection of design values. The design values are either derived from the characteristic value by applying the relevant partial factors or assessed directly. Similarly, there can be several design values for the same material type.

In the event that geotechnical designs are included in this report, selection of the characteristic and design values is included. Otherwise, it is the duty of the geotechnical designer to determine these within a separate design report (a GDR).

Where it has not been possible to reasonably use an EC7 compliant technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

In addition to the above:

- Assessments for highways designs are based on CD 622 Managing Geotechnical Risk.
- The assessment of sustainable drainage is based on BRE365 and CIRIA C753 'The SuDS Manual'.
- Earthworks Assessments are based on SHW Series 600 and BS6031.
- Risks from mining (both at the desk based and intrusive stages) are assessed adopting guidance from CIRIA C758.

Re-Use of Waste Soils Guidance

Definition of Waste
The Environment Agency considers waste to be "*...any material that is discarded, or intended to be discarded*..." this includes any soil from drainage trenches, foundation arisings, site strips etc. It is no longer required in its original location, therefore it is considered to be waste. Without an appropriate materials management plan, permit or exemption in place, by law this material is defined as "illegally deposited waste".

Landfill tax rules allow HM Revenue & Customs (HMRC) to recover landfill tax on illegally deposited waste on construction sites. This could lead to excessive costs without the correct documentation in place. In addition, a

person who makes, knowingly causes or knowingly facilitates a disposal to be made at an unauthorised site is also liable to pay Landfill Tax.

CL:AIRE: Code of Practice

Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. This can be implemented under the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE DoWCoP), also commonly referred to as a "Materials Management Plan".

https://www.claire.co.uk/projects-and-initiatives/dow-cop

Developers and contractors are advised to complete all works under the DoWCoP where applicable.

To implement the DoWCoP (for Route A), there is a requirement to notify the Environment Agency and Local Authority of the intention to use the code of practice in principle, after which there is a 21-day notice period for their response.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
- The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
- There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
- Quantity (the quantity of materials used should be known).

Potential scenarios where soils may be able to be re-used:

- Material capable of being used in another place on the same site without treatment.
- Material capable of being used in another place on the same site following ex-situ treatment on site.
- Material capable of being used in another development site without treatment (Direct Transfer).
- Material capable of being used in another development site following ex-situ treatment on another site e.g. Hub site.

In order to satisfy these requirements, the following are required:

i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
v) Volume calculations.
vi) Planning permission for the development.
vii) Contractual details to be clear, regarding who steps in is a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (e.g. bioremediation, stabilisation etc) may require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties are not generally regarded as waste treatment operations and do not require a permit.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

Any declared MMP should be amended as new import sources are added.

Regardless of implementing re-use under the code of practice or not, all sites should have some form of materials tracking in place in compliance with current legislation. Any re-use scheme should also be designed to minimise disposal costs. Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Soils Re-use under Exemptions and Permits
Other potential options to allow the re-use and/or import of soils and aggregates on site are provided in the table below. Applies to England/Wales only – Scotland differs.

Re-use Mechanism	Description
U1 Exemption	Can be applied to re-use/import of soils and stones, but only up to 1000 tonnes or for brick and concrete up to 5000 tonnes. This is usually an efficient way to re-use small volumes of waste materials. However, only one U1 can be filled in per site in any 3-year period. Quick and free via online registration.
WRAP Quality Protocols	Describes how processed demolition arisings can be removed from regulatory waste regime. Requires a demonstration of appropriateness by: • Factory Production Control Manual. • Facility Permit (or Exemption). • Grading Analysis.
Waste Framework Directive (WFD) exclusion	In regard to "clean" naturally occurring soils only that are to be re-used on their site of origin, these are covered by a Waste Framework Directive (WFD) exclusion which is an EA regulatory position statement. So long as the project can prove the four criteria listed above for the DoWCoP, then permits or the DoWCoP are not required. However, many projects still use the CoP to ensure compliance.
T5 Screening and blending of waste	The T5 exemption allows you to temporarily treat waste on a small scale to produce aggregate or soil at a particular location, such as a construction or demolition site. The limit is 5,000 tonnes. This applies to: • Screening soil on a demolition site to remove wood and rubble. • Blending soil and compost that has been produced under an exemption on a construction site to produce better soil for landscaping on that site (e.g. peaty deposits). • Crushing waste (except bricks, tiles and concrete) before screening or blending • Grading waste concrete after it has been crushed to produce a certain type of aggregate.
T7 Exemption	The T7 allows treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size. This needs to be registered with the Local Authority.
Other Permitting Routes	Other options include use under an Environmental Permit (Standard or Bespoke Rules), however these may be a time consuming and costly route, where use of the other above options (if applicable) are likely to be more feasible in construction.

There are also potential non-enforcement positions for re-use e.g. a site has a large volume waste illegally deposited on it (not by landowner). The new owner is keen to re-use waste where possible to reprofile the site (planning condition granted). The DoWCoP could not be used as materials already excavated and deposited as a waste (illegally). The EA may agree that although the DoWCoP not applicable, they would take a non-enforcement position if the works were completed in accordance with the DoWCoP – this would need to be agreed in advance.

Waste Classification and Disposal Guidance for Soils

Introduction
As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. Waste producers have a duty of care to classify the waste they are producing:

- Before it is collected, disposed of or recovered.
- To identify the controls that apply to the movement of the waste.
- To complete waste documents and records.
- To identify suitably authorised waste management options.
- To prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal
The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points:

- Not all waste can be landfilled.
- Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not i.e. the hazard assessment. The most common EWC waste codes related to soil are:

17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (e.g. asbestos, oil,) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on specific "hazardous properties" which include hazards such as carcinogenicity, flammability and toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations** and classified as either hazardous or non-hazardous waste. WAC analysis must not be used for waste classification.

Waste Definitions

Inert	• Will not undergo any significant physical, chemical or biological transformations. • Will not dissolve. • Will not burn. • Will not physically or chemically react. • Will not biodegrade. • Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. • Has insignificant total leachability and pollutant content. • Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above). Is not hazardous (see below).
Hazardous	Soil has hazardous properties as defined in WM3 (Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance).
Stable Non-reactive hazardous waste#	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents either: in the waste alone (for example, by biodegradation), under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints) or by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that is stable and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. If the waste has any disposal route other than a landfill site (e.g. recycling facility, incineration etc) then WAC is not relevant. Furthermore, the WAC limits **cannot** be used to make an assessment of whether a waste is hazardous. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.

Classification based on Total Concentrations[1]	Non-Hazardous Waste		Hazardous Waste	
WAC testing	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	> WAC limit values

Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Greenfield Sites and Inert Waste
The possibility of automatic inert classification naturally occurring "clean" soils should be explored in accordance with the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005). 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 classes of landfill (e.g. the waste producer can characterise the waste based on visual assessment and written description with supporting evidence such as a desk study, subject to agreement by the landfill operator).

Hydrocarbons in Soils
WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However, hydrocarbons in soils are a mixture rather than a pure product and are therefore not absolute entries.

Known Oils
The simplest scenario is where the identity of the contaminating oil is known or can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation of the chromatograph to determine if it is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils
Where hydrocarbons are contaminating soils, it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

> For contaminated land specific consideration must be given to the following before proceeding:
>
> - The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in WM3 example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
> - The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of marker compounds is optional; however, it is recommended that where possible the marker compounds should be used. WM3 states:

> If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:
>
> - The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
> - This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D of WM3, and
> - The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

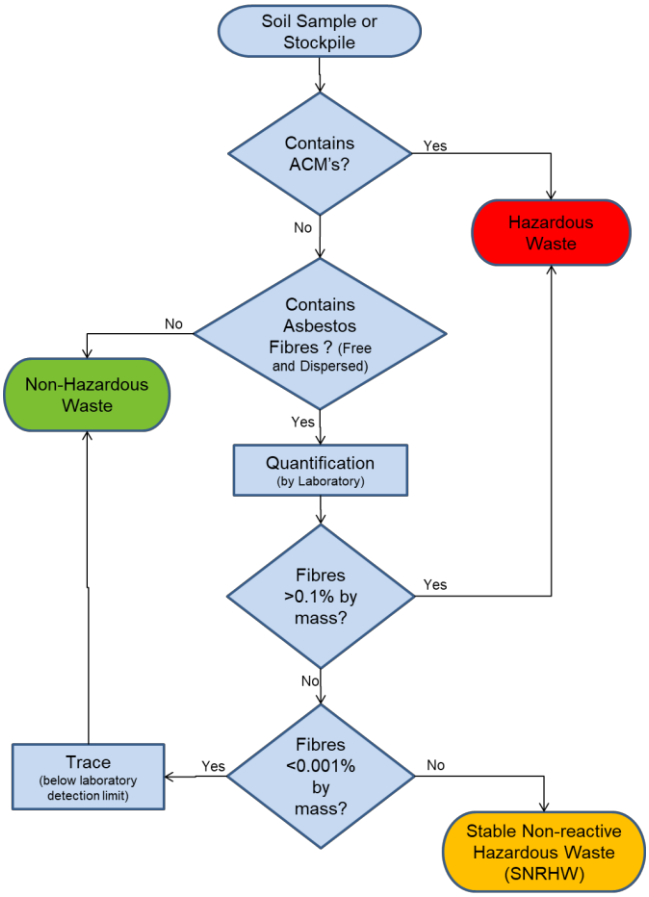
1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the subsequent Council Decisions.
2. Environment Agency Environmental Permitting Regulations: "Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land" 2009.
3. Environment Agency "Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria" Nov 2010.
4. Environment Agency "Guidance on the classification and assessment of waste (Technical Guidance WM3)".
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
7. 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament.
8. Environmental Permitting Guidance The Landfill Directive For the Environmental Permitting (England and Wales) Regulations 2010 Updated March 2010 Version 3.1.
9. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

Waste Containing Asbestos

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's).

Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.



Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site[1]. These levels are often termed "trace" by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)[1]. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	Insulation materials and asbestos-containing construction materials
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and "*other suitable materials*" may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction

Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However, where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However, it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four-hour period. The control limit is not a '*safe*' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 "the release of dispersed asbestos fibres from soil" 1988 concludes that:

- Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m3.
- An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (e.g. by wetting).
- The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use
The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation.

Asbestos containing materials can remain in situ under a suitable cover system which may be hard surfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Publications from the JIWG provide guides for decision making in relation to construction.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk. There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However, the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required. Re-use of soils containing asbestos should be as per CARSOILS.

The re-use of soils containing asbestos at concentrations above hazardous waste levels may be met with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
Not detected	√	√			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractor's method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes.	None.
Trace (<0.001%)		√ [2]			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: • Ensuring soils do not dry out to become dusty. • Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			√		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling. • Clean haulage routes.	Possibly. Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover with hard dig/demarcation layer or hardstanding cover required.
0.1+%				√	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Site wide and or perimeter monitoring. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling.	Unlikely [3] Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the risk for generating dusts will be significantly	Clean cover and a hard dig / demarcation layer. A plan should be in place for future excavations as part of the Health and Safety File.

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
					• Clean haulage routes. • Decontamination unit	increased with repeated handling and compaction.	

1. The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.

2 The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.

APPENDIX B

Exploratory Hole Logs

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH201

Sheet 1 of 3

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:**	05/11/24 - 07/11/24

Logged	Checked
AH	NS

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.05-0.80	ES		0.05			MADE GROUND: Concrete.
					0.80			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
					0.90			MADE GROUND: Concrete.
		1.20	SPT	N=10 (3,3/2,2,3,3)				MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		1.30-1.70	D					
		2.00	SPT	N=12 (2,2/3,4,3,2)				
		2.30-2.70	D					
								Some angular fine to coarse gravels of clinker at 2.80m bgl.
		3.00	SPT	N=4 (1,1/1,1,1,1)				
		3.80-4.00	D		3.70			Very weak red fine to coarse grained moderately weathered SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.80	SPT	N≥50 (25 for 125mm/50 for 85mm)	4.01			Weak red fine to coarse grained moderately weathered SANDSTONE.
		4.50 - 6.00	NR	80 80 0				
			25					
		6.00 - 7.00	NR	50 40 0				
			3					
			NI 2					
		7.00 - 8.00	6	100 95 55				
			NI 2		7.77			Very weak unweathered red MUDSTONE.
		8.00 - 9.00	12	100 100 40	7.85			Weak red fine to coarse grained slightly weathered SANDSTONE.
								8.00-9.00m bgl: Discontinuities are extremely close to closely spaced rough undulating horizontal to 45 degrees sub-horizontal.
								8.38-8.50m bgl: Vertical fractures.
		9.00 - 10.00	NR	0 0 0				*9.00-10.00m bgl: No recovery, suspected sand lense.*
				100 80 20				
				TCR SCR RQD				

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.01m bgl, redrilled with rotary open hole to widen borehole from ground level to 4.50m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH201

Sheet 2 of 3

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:**	05/11/2024 - 07/11/2024

Logged	Checked
AH	NS

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		10.00 - 11.00	NI 9	100	95	60				*10.00-10.20m bgl: Not intact.* *10.00-11.00m bgl: Discontinuities are very close to medium spaced rough undulating horizontal to 15 degrees sub-horizontal.*
		11.00 - 12.00	7 NI 2	100	100	60				*10.80-10.85m bgl: Vertical fractures.* *11.00-12.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 10 degrees sub-horizontal.*
	▼	12.00 - 13.00	5	100	98	45				*11.68-11.73m bgl: Non intact.* *12.00-13.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 45 degrees sub-horizontal.*
		13.00 - 14.00	6 1	100	90	50				*13.00-14.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 10 degrees sub-horizontal.*
		14.00 - 15.00	5 NI 2	100	100	65	14.78 14.88			*13.90-13.92m bgl: Not intact.* *14.00-15.00m bgl: Discontinuities are extremely close to medium spaced rough undulating horizontal to 30 degrees sub-horizontal.* Very weak unweathered red MUDSTONE. *14.78-14.88m bgl: Non intact.*
		15.00 - 16.00	6	100	100	60				Weak red fine to coarse grained slightly weathered SANDSTONE. *15.00-16.00m bgl: Discontinuities are extremely close to medium spaced rough undulating horizontal to 5 degrees sub-horizontal.*
		16.00 - 17.00	7	100	92	67	16.47 16.54			*16.00-17.00m bgl: Discontinuities are extremely close to medium spaced rough undulating horizontal to 30 degrees sub-horizontal.* Extremely weak unweathered red MUDSTONE. Weak red fine to coarse grained slightly weathered SANDSTONE.
		17.00 - 18.00	4 NI 3	93	88	53				*17.00-18.00m bgl: Discontinuities are extremely close to medium spaced rough undulating horizontal to 10 degrees sub-horizontal.* *17.72-17.80m bgl: Non intact.*
		18.00 - 19.50	NR 6 NI 5	100	87	33	18.77 18.84			*18.00-18.10m bgl: No recovery.* *18.10-19.50m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 5 degrees sub-horizontal.* *18.74-18.82m bgl: Non intact.* Extremely weak unweathered red MUDSTONE. Weak red fine to coarse grained slightly weathered SANDSTONE. *19.50-19.60m bgl: Vertical fractures.* *19.50-21.00m bgl: Discontinuities are extremely close to closely spaced rough undulating horizontal to 20 degrees sub-horizontal.* *19.74-19.75m bgl: Non intact.*
			1 2							

11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.01m bgl, redrilled with rotary open hole to widen borehole from ground level to 4.50m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH201

Sheet 3 of 3

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:**	05/11/2024 - 07/11/2024

Logged	Checked
AH	NS

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		19.50 - 21.00	12	100	100	70				*20.54-20.60m bgl: Non intact.*
			NI 3							*20.83-20.91m bgl: Non intact.*
			NI 1							*21.00-22.50m bgl: Discontinuities are very close to medium spaced rough horizontal.*
		21.00 - 22.50	11							
		22.50 - 24.00	6	100	99	53				*22.50-24.00m bgl: Discontinuities are closely spaced rough undulating horizontal to 5 degrees sub-horizontal.*
			3							*23.31-23.34m bgl: Non intact.*
			2							*23.53-23.57m bgl: Non intact.*
			NR							*23.90-24.00m bgl: No recovery.*
		24.00 - 25.50	10	97	93	50				*24.00-25.50m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 5 degrees sub-horizontal.*
			NR 1							*25.20-25.30m bgl: No recovery.*
		25.50 - 27.00	13	97	97	37				*25.50-27.00m bgl: Discontinuities are very close to closely spaced partly rough undulating horizontal to 10 degrees sub-horizontal.*
			NR							*26.95-27.00m bgl: No recovery.*
		27.00 - 28.50	16	100	100	27				*27.00-27.94m bgl: Discontinuities are extremely close to very closely spaced rough undulating horizontal to 5 degrees sub-horizontal.*
			3							*27.94-28.50m bgl: Discontinuities are very close to closely spaced rough horizontal to 45 degrees sub-horizontal.*
		28.50 - 30.00	5	100	98	80				*28.50-29.09m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 45 degrees sub-horizontal.*
			4							*29.09-30.00m bgl: Non intact.*
										28.50-29.09m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 10 degrees sub-horizontal.
							30.00			End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.01m bgl, redrilled with rotary open hole to widen borehole from ground level to 4.50m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH202

Sheet 1 of 4

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24 - 06/11/24	**Logged** / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete and sandstone.
		1.20	SPT	N=16 (12,12/7,3,3,3)				
		1.30-1.70	D					
		2.00	SPT	N=16 (4,5/6,4,3,3)				
		2.80-3.40	D		2.50			Orangish brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.00	SPT	N=12 (4,3/3,3,3,3)				
		3.90-4.10	D		3.90			Very weak red fine to coarse grained moderately weathered SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		4.00	SPT	N≥50 (25 for 100mm/50 for 140mm)	4.24			Weak red fine to coarse grained slightly weathered SANDSTONE.
		5.00 - 6.00	NR	30 10 0				
			NI					
			4	100 93 0				
		6.00 - 7.00	8					
			4					
			5					
		7.00 - 8.00	10	90 90 20				
		8.00 - 9.00	4	100 88 15				
			NI					
			6					
			3					
		9.00 - 10.00	15	100 98 45				
				100 100 40				
				TCR SCR RQD				

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.24m bgl, redrilled with rotary open hole to widen borehole from ground level to 5.00m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH202

Sheet 2 of 4

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:**	04/11/2024 - 06/11/2024

Logged	Checked
	NS

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		10.00 - 11.00	11	100	95	40	10.35			Interbedded very weak red unweathered MUDSTONE and fine to coarse grained unweathered SANDSTONE. Weak red fine to coarse grained slightly weathered SANDSTONE.
		11.00 - 12.00	10				10.65			*11.00-12.00m bgl: Discontinuities are very close to closely spaced partly open to open rough undulating horizontal to 5 degrees subhorizontal.*
	▼	12.00 - 13.00	NI 1 2 NI 3 4	100	93	60				*11.90-11.95m bgl: Non intact.* *12.00-13.00m bgl: Discontinuities are very close to closely spaced partly open to open rough undulating horizontal to 5 degrees subhorizontal.* *12.14-12.18m bgl: Non intact.* *12.24-12.27m bgl: Non intact.*
		13.00 - 14.00	NR 3 6	90	85	40				*13.00-13.10m bgl: No recovery.* *12.00-13.00m bgl: Discontinuities are very close to closely spaced tight to open rough undulating horizontal to 5 degrees subhorizontal.* *13.22-13.26m bgl: Non intact.*
		14.00 - 15.00	NI 7 NI 1	100	75	45				*14.00-14.20m bgl: Non intact.* *14.00-15.00m bgl: Discontinuities are very close to closely spaced open rough undulating horizontal to 5 degrees subhorizontal.*
		15.00 - 16.00	8 3	100	98	30				*14.80-14.85m bgl: Non intact.* *15.00-16.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 10 degrees sub-horizontal.*
		16.00 - 17.00	8	100	94	40				*15.73-15.75m bgl: Non intact.* *16.00-17.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 10 degrees sub-horizontal.* *16.43-16.49m bgl: Vertical fractures.*
		17.00 - 18.00	10	100	100	45				*17.00-18.00m bgl: Discontinuities are extremely close to closely spaced rough undulating horizontal to 5 degrees sub-horizontal.*
		18.00 - 19.00	5	100	100	70				*18.00-19.00m bgl: Discontinuities are very close to medium spaced spaced rough undulating horizontal to 5 degrees sub-horizontal.* *18.62-19.40m bgl: Fine to medium grained SANDSTONE.*
		19.00 - 20.00	7	100	100	80				*19.00-20.00m bgl: Discontinuities are extremely close to medium spaced partly open to open rough undulating horizontal to 20 degrees sub-horizontal.*
				90	90	40				

11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.24m bgl, redrilled with rotary open hole to widen borehole from ground level to 5.00m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH202

Sheet 3 of 4

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:**	04/11/2024 - 06/11/2024

Logged	Checked
	NS

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		20.00 - 21.00	NR 7	100	100	50				*20.00-20.10m bgl: No recovery.* *20.10-21.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal.* *20.60-20.95m bgl: Fine to medium grained SANDSTONE.*
		21.00 - 22.00	8	100	94	20				*21.00-22.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 15 degrees sub-horizontal.*
		22.00 - 23.00	2 NI 11	100	95	45				*22.00-23.00m bgl: Discontinuities are very closely spaced rough undulating horizontal to 10 degrees sub-horizontal.* *22.16-22.22m bgl: Non intact.*
		23.00 - 24.00	NI 13	100	85	40				*23.00-23.05m bgl: Non intact.* *23.00-24.00m bgl: Discontinuities are extremely close to closely spaced rough undulating horizontal to 15 degrees sub-horizontal.*
		24.00 - 25.00	NI 4 NI 5	90	89	55				*24.00-24.10m bgl: Non intact.* *24.00-25.00m bgl: Discontinuities are very close to closely spaced rough undulating horizontal to 20 degrees sub-horizontal.* *24.25-24.30m bgl: Non intact.*
		25.00 - 26.00	7	100	95	50				*25.00-26.00m bgl: Discontinuities are very close to medium spaced rough undulating horizontal to 45 degrees sub-horizontal.* *25.58-25.60m bgl: Vertical fractures.*
		26.00 - 27.00	6	100	93	65				*26.00-27.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal.* *26.95-27.00m bgl: Vertical fractures.*
		27.00 - 28.00	4 NI 2	100	95	55	27.61 27.68			*27.00-28.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 15 degrees sub-horizontal.* Very weak unweathered red MUDSTONE. *27.61-27.68m bgl: Non intact.*
		28.00 - 29.00	4 NI 3	100	100	75				Weak red fine to coarse grained slightly weathered SANDSTONE. *28.00-29.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 5 degrees sub-horizontal.* *28.46-28.51m bgl: Non intact.*
		29.00 - 30.00	3	100	98	75				*29.00-30.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal.* *29.11-29.35m bgl: Fine to medium grained SANDSTONE.*

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.24m bgl, redrilled with rotary open hole to widen borehole from ground level to 5.00m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole with Rotary Core Follow-on No.

BH202

Sheet 4 of 4

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** RO+RC
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:51
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/2024 - 06/11/2024	**Logged** / **Checked** NS

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
[redacted]		30.00 - 31.00	2	100	100	70	32.00			*30.00-31.00m bgl: Discontinuities are close to medium spaced rough undulating horizontal to 15 degrees sub-horizontal.* *30.28-30.30m bgl: Non intact.*
			4							
		31.00 - 32.00	7							*30.00-31.00m bgl: Discontinuities are very close to medium spaced rough undulating horizontal to 10 degrees sub-horizontal.*
										End of Borehole at 32.00m

31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater encountered from 12.00m bgl.
4. Borehole sides stable.
5. Window sample borehole to 4.24m bgl, redrilled with rotary open hole to widen borehole from ground level to 5.00m bgl with rotary cored follow on to 32.00m bgl.
6. Installation to 13.00m bgl: 6.00m plain 50mm PVC, 7.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA201
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged** AH / **Checked** NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-1.00	ES		0.05			MADE GROUND: Concrete.
							MADE GROUND: Brown slightly clayey very gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate, ceramics and metal. Cobbles of angular to sub-angular brick and concrete up to 250mm in diameter.
	1.50-2.40	D					
				2.40			End of Trial Pit at 2.40m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA201A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate, ceramics and metal. Cobbles of angular to sub-angular brick and concrete up to 250mm in diameter.
				1.40			End of Trial Pit at 1.40m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA202
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged** AH / **Checked** NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate, ceramics and metal. Cobbles of angular to sub-angular brick and concrete up to 250mm in diameter.
	1.50-2.50	D					
	2.50-3.40	D					
				3.40			End of Trial Pit at 3.40m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA202A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate, ceramics and metal. Cobbles of angular to sub-angular brick and concrete up to 250mm in diameter.
	1.50-2.50	D					
							Low cobble content from 2.00m bgl.
	2.50-3.50	D					
				3.70			End of Trial Pit at 3.70m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP201
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:**	07/11/24

Logged	Checked
AH	NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate and plastic with occassional wood. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
	1.00-2.00	ES					
				2.00			End of Trial Pit at 2.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP202
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 07/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-0.50	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate, plastic and occasional wood. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
				0.50			
	0.60-0.80	D					MADE GROUND: Orangish brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
				0.90			
	1.00-1.80	D					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate and plastic with occasional wood. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
				1.90			
	2.00-2.20	D					Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				2.30			End of Trial Pit at 2.30m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP203
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:**	07/11/24

Logged	Checked
AH	NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey gravelly sand with low cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone and slate with occasional plastic and metal. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
	1.50-2.50	D					
				2.80			Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				2.90			End of Trial Pit at 2.90m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP204
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 07/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone and slate with occasional plastic and metal. Cobbles are angular to sub-angular of brick and concrete up to 400mm in diameter.
	1.00-2.00	D					
				2.40			Orangish brown clayey SAND. Sand is fine to coarse.
				2.50			End of Trial Pit at 2.50m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP205
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 07/11/24	**Logged** AH / **Checked** NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-0.90	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone and slate with occasional plastic and metal. Cobbles are angular to sub-angular of brick and concrete up to 400mm in diameter.
	1.00-1.50 1.00	D HSV	88kPa	0.90			Soft orangish brown very sandy CLAY. Sand is fine to coarse.
	1.50-2.00 1.50	D HSV	107kPa				
	2.30-3.30	D		2.20			Orangish brown clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				3.30			End of Trial Pit at 3.30m

1.0 2.0 3.0 4.0 5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides stable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP206
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 07/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey gravelly sand with high cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone and slate with occasional plastic, wood and metal. Cobbles are angular to sub-angular of brick and concrete up to 200mm in diameter.
	1.50-2.50	D					
				3.10			End of Trial Pit at 3.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides unstable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP207
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged** AH / **Checked** NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.40	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate and plastic with occasional wood. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
				1.40			Orangish brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				2.40			End of Trial Pit at 2.40m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides stable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP208
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, glass, plastic, wood and ceramics. Cobbles are angular to sub-angular of brick and concrete up to 200mm in diameter.
	1.50-1.70 1.50	D HSV	63kPa	1.40			Firm orangish brown sandy CLAY. Sand is fine to coarse.
				2.00			Orangish brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				2.20			End of Trial Pit at 2.20m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides stable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP209
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type**: TP
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale**: 1:25
CLIENT:	ATRI7 6 LTD	**DATES:** 08/11/24	**Logged**: AH / **Checked**: NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00-1.00	ES					MADE GROUND: Brown slightly clayey gravelly sand with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, sandstone, slate and plastic with occasional wood. Cobbles are angular to sub-angular of brick and concrete up to 170mm in diameter.
	1.50-2.00	D					
				2.30			Orangish brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded to rounded fine to coarse of sandstone.
				2.50			End of Trial Pit at 2.50m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. No groundwater encountered.
3. Excavation sides stable.
4. Excavation backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS201
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.05-1.00	ES		0.05			MADE GROUND: Concrete.
								MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		1.20	SPT	N=9 (3,2/2,2,3,2)				
		1.30-1.70	D					
		2.00	SPT	N=5 (3,2/2,1,1,1)				
					2.40			MADE GROUND: Firm brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of sandstone, brick and coal.
		2.70-2.80	D					
		3.00	SPT	N=10 (3,3/2,3,2,3)	3.00			MADE GROUND: Brown very gravelly very clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone. *Becomes very clayey between 3.20m and 3.50m bgl.*
					3.60			Extremely weak moderately weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.70	SPT	N≥50 (25 for 125mm/50 for 115mm)	3.94			End of Borehole at 3.94m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 3.94m bgl within bedrock.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS202
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-1.00	ES					MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		1.20	SPT	N=9 (2,1/2,2,2,3)				
		1.30-1.70	D					
		2.00	SPT	N=8 (3,3/2,1,2,3)				
		2.30-2.70	D					
		3.00	SPT	N=20 (3,3/2,4,6,8)				
					3.60			Orangish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
					3.70			Extremely weak partially weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.80-4.00	D					
		4.00	SPT	N≥50 (25 for 95mm/50 for 190mm)				
					4.29			End of Borehole at 4.28m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 4.28m bgl within bedrock.
6. Installation to 3.50m bgl: 0.50m plain 50mm, 3.00m slotted upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS203
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.30	ES		0.30			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.30m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.30m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.30m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS203A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.30m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.30m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.30m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS203B
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	SPT	N≥50 (60 for 145mm/15 for 20mm)	0.47			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.46m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.35m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.47m bgl due to SPT refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.	WS203C
	Sheet 1 of 1
PROJECT NO:	C5504
CO-ORDS:	
Hole Type	WS
PROJECT NAME:	VISION, MANCHESTER
LEVEL:	
Scale	1:30
CLIENT:	ATRI7 6 LTD
DATES:	05/11/24
Logged	AH
Checked	NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.35			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.35m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.35m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.35m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS203D
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	SPT	N≥50 (25 for 85mm/50 for 20mm)	0.40			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.40m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.30m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.40m bgl due to SPT refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS204
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-0.80	ES		0.05			MADE GROUND: Concrete.
								MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		0.80	SPT	N≥50 (75 for 90mm/0 for 0mm)	0.89			*Concrete obstruction observed at 0.89m bgl.*
								End of Borehole at 0.89m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.70m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.80m bgl due to concrete obstruction.
6. Borehole backfilled with araisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS204A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.05			MADE GROUND: Concrete.
					0.30			MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.30m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.30m bgl due to sample casing refusal in very dense made ground. 6. Borehole backfilled with araisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS204B
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 05/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.80	SPT	N≥50 (25 for 95mm/50 for 105mm)	0.05			MADE GROUND: Concrete.
								MADE GROUND: Brown very gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
					1.00			End of Borehole at 1.00m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.80m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 1.00m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS205
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS205A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.40m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.40m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.40m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS205B
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.45			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.45m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.45m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.45m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS205C
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		1.20	SPT	N=14 (3,3/3,3,4,4)				
		1.30-1.70	D					
		2.00	SPT	N=4 (3,1/1,1,1,1)				*No SPT recovery at 2.00m bgl.* *Poor recovery between 2.00m and 3.00m bgl.*
		2.40-2.60	D					*Becomes very clayey between 2.40m and 2.60m bgl.*
		3.00-3.60	D		3.00			Orangish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.00	SPT	N=17 (6,6/4,4,4,5)				
		3.80	SPT	N≥50 (25 for 145mm/50 for 145mm)	3.80			Extremely weak moderately weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
					4.09			End of Borehole at 4.09m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 4.09m bgl within bedrock.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS206
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-0.50	ES		0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS206A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS206B
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
								End of Borehole at 0.40m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.40m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS207
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, coal, glass and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl within bedrock.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS207A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, coal, glass and sandstone.
		1.20	SPT	N=31 (10,8/7,9,8,7)				
		1.30-1.70	D					
		2.00	SPT	N=20 (4,4/5,6,5,4)				
		2.30-2.70	D					
		3.00	SPT	N=15 (6,6/5,4,3,3)				
					3.70			
		3.80-4.20	D					Extremely weak moderately weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		4.00	SPT	N≥50 (25 for 115mm/50 for 105mm)				
					4.22			End of Borehole at 4.22m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 4.22m bgl within bedrock.
6. Installation to 3.50m bgl: 0.50m plain 50mm PVC, 3.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS208
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete, slate, ceramics and sandstone.
		1.00-2.00	ES					
		1.20	SPT	N=17 (5,5/5,4,3,5)				
		2.00	SPT	N=5 (2,1/1,1,2,1)				
		2.50-3.00	D		2.40			Orangish brown slightly gravelly slightly clayey SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.00	SPT	N=15 (3,3/4,3,4,4)				
		3.70-7.10	D		3.60			Extremely weak moderately weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		4.00	SPT	N≥50 (25 for 125mm/50 for 115mm)				
					4.24			End of Borehole at 4.24m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 4.24m bgl within bedrock.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS209
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.50	ES		0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS209A
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-1.00	ES					MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete and sandstone.
		1.20	SPT	N≥50 (25 for 125mm/50 for 20mm)	1.35			End of Borehole at 1.34m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 1.345m bgl due to SPT refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS209B
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete and sandstone.
								End of Borehole at 0.40m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.40m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.40m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS209C
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.50			MADE GROUND: Brown slightly clayey very gravelly sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse brick, concrete and sandstone.
								End of Borehole at 0.50m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 0.50m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 0.50m bgl due to sample casing refusal in very dense made ground.
6. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS210
Sheet 1 of 1

PROJECT NO:	C5504	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	VISION, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ATRI7 6 LTD	**DATES:** 04/11/24	**Logged** AH / **Checked** NS

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.00-0.90	ES					MADE GROUND: Brown gravelly clayey sand. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of brick, concrete, coal, slate and sandstone.
								Becomes very clayey between 0.90m and 1.50m bgl.
		1.00-1.50	ES					
		1.20	SPT	N=24 (6,6/5,6,6,7)				
		1.50-1.80	D		1.50			Orangish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
								Becomes very gravelly between 1.80m and 3.10m bgl.
		2.00	SPT	N=20 (4,4/6,4,4,6)				
		2.40-2.60	D					
		3.00	SPT	N=16 (4,5/5,3,4,4)				*No SPT recovery at 3.00m bgl.*
					3.60			Extremely weak moderately weathered red fine to coarse grained SANDSTONE recovered as a gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		3.70-4.00	D					
		3.90	SPT	N≥50 (25 for 125mm/50 for 145mm)				
					4.17			End of Borehole at 4.17m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny and GPR.
2. Hand pit excavation to 1.20m bgl.
3. No groundwater encountered.
4. Borehole sides stable.
5. Borehole terminated at 4.17m bgl within bedrock.
6. Installation to 1.50m bgl: 0.50m plain 50mm PVC, 1.00m slotted PVC upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

APPENDIX C

Chemical Testing Results

Brownfield Solutions Ltd
William Smith House
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Northwich
Cheshire
CW9 5LP

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i2 Analytical Ltd.
7 Woodshots Meadow,
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WD18 8YS

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Analytical Report Number : 24-053869

Project / Site name:	Vision, Manchester	**Samples received on:**	14/11/2024
Your job number:	C5504	**Samples instructed on/ Analysis started on:**	14/11/2024
Your order number:	638	**Analysis completed by:**	21/11/2024
Report Issue Number:	1	**Report issued on:**	22/11/2024
Samples Analysed:	6 soil samples		

Signed: [redacted]

Trevor Hill
Customer Service Advisor
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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-053869
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379526	379527	379528	379529	379530
Sample Reference				WS201	WS205d	TP201	TP208	BH201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.05-0.80
Date Sampled				05/11/2024	04/11/2024	07/11/2024	08/11/2024	05/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	41.2	40.2	50.3	41.5	49.6
Moisture Content	%	0.01	NONE	7.9	9.8	9.6	17	13
Total mass of sample received	kg	0.1	NONE	1.2	0.8	0.8	0.8	0.9
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KWB	KWB	KWB	KWB	KWB
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	11	10.2	10.7	8.4	10.1
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	660	780	760	170	3800
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	329	389	382	82.5	1890
Organic Matter (automated)	%	0.1	MCERTS	1.4	1.4	1.6	2.6	1.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.79	0.12	0.55	7.1	1.2
Acenaphthylene	mg/kg	0.05	MCERTS	0.15	< 0.05	0.14	0.23	0.17
Acenaphthene	mg/kg	0.05	MCERTS	0.58	0.17	0.38	6.7	1.7
Fluorene	mg/kg	0.05	MCERTS	0.61	0.15	0.44	5.4	1.5
Phenanthrene	mg/kg	0.05	MCERTS	4.8	1.4	3.6	32	11
Anthracene	mg/kg	0.05	MCERTS	0.96	0.32	0.71	7.9	2.7
Fluoranthene	mg/kg	0.05	MCERTS	5.4	2.3	4.2	21	10
Pyrene	mg/kg	0.05	MCERTS	5.2	2.3	4.1	22	10
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.6	1.1	2.1	11	4.6
Chrysene	mg/kg	0.05	MCERTS	2.5	1.1	2.1	10	4.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.3	1.2	1.9	9.8	4.8
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.3	0.62	1.1	3.4	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.5	1.1	2	9.1	4.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	0.6	0.86	3.4	1.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.23	0.09	0.16	0.9	0.35
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	0.66	1.1	4	2.2
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	32.2	13.3	25.3	154	62.8
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.1	8.1	11	24	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	0.4	0.7	0.5
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	16	15	20	16	17
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	15	20	16	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	51	30	48	110	98
Lead (aqua regia extractable)	mg/kg	1	MCERTS	78	59	78	270	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3	0.9	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	13	16	21	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	67	70	100	180	120

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Analytical Report Number: 24-053869
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379526	379527	379528	379529	379530
Sample Reference				WS201	WS205d	TP201	TP208	BH201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.05-0.80
Date Sampled				05/11/2024	04/11/2024	07/11/2024	08/11/2024	05/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	-	< 2.0	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	-	< 8.0	-	< 8.0	-
TPHCWG - Aliphatic >EC16 - EC35 $_{EH_CU_1D_AL}$	mg/kg	10	MCERTS	-	20	-	< 10	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	-	20	-	< 8.0	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH_CU_1D_AL}$	mg/kg	10	NONE	-	< 10	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	-	20	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	-	20	-	< 10	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	-	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	-	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.02	MCERTS	-	< 0.020	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	-	< 1.0	-	4.6	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	-	4	-	21	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	-	10	-	73	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	-	37	-	88	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH_CU_1D_AR}$	mg/kg	10	NONE	-	13	-	13	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	-	51	-	190	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	-	64	-	200	-
TPH (>EC5 - EC10) $_{HS_1D_TOTAL}$	mg/kg	1	NONE	-	< 1.0	-	< 1.0	-
TPH (>EC16 - EC40) $_{EH_CU_1D_TOTAL}$	mg/kg	10	NONE	-	89	-	170	-
TPH Total >EC5 - EC40 $_{EH_CU+HS_1D_TOTAL}$	mg/kg	10	NONE	-	84	-	200	-
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	< 0.005	-	< 0.005	-
Benzene	mg/kg	0.005	MCERTS	-	< 0.005	-	< 0.005	-
Toluene	mg/kg	0.005	MCERTS	-	< 0.005	-	< 0.005	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	< 0.005	-	< 0.005	-
p & m-xylene	mg/kg	0.008	MCERTS	-	< 0.008	-	< 0.008	-
o-Xylene	mg/kg	0.005	MCERTS	-	< 0.005	-	< 0.005	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-053869
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379531
Sample Reference				BH202
Sample Number				None Supplied
Depth (m)				0.00-1.00
Date Sampled				04/11/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	50.6
Moisture Content	%	0.01	NONE	8.8
Total mass of sample received	kg	0.1	NONE	1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KWB

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	11.1
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2000
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	989
Organic Matter (automated)	%	0.1	MCERTS	1.6

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.39
Acenaphthylene	mg/kg	0.05	MCERTS	0.12
Acenaphthene	mg/kg	0.05	MCERTS	0.49
Fluorene	mg/kg	0.05	MCERTS	0.46
Phenanthrene	mg/kg	0.05	MCERTS	3.8
Anthracene	mg/kg	0.05	MCERTS	0.89
Fluoranthene	mg/kg	0.05	MCERTS	4.1
Pyrene	mg/kg	0.05	MCERTS	4.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.9
Chrysene	mg/kg	0.05	MCERTS	1.9
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.7
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.14
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	25.1

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (III)	mg/kg	1	NONE	19
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	100
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140

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Analytical Report Number: 24-053869
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379531
Sample Reference				BH202
Sample Number				None Supplied
Depth (m)				0.00-1.00
Date Sampled				04/11/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Petroleum Hydrocarbons				
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC35 EH_CU_1D_AL	mg/kg	10	MCERTS	-
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC35 - EC40 EH_CU_1D_AL	mg/kg	10	NONE	-
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-
TPHCWG - Aliphatic >EC5 - EC40 EH_CU+HS_1D_AL	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	-
TPH (>EC5 - EC10) HS_1D_TOTAL	mg/kg	1	NONE	-
TPH (>EC16 - EC40) EH_CU_1D_TOTAL	mg/kg	10	NONE	-
TPH Total >EC5 - EC40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	-
VOCs				
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-
Benzene	mg/kg	0.005	MCERTS	-
Toluene	mg/kg	0.005	MCERTS	-
Ethylbenzene	mg/kg	0.005	MCERTS	-
p & m-xylene	mg/kg	0.008	MCERTS	-
o-Xylene	mg/kg	0.005	MCERTS	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 24-053869
Project / Site name: Vision, Manchester

* 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 *
379526	WS201	None Supplied	0.05-1.00	Brown gravelly sand with brick and stones
379527	WS205d	None Supplied	0.00-1.00	Brown loam and sand with gravel and brick
379528	TP201	None Supplied	0.00-1.00	Brown loam and clay with vegetation and stones
379529	TP208	None Supplied	0.00-1.00	Brown loam and clay with vegetation and stones
379530	BH201	None Supplied	0.05-0.80	Brown gravelly sand with brick and stones
379531	BH202	None Supplied	0.00-1.00	Brown loam and clay with brick and stones

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Analytical Report Number : 24-053869
Project / Site name: Vision, Manchester

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	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 (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
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	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	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
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.

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Analytical Report Number : 24-053869
Project / Site name: Vision, Manchester

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

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 - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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The results included within the report relate only to the sample(s) submitted for testing.

Sample Deviation Report

Analytical Report Number : 24-053869

Project / Site name: Vision, Manchester

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.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH201	N/A	S	379530	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
BH202	N/A	S	379531	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
TP201	N/A	S	379528	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS201	N/A	S	379526	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS205d	N/A	S	379527	c	BTEX and/or Volatile organic compounds in soil	L073B	c
WS205d	N/A	S	379527	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS205d	N/A	S	379527	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088-PL	c
WS205d	N/A	S	379527	c	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	c

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APPENDIX D

Geotechnical Testing Results

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Brownfield Solutions Ltd

Address William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Contract C5504 -
Vision, Manchester

Job Number MRN 24032/40
Date of Issue 29 November 2024

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

5 The results included within the report are representative of the samples submitted for analysis.

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS

ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions Ltd
SITE	C5504 - Vision, Manchester
JOB NUMBER	MRN 24032/40

DATE RECEIVED	21-Nov-24	DATE SAMPLED	5, 6, 7-Nov-24
DATE TESTED	25-Nov-24	SAMPLED BY	Client
MATERIAL TESTED	Rock Core		

Sample Number	B/H No.	Sample Depth	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm^2)	Description after Test
602203	BH201	12.22-12.52	M.R.	86	172	2.00	Saw / Grinding	82.2	**14.2**	Split vertically top to bottom with no visible end defects
602205	BH201	15.00-15.52	M.R.	86	172	2.00	Saw / Grinding	69.4	**11.9**	Split vertically top to bottom with no visible end defects
602207	BH201	22.40-22.73	M.R.	86	172	2.00	Saw / Grinding	89.8	**15.5**	Split vertically top to bottom with no visible end defects
602211	BH201	29.20-29.55	M.R.	86	172	2.00	Saw / Grinding	104.2	**17.9**	Split vertically top to bottom with no visible end defects
602222	BH202	12.65-13.00	M.R.	86	172	2.00	Saw / Grinding	90.1	**15.5**	Split vertically top to bottom with no visible end defects
602217	BH202	19.22-19.46	M.R.	86	172	2.00	Saw / Grinding	89.4	**15.4**	Split vertically top to bottom with no visible end defects
602220	BH202	27.17-27.42	M.R.	86	172	2.00	Saw / Grinding	117.3	**20.2**	Split vertically top to bottom with no visible end defects
602221	BH202	29.09-29.36	M.R.	86	172	2.00	Saw / Grinding	101.3	**17.4**	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.

*Length after sample preparation

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

SIGNED 

DATE 29-Nov-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions Ltd
SITE	C5504 - Vision, Manchester
JOB NUMBER	MRN 24032/40

DATE RECEIVED	21-Nov-24	DATE SAMPLED	5, 6, 7-Nov-24
DATE TESTED	25-Nov-24	SAMPLED BY	Client

MATERIAL	Rock Core
ADVISED SOURCE	Site Investigation Sample

Sample Number	B/H No.	Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
602201	BH201	4.95-5.14	D	85.9		1.2	7378.81	85.90	0.16	1.28	0.21
602202	BH201	8.11-8.27	D	85.4		0.8	7293.16	85.40	0.11	1.27	0.14
602204	BH201	13.51-13.76	D	85.8		1.2	7361.64	85.80	0.16	1.28	0.21
602206	BH201	18.57-18.73	D	85.7		0.4	7344.49	85.70	0.05	1.27	0.07
602208	BH201	22.97-23.12	D	85.9		0.6	7378.81	85.90	0.08	1.28	0.10
602209	BH201	25.60-25.74	D	85.9		1.1	7378.81	85.90	0.15	1.28	0.19
602210	BH201	27.97-28.12	D	85.4		0.9	7293.16	85.40	0.12	1.27	0.16
602212	BH202	7.16-7.32	D	85.9		0.7	7378.81	85.90	0.09	1.28	0.12
602213	BH202	11.41-11.50	D	86.0		1.4	7396.00	86.00	0.19	1.28	0.24
602214	BH202	14.55-14.72	D	85.9		0.7	7378.81	85.90	0.09	1.28	0.12
602216	BH202	18.55-18.71	D	85.8		0.9	7361.64	85.80	0.12	1.28	0.16
602218	BH202	21.00-21.12	D	86.3		1.5	7447.69	86.30	0.20	1.28	0.26
602219	BH202	25.60-25.76	D	86.1		1.0	7413.21	86.10	0.13	1.28	0.17
602215	BH202	15.42-15.66	D	86.2		0.8	7430.44	86.20	0.11	1.28	0.14

Test Type *			
A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

**W Entry required if test type is not Diametral

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons) DATE 29-Nov-24
(Director / Head of Laboratory)

Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: a.hunt@brownfield-solutions.co.uk

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 : 24-054270

Project / Site name:	Vision, Manchester	**Samples received on:**	18/11/2024
Your job number:	C5504	**Samples instructed on/ Analysis started on:**	18/11/2024
Your order number:	611	**Analysis completed by:**	28/11/2024
Report Issue Number:	1	**Report issued on:**	29/11/2024
Samples Analysed:	10 soil samples		

[redacted]

Signed: _____

Anna Goc
PL Head of 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

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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.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-054270
Project / Site name: Vision, Manchester
Your Order No: 611

Lab Sample Number				381744	381745	381746	381747	381748
Sample Reference				TP205	WS207b	WS208	WS210	BH201
Sample Number				CLAY	SDST	SAND	SAND	SDST
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				1.50-2.00	3.80-4.20	2.50-3.00	1.50-1.80	6.70-6.80
Date Sampled				07/11/2024	04/11/2024	04/11/2024	04/11/2024	06/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	7.8	6.6	4.4	8
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.8	0.8
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.8	8.1	7.7	7.7	5.7
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	160	490	280	99	230
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	78	247	138	49.4	114
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-	-
Heavy Metals / Metalloids								
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-054270
Project / Site name: Vision, Manchester
Your Order No: 611

Lab Sample Number				381749	381750	381751	381752	381753
Sample Reference				BH201	BH201	BH202	BH202	WS205d
Sample Number				SDST	SDST	SDST	SDST	SAND
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				10.00-10.20	17.72-17.80	14.00-14.20	24.00-24.10	3.00-3.60
Date Sampled				06/11/2024	06/11/2024	05/11/2024	05/11/2024	05/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	6.7
Moisture Content	%	0.01	NONE	9.3	9.3	8.3	8.7	5.1
Total mass of sample received	kg	0.1	NONE	0.8	0.9	0.9	0.8	0.8
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.8	8.5	8.5	8.6	8.2
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.01	-	0.029
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	200	29	39	45	120
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	19.6	-	59.5
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	98.1	14.3	-	22.7	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	2	-	1.2
Total Sulphur	mg/kg	50	MCERTS	-	-	53	-	83
Total Sulphur	%	0.005	MCERTS	-	-	0.005	-	0.008
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	< 0.5	-	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	< 2.0	-	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	< 2.0	-	< 2.0
Heavy Metals / Metalloids								
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	3.5	-	2.7
Magnesium (water soluble)	mg/kg	5	NONE	-	-	7	-	5.4

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 24-054270
Project / Site name: Vision, Manchester

* 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 *
381744	TP205	CLAY	1.50-2.00	Brown clay with gravel
381745	WS207b	SDST	3.80-4.20	Brown sand
381746	WS208	SAND	2.50-3.00	Brown sand with gravel
381747	WS210	SAND	1.50-1.80	Brown sand with gravel
381748	BH201	SDST	6.70-6.80	Brown clay and sand
381749	BH201	SDST	10.00-10.20	Brown clay and sand
381750	BH201	SDST	17.72-17.80	Brown clay and sand
381751	BH202	SDST	14.00-14.20	Brown clay and sand
381752	BH202	SDST	24.00-24.10	Brown clay and sand
381753	WS205d	SAND	3.00-3.60	Brown sand with gravel and stones

Analytical Report Number : 24-054270
Project / Site name: Vision, Manchester

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	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

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.

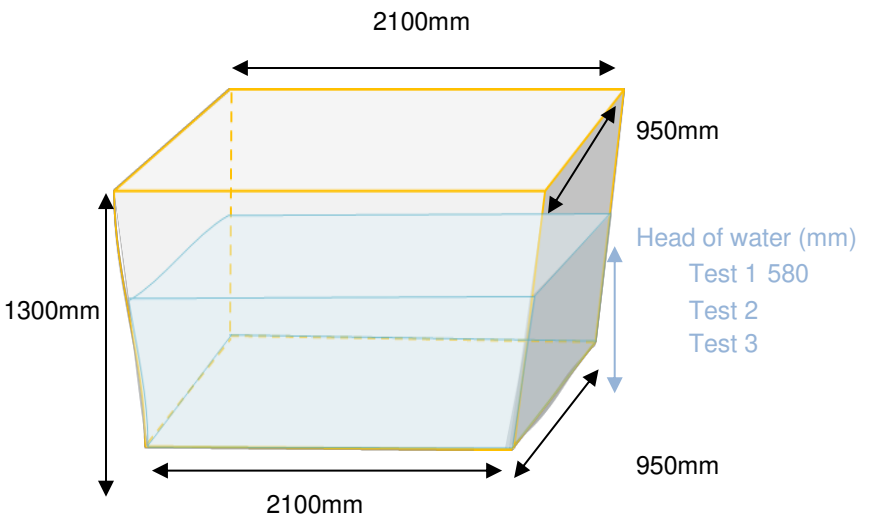
Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Percolation Test	ATRI7 6 LTD	Date of Test: 03/11/2024
	VISION	Logged By: SJ
SA201A	C5504	Checked By: NS

BROWNFIELD SOLUTIONS LTD

Dimensions (mm)	TEST 1	TEST 2	TEST 3
Length at Top	2100		
Length at Bottom	2100		
Width at Top	950		
Width at Bottom	950		
Depth Tested (Head of Water)	580		
Depth of Excavation	1300		
Volume of Water (m3)	1.1571		
Void Ratio	1		
Factored Volume of Water (m3)	1.1571		
Strata Description	Made Ground: Brown slightly clayey very gravelly sand with moderate cobble content.		
Pit Details	Open with no stone filling See associated log for stratum details		

Test Pit Construction

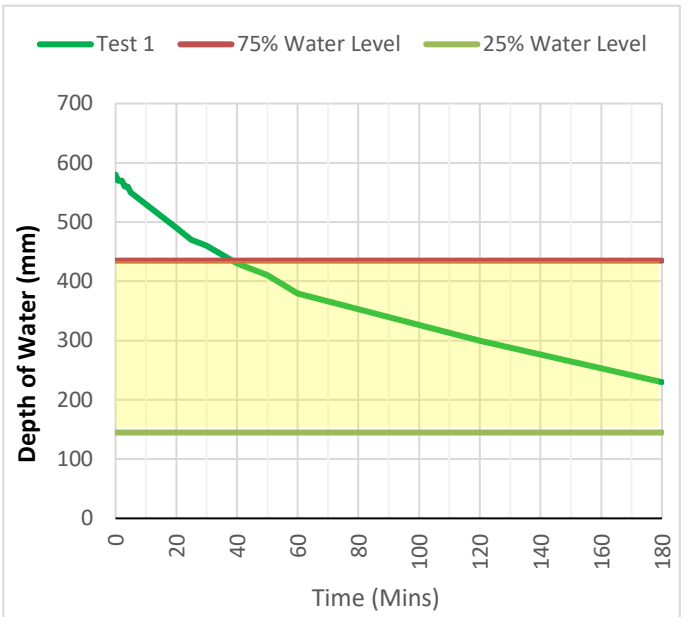


Site Recorded Data

Test 1			Test 2			Test 3		
Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)
0.00	720	580						
0.17	722	578						
0.25	724	576						
0.33	725	575						
0.42	726	574						
0.50	728	572						
0.67	729	571						
0.83	730	570						
1.00	730	570						
2.00	730	570						
3.00	740	560						
4.00	740	560						
5.00	750	550						
10.00	770	530						
15.00	790	510						
20.00	810	490						
25.00	830	470						
30.00	840	460						
40.00	870	430						
50.00	890	410						
60.00	920	380						
90.00	960	340						
120.00	1000	300						
180.00	1070	230						

Percolation Test	**ATRI7 6 LTD**	Date of Test: 03/11/2024	BROWNFIELD SOLUTIONS LTD
	VISION	Logged By: SJ	
SA201A	C5504	Checked By: NS	

Data Analysis



Soil Infiltration Rate Calculation

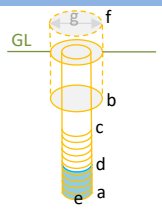
	Test 1	Test 2	Test 3
Water Level 1	1070.000		
Water Level 2	720.000		
Time to drain from Water Level 1 to Level 2 (mi	180.000		
Volume of Water Discharged m3)	0.6982500		
Discharge Area (m3)	7.455		
Soil Infiltration Rate (m/min)	0.0005204		
Soil Infiltration Rate (m/sec)	8.67E-06		

Compliancy Check

	Test 1	Test 2	Test 3
Water Level at 75% effective depth (mm)	435		
Water Level at 25% effective depth (mm)	145		
	Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth		

Falling Head Permeability Test	**ATRI7 6 LTD**	Date of Test: 27/11/2024	BROWNFIELD SOLUTIONS LTD
	VISION	Logged By: GK	
BH201	C5504	Checked By: NS	

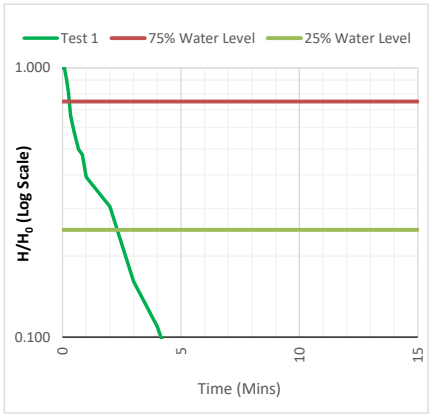
Dimensions (mm)	Test 1	Test 2	Test 3
Bottom of Borehole (a)	12900	12900	12900
Top of Filter Material (c)	6000	6000	6000
Initial Groundwater Level or Base of Hole (d)	9190	9190	9190
Centre of Piezometer Tip (e)			
Height of Casing/Standpipe Above Surface (f)	0	0	0
Diameter of Casing/Standpipe (g)	150	150	150
Length of Filter (above GW table/base of hole)	3190	3190	3190

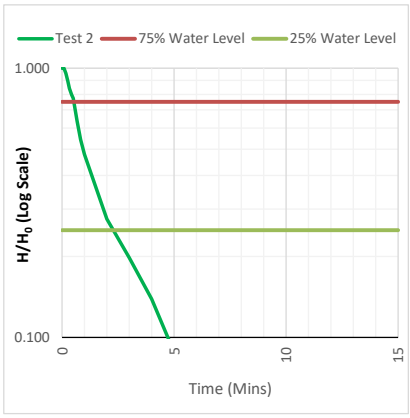


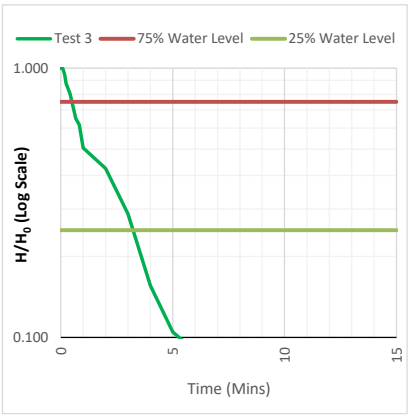
Site Recorded Data

Test 1				Test 2				Test 3			
Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0
0.00	6080	3110	1.000	0.00	5450	3740	1.000	0.00	5470	3720	1.000
0.08	6080	3110	1.000	0.08	5450	3740	1.000	0.08	5470	3720	1.000
0.17	6390	2800	0.900	0.17	5610	3580	0.957	0.17	5660	3530	0.949
0.25	6700	2490	0.801	0.25	5840	3350	0.896	0.25	5940	3250	0.874
0.33	7110	2080	0.669	0.33	6040	3150	0.842	0.33	6070	3120	0.839
0.42	7270	1920	0.617	0.42	6210	2980	0.797	0.42	6200	2990	0.804
0.50	7410	1780	0.572	0.50	6300	2890	0.773	0.50	6410	2780	0.747
0.67	7640	1550	0.498	0.67	6810	2380	0.636	0.67	6770	2420	0.651
0.83	7710	1480	0.476	0.83	7160	2030	0.543	0.83	6900	2290	0.616
1.00	7970	1220	0.392	1.00	7400	1790	0.479	1.00	7310	1880	0.505
2.00	8240	950	0.305	2.00	8160	1030	0.275	2.00	7610	1580	0.425
3.00	8690	500	0.161	3.00	8450	740	0.198	3.00	8120	1070	0.288
4.00	8850	340	0.109	4.00	8670	520	0.139	4.00	8610	580	0.156
5.00	9000	190	0.061	5.00	8860	330	0.088	5.00	8800	390	0.105
10.00	9160	30	0.010	10.00	9150	40	0.011	10.00	9020	170	0.046
15.00	9190	0	0.000	15.00	9190	0	0.000	15.00	9190	0	0.000

Data Analysis







Falling Head Permeability Test	**ATRI7 6 LTD**	Date of Test: 27/11/2024 Logged By: GK Checked By: NS	BROWNFIELD SOLUTIONS LTD
	VISION		
BH201	C5504		

Calculation of Intake Factor (F)

		Test 1	Test 2	Test 3
m^2	Cross sectional area of base	0.018	0.018	0.018
m	Diameter	0.150	0.150	0.150
m	Length	3.190	3.190	3.190
	Intake Factor Scenario	Soil flush with bottom in uniform soil		
	Intake Factor, F	**0.4125**	**0.4125**	**0.4125**

Soil Infiltration Rate Calculation

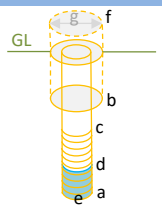
		Test 1	Test 2	Test 3
75% Effective Level	Head (m)	2.333	2.805	2.790
	Depth to water (m bgl)	6.858	6.385	6.380
	Time (mins)	0.30	0.50	0.50
	Time (sec)	18	30	30
25% effective Level	Head (m)	0.778	0.935	0.930
	Depth to water (m bgl)	8.413	8.255	8.260
	Time (mins)	2.50	2.50	3.50
	Time (sec)	150	150	210
m (bgl)	Initial groundwater level	9.19	9.19	9.19
m (bgl)	At time (t_1) Depth to water	6.858	6.385	6.380
seconds	t_1	18	30	30
m (bgl)	Depth of water H_1	2.333	2.805	2.810
m (bgl)	At time (t_2) Depth to water	8.413	8.255	8.260
seconds	t_2	150	150	210
m (bgl)	Depth of water H_2	0.778	0.935	0.930

$$Permeability = k = \frac{A}{F(t_2 - t_1)} Log_e \frac{H_1}{H_2}$$

	Test 1	Test 2	Test 3
Permeability, k (m/s)	**3.57E-04**	**3.92E-04**	**2.63E-04**

Falling Head Permeability Test	**ATRI7 6 LTD**	Date of Test: 27/11/2024	BROWNFIELD SOLUTIONS LTD
	VISION	Logged By: GK	
BH201	C5504	Checked By: NS	

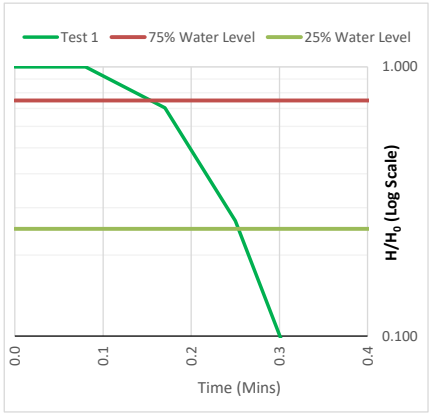
Dimensions (mm)	Test 1	Test 2	Test 3
Bottom of Borehole (a)	3410	3410	3410
Top of Filter Material (c)	500	500	500
Initial Groundwater Level or Base of Hole (d)	3410	3410	3410
Centre of Piezometer Tip (e)			
Height of Casing/Standpipe Above Surface (f)	0	0	0
Diameter of Casing/Standpipe (g)	100	100	100
Length of Filter (above GW table/base of hole)	2910	2910	2910

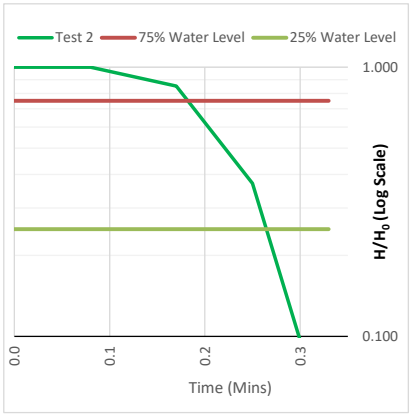


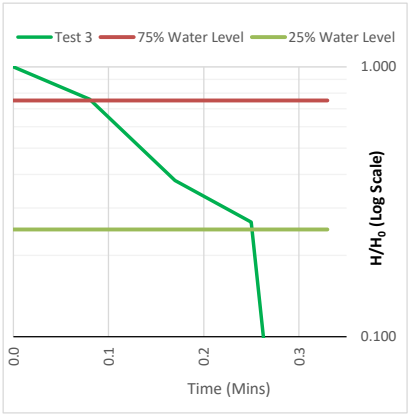
Site Recorded Data

Test 1				Test 2				Test 3			
Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0
0.00	2700	710	1.000	0.00	2600	810	1.000	0.000	2620	790	1.000
0.08	2700	710	1.000	0.08	2600	810	1.000	0.080	2810	600	0.759
0.17	2910	500	0.704	0.17	2720	690	0.852	0.170	3110	300	0.380
0.25	3220	190	0.268	0.25	3110	300	0.370	0.250	3200	210	0.266
0.33	3370	40	0.056	0.32	3409	1	0.056	0.320	3409	1	0.001
0.42	3410	0	0.000	0.33	3410	0	0.000	0.330	3410	0	0.000

Data Analysis







Falling Head Permeability Test	ATRI7 6 LTD	Date of Test: 27/11/2024
	VISION	Logged By: GK
BH201	C5504	Checked By: NS

BROWNFIELD SOLUTIONS LTD

Calculation of Intake Factor (F)

		Test 1	Test 2	Test 3
m^2	Cross sectional area of base	0.008	0.008	0.008
m	Diameter	0.100	0.100	0.100
m	Length	2.910	2.910	2.910
	Intake Factor Scenario	Soil flush with bottom in uniform soil		
	Intake Factor, F	**0.275**	**0.275**	**0.275**

Soil Infiltration Rate Calculation

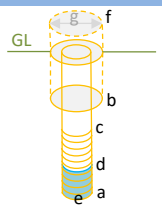
		Test 1	Test 2	Test 3
75% Effective Level	Head (m)	0.533	0.608	0.593
	Depth to water (m bgl)	2.878	2.803	2.798
	Time (mins)	0.15	0.18	0.08
	Time (sec)	9	11	5
25% effective Level	Head (m)	0.178	0.203	0.198
	Depth to water (m bgl)	3.233	3.208	3.213
	Time (mins)	0.25	0.26	0.26
	Time (sec)	15	16	16
m (bgl)	Initial groundwater level	3.41	3.41	3.41
m (bgl)	At time (t_1) Depth to water	2.878	2.803	2.798
seconds	t_1	9	11	5
m (bgl)	Depth of water H_1	0.533	0.608	0.613
m (bgl)	At time (t_2) Depth to water	3.233	3.208	3.213
seconds	t_2	15	16	16
m (bgl)	Depth of water H_2	0.178	0.203	0.198

$$Permeability = k = \frac{A}{F(t_2 - t_1)} Log_e \frac{H_1}{H_2}$$

	Test 1	Test 2	Test 3
Permeability, k (m/s)	**5.23E-03**	**6.54E-03**	**2.99E-03**

Falling Head Permeability Test	**ATRI7 6 LTD**	Date of Test: 27/11/2024	BROWNFIELD SOLUTIONS LTD
	VISION	Logged By: GK	
WS210	C5504	Checked By: NS	

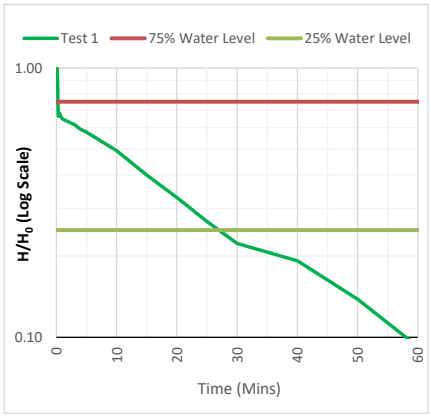
Dimensions (mm)	Test 1	Test 2	Test 3
Bottom of Borehole (a)	1650	1640	
Bottom of Casing (b)			
Top of Filter Material (c)	500	500	
Initial Groundwater Level or Base of Hole (d)	1650	1640	
Centre of Piezometer Tip (e)			
Height of Casing/Standpipe Above Surface (f)	0	0	
Diameter of Casing/Standpipe (g)	100	100	
Length of Filter (above GW table/base of hole)	1150	1150	

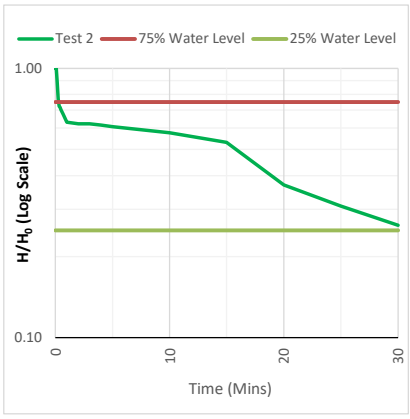


Site Recorded Data

Test 1				Test 2				Test 3			
Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0	Time (mins)	Depth to water (mm)	Head of water (mm)	Head Ratio H/H_0
0.00	350	1300	1.00	0.00	340	1300	1.00				
0.08	350	1300	1.00	0.08	340	1300	1.00				
0.17	410	1240	0.95	0.17	490	1150	0.88				
0.25	710	940	0.72	0.25	640	1000	0.77				
0.33	790	860	0.66	0.33	700	940	0.72				
0.42	790	860	0.66	0.42	710	930	0.72				
0.50	770	880	0.68	0.50	730	910	0.70				
0.67	790	860	0.66	0.67	760	880	0.68				
0.83	800	850	0.65	0.83	790	850	0.65				
1.00	810	840	0.65	1.00	820	820	0.63				
2.00	830	820	0.63	2.00	830	810	0.62				
3.00	850	800	0.62	3.00	830	810	0.62				
4.00	880	770	0.59	4.00	840	800	0.62				
5.00	900	750	0.58	5.00	850	790	0.61				
10.00	1010	640	0.49	10.00	890	750	0.58				
15.00	1130	520	0.40	15.00	950	690	0.53				
20.00	1220	430	0.33	20.00	1160	480	0.37				
25.00	1300	350	0.27	25.00	1240	400	0.31				
30.00	1360	290	0.22	30.00	1300	340	0.26				
40.00	1400	250	0.19								
50.00	1470	180	0.14								
60.00	1530	120	0.09								
90.00	1650	0	0.00								

Data Analysis





Falling Head Permeability Test	**ATRI7 6 LTD**	Date of Test: 27/11/2024 Logged By: GK Checked By: NS	BROWNFIELD SOLUTIONS LTD
	VISION		
WS210	C5504		

Calculation of Intake Factor (F)

		Test 1	Test 2	Test 3
m^2	Cross sectional area of base	0.008	0.008	
m	Diameter	0.100	0.100	
m	Length	1.150	1.150	
	Intake Factor Scenario	Soil flush with bottom in uniform soil		
	Intake Factor, F	**0.275**	**0.275**	-

Soil Infiltration Rate Calculation

		Test 1	Test 2	Test 3
75% Effective Level	Head (m)	0.975	0.975	
	Depth to water (m bgl)	0.675	0.665	
	Time (mins)	0.25	0.30	
	Time (sec)	15	18	
25% effective Level	Head (m)	0.325	0.325	
	Depth to water (m bgl)	1.325	1.315	
	Time (mins)	27.00	30.00	
	Time (sec)	1620	1800	
m (bgl)	Initial groundwater level	1.65	1.64	
m (bgl)	At time (t_1) Depth to water	0.675	0.665	
seconds	t_1	15	18	
m (bgl)	Depth of water H_1	0.975	0.975	
m (bgl)	At time (t_2) Depth to water	1.325	1.315	
seconds	t_2	1620	1800	
m (bgl)	Depth of water H_2	0.325	0.325	

$$Permeability = k = \frac{A}{F(t_2 - t_1)} Log_e \frac{H_1}{H_2}$$

	Test 1	Test 2	Test 3
Permeability, k (m/s)	**1.95E-05**	**1.76E-05**	-

APPENDIX E

Monitoring Results

Ground Gas Monitoring Results

BROWNFIELD SOLUTIONS LTD

CLIENT:	Date	Operator	Analsyer	Weather Observations			Temp (°C)	Pressure Trend	Min Barometric Pressure (mb)	Notes
ATRI7 6 LTD	19/11/2024	AR	GFM436	Overcast	No wind	Cold	3	Rising	996	
JOB NO.	03/12/2024	AR	GFM436	Sunny	No wind	Cold	2	Falling	1017	
C5540	16/12/2024	TW	GFM436	Overcast	No wind	Cool	11	Falling	1023	
SITE:	07/01/2025	AR	GFM436	Intermittent cloud	No wind	Cool	3	Rising	992	
VISION, MANCHESTER	24/01/2025	SJ	GFM436	Sunny	Heavy gusts	Cold	6	Rising	980	
	07/02/2025	SJ	GFM436	Overcast	Light breeze	Cold	6	Falling	1027	

Notes: mb = milibars; CH_4 = methane; LEL = lower explosive limit = 5%v/v; CO_2 = carbon dioxide; O_2 = oxygen; CO=carbon monoxide; H_2S = hydrogen sulphide; TVOC= Total volatile organic compounds; PPM = parts per million. Where the flow is less than the limit of detection of the instrument, the detection limit is reported (Highlighted in green). Gas Screening Values (GSVs) are rounded to 3 decimal places. Calibration Records for analysers used availble on request.

Date	Time	Location	Response zone (m)		Pressures (mb)		Gas flows (l/hr)		CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes
					Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H_2S	TVOC (PID)					
					Summary Statistcs																			
				Max. values:	1029	0.0	3.1	0.0	0.0	0.0	8.0	6.0	3.2	1.0	20.6	20.5	0.0	0.0	0.0	9.3	13.0	0.000	0.000	Highlight Box - Methane >1.0% v/v
				Min. values:	980	0.0	0.0	0.0	-0.4	-0.3	0.0	0.0	0.0	0.0	7.2	8.0	0.0	0.0	0.0	1.3	1.6	0.000	0.000	Highlight Box - Carbon Dioxide >5.0% v/v
			Top	Bottom	Worst-case (note - not worst credible) GSVs based on maximum recorded steady flow and maximum individual peak concentrations:																	0.000	0.003	Highlight Box - Water above Response Zone
19/11/2024	PM	Ambient			997																			
		BH201	6.00	13.00		0.0	0.0	0.0	-0.3	-0.3	6.0	6.0	0.3	0.0	12.5	19.1	0.0	0.0		9.27	12.73	0.000	0.000	
		WS202	0.50	3.50		0.0	3.1	0.0	-0.3	-0.3	6.0	6.0	0.0	0.0	7.8	9.0	0.0	0.0		NGW	3.37	0.000	0.000	
		WS207A	0.50	3.50		0.0	0.0	0.0	-0.3	-0.3	6.0	6.0	0.0	0.0	8.1	12.5	0.0	0.0		NGW	3.39	0.000	0.000	
		BH202	6.00	13.00		0.0	0.0	0.0	-0.4	-0.3	8.0	6.0	0.7	0.1	13.9	19.7	0.0	0.0		9.25	12.74	0.000	0.000	
		WS210	0.5	1.50		0.0	0.0	0.0	-0.3	-0.3	6.0	6.0	0.0	0.0	17.1	18.3	0.0	0.0		NGW	1.61	0.000	0.000	
		Ambient			996																			
03/12/2024	AM	Ambient			1019				0.0		0.0		0.0		20.0									
		BH201	6.00	13.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	18.5	20.0	0.0	0.0		9.24	12.75	0.000	0.000	
		WS202	0.50	3.50		0.0	0.0	0.0	-0.1	-0.1	2.0	2.0	0.0	0.0	7.2	11.1	0.0	0.0		NGW	3.30	0.000	0.000	
		WS207A	0.50	3.50		0.0	0.0	0.0	-0.1	-0.1	2.0	2.0	0.3	0.0	14.7	18.1	0.0	0.0		NGW	3.39	0.000	0.000	
		BH202	6.00	13.00																				Inaccessable due to puddle.
		WS210	0.5	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	18.9	0.0	0.0		NGW	1.59	0.000	0.000	
		Ambient			1017																			
16/12/2024	AM	Ambient			1023																			
		BH201	6.00	13.00			0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	18.3	19.7	0.0	0.0		8.02	13.00	0.000	0.000	
		WS202	0.50	3.50			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	8.0	0.0	0.0		2.40	3.30	0.000	0.000	
		WS207A	0.50	3.50			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	12.4	0.0	0.0		1.30	3.40	0.000	0.000	
		BH202	6.00	13.00																				Inaccessable due to puddle.
		WS210	0.50	1.50			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	19.7	0.0	0.0		NGW	1.60	0.000	0.000	
		Ambient			1023																			
07/01/2025		Ambient			994					0.0		0.0		0.0		20.3								
		BH201	6.00	13.00				0.0		0.0		0.0		0.6		19.2				8.85	13.00	0.000	0.000	Test point submerged, steady readings only
		WS202	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	9.7	0.0	0.0		NGW	3.29	0.000	0.000	
		WS207A	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	13.8	0.0	0.0		NGW	3.38	0.000	0.000	
		BH202	6.00	13.00																				BH covered by puddle
		WS210	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	18.0	0.0	0.0		NGW	1.60	0.000	0.000	
		Ambient			992					0.0		0.0		0.0		20.1								

Ground Gas Monitoring Results

BROWNFIELD SOLUTIONS LTD

Date	Time	Location	Response zone (m)		Pressures (mb)		Gas flows (l/hr)		CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes
					Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H_2S	TVOC (PID)					
24/01/2025		Ambient			980					0.0		0.0		0.0		20.5								
		BH201	6.00	13.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	1.0	14.1	18.4	0.0	0.0		8.92	12.98	0.000	0.000	
		WS202	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	19.3	0.0	0.0		NGW	3.38	0.000	0.000	
		WS207A	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	13.2	0.0	0.0		NGW	3.44	0.000	0.000	
		BH202	6.00	13.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	16.0	20.1	0.0	0.0		8.92	12.90	0.000	0.000	
		WS210	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	17.5	0.0	0.0		NGW	1.63	0.000	0.000	
		Ambient			981					0.0		0.0		0.0		20.4								
07/02/2025		Ambient			1029				0.0		0.0		0.0		20.6									
		BH201	6.00	13.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.6	12.1	19.2	0.0	0.0		9.01	12.93	0.000	0.000	
		WS202	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	17.2	0.0	0.0		NGW	3.32	0.000	0.000	
		WS207A	0.50	3.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	10.8	0.0	0.0		NGW	3.39	0.000	0.000	
		BH202	6.00	13.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	18.2	20.1	0.0	0.0		8.01	12.89	0.000	0.000	
		WS210	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	19.7	0.0	0.0		NGW	1.59	0.000	0.000	
		Ambient			1027				0.0		0.0		0.0		20.5									

APPENDIX F

Waste Assessment 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:

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

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

EZ1I1-RSBVZ-2UR4Y

Report is invalid if pages are removed.

Job name

C5504 Vision

Description/Comments

Project

C5504

Site

Vision

Classified by

Name:
Jack Mather
Date:
16 Dec 2024 13:31 GMT
Telephone:
01606334844

Company:
Brownfield Solutions Limited
173-183 Witton Street
Northwich
CW9 5LP

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: **CERTIFIED**

Course	Date
Hazardous Waste Classification	09 Feb 2023

Next 3 year Refresher due by Feb 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Whitworth Street West, Manchester **Post Code** M1 5NZ

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

Redevelopment of brownfield site currently used as a storage area for building materials.

Description of the specific process, sub-process and/or activity that created the waste

Waste created during the excavation of soils for ground investigation.

Description of the waste

A mixture of made ground comprising brown gravelly clayey sand, natural sand and clay and sandstone.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS201	0.05-1.00	Non Hazardous		3
2	WS205d	0.00-1.00	Non Hazardous		5
3	TP201	0.00-1.00	Non Hazardous		8
4	TP208	0.00-1.00	Non Hazardous		10
5	BH201	0.05-0.80	Non Hazardous		13
6	BH202	0.00-1.00	Non Hazardous		15
7	TP205	1.50-2.00	Non Hazardous		17
8	WS207b	3.80-4.20	Non Hazardous		18
9	WS208	2.50-3.00	Non Hazardous		19
10	WS210	1.50-1.80	Non Hazardous		20
11	BH201[2]	6.70-6.80	Non Hazardous		21
12	BH201[3]	10.00-10.20	Non Hazardous		22
13	BH201[4]	17.72-17.80	Non Hazardous		23
14	BH202[2]	14.00-14.20	Non Hazardous		24
15	BH202[3]	24.00-24.10	Non Hazardous		25
16	WS205d[2]	3.00-3.60	Non Hazardous		26

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jack Mather

Created date: 16 Dec 2024 13:31 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	27
Appendix B: Rationale for selection of metal species	28
Appendix C: Version	28

Classification of sample: WS201

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

Sample details

Sample name:
WS201
Sample Depth:
0.05-1.00 m
Moisture content:
7.9%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.9% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		11	pH		11	pH	11pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9.1	mg/kg	1.32	11.066	mg/kg	0.00111 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3	mg/kg	1.285	0.355	mg/kg	0.0000276 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16	mg/kg	1.462	21.537	mg/kg	0.00215 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		51	mg/kg	1.126	52.884	mg/kg	0.00529 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	78	mg/kg		71.838	mg/kg	0.00718 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.4	mg/kg	1.353	0.499	mg/kg	0.0000499 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		15	mg/kg	1.579	21.821	mg/kg	0.00218 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		67	mg/kg	2.469	152.373	mg/kg	0.0152 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.79	mg/kg		0.728	mg/kg	0.0000728 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.15	mg/kg		0.138	mg/kg	0.0000138 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.58	mg/kg		0.534	mg/kg	0.0000534 %	✓	

#		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									
15		fluorene				0.61	mg/kg		0.562	mg/kg	0.0000562 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				4.8	mg/kg		4.421	mg/kg	0.000442 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.96	mg/kg		0.884	mg/kg	0.0000884 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				5.4	mg/kg		4.973	mg/kg	0.000497 %	✓	
			205-912-4	206-44-0									
19		pyrene				5.2	mg/kg		4.789	mg/kg	0.000479 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.6	mg/kg		2.395	mg/kg	0.000239 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.5	mg/kg		2.303	mg/kg	0.00023 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.3	mg/kg		2.118	mg/kg	0.000212 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.3	mg/kg		1.197	mg/kg	0.00012 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.5	mg/kg		2.303	mg/kg	0.00023 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.1	mg/kg		1.013	mg/kg	0.000101 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.23	mg/kg		0.212	mg/kg	0.0000212 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.3	mg/kg		1.197	mg/kg	0.00012 %	✓	
			205-883-8	191-24-2									
										Total:	0.0367 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS205d

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

Sample details

Sample name:
WS205d
Sample Depth:
0.00-1.00 m
Moisture content:
9.8%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		10.2	pH		10.2	pH	10.2 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8.1	mg/kg	1.32	9.647	mg/kg	0.000965 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3	mg/kg	1.285	0.348	mg/kg	0.0000271 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	19.775	mg/kg	0.00198 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		30	mg/kg	1.126	30.467	mg/kg	0.00305 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	59	mg/kg		53.218	mg/kg	0.00532 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		13	mg/kg	1.579	18.521	mg/kg	0.00185 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		70	mg/kg	2.469	155.911	mg/kg	0.0156 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.12	mg/kg		0.108	mg/kg	0.0000108 %	✓	
13	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
14	acenaphthene		201-469-6	83-32-9		0.17	mg/kg		0.153	mg/kg	0.0000153 %	✓	

#		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									
15		fluorene				0.15	mg/kg		0.135	mg/kg	0.0000135 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				1.4	mg/kg		1.263	mg/kg	0.000126 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.32	mg/kg		0.289	mg/kg	0.0000289 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				2.3	mg/kg		2.075	mg/kg	0.000207 %	✓	
			205-912-4	206-44-0									
19		pyrene				2.3	mg/kg		2.075	mg/kg	0.000207 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.1	mg/kg		0.992	mg/kg	0.0000992 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.1	mg/kg		0.992	mg/kg	0.0000992 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.2	mg/kg		1.082	mg/kg	0.000108 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.62	mg/kg		0.559	mg/kg	0.0000559 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.1	mg/kg		0.992	mg/kg	0.0000992 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.6	mg/kg		0.541	mg/kg	0.0000541 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.09	mg/kg		0.0812	mg/kg	0.00000812 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.66	mg/kg		0.595	mg/kg	0.0000595 %	✓	
			205-883-8	191-24-2									
28		TPH (C6 to C40) petroleum group				84	mg/kg		75.768	mg/kg	0.00758 %	✓	
				TPH									
29		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
30		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
31		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
32		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.00758%)

Classification of sample: TP201

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

Sample details

Sample name:
TP201
Sample Depth:
0.00-1.00 m
Moisture content:
9.6%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.6% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		10.7	pH		10.7	pH	10.7 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11	mg/kg	1.32	13.129	mg/kg	0.00131 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.4	mg/kg	1.285	0.465	mg/kg	0.0000362 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	26.425	mg/kg	0.00264 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		48	mg/kg	1.126	48.855	mg/kg	0.00489 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	78	mg/kg		70.512	mg/kg	0.00705 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16	mg/kg	1.579	22.846	mg/kg	0.00228 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		100	mg/kg	2.469	223.224	mg/kg	0.0223 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.55	mg/kg		0.497	mg/kg	0.0000497 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.14	mg/kg		0.127	mg/kg	0.0000127 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.38	mg/kg		0.344	mg/kg	0.0000344 %	✓	

#		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									
15		fluorene				0.44	mg/kg		0.398	mg/kg	0.0000398 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				3.6	mg/kg		3.254	mg/kg	0.000325 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.71	mg/kg		0.642	mg/kg	0.0000642 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				4.2	mg/kg		3.797	mg/kg	0.00038 %	✓	
			205-912-4	206-44-0									
19		pyrene				4.1	mg/kg		3.706	mg/kg	0.000371 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.1	mg/kg		1.898	mg/kg	0.00019 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.1	mg/kg		1.898	mg/kg	0.00019 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.9	mg/kg		1.718	mg/kg	0.000172 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.1	mg/kg		0.994	mg/kg	0.0000994 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2	mg/kg		1.808	mg/kg	0.000181 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.86	mg/kg		0.777	mg/kg	0.0000777 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.16	mg/kg		0.145	mg/kg	0.0000145 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.1	mg/kg		0.994	mg/kg	0.0000994 %	✓	
			205-883-8	191-24-2									
										Total:	0.0434 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP208

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

Sample details

Sample name:
TP208
Sample Depth:
0.00-1.00 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		8.4	pH		8.4	pH	8.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		24	mg/kg	1.32	26.301	mg/kg	0.00263 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7	mg/kg	1.285	0.747	mg/kg	0.0000581 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16	mg/kg	1.462	19.409	mg/kg	0.00194 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		110	mg/kg	1.126	102.794	mg/kg	0.0103 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	270	mg/kg		224.1	mg/kg	0.0224 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.9	mg/kg	1.353	1.011	mg/kg	0.000101 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21	mg/kg	1.579	27.531	mg/kg	0.00275 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		180	mg/kg	2.469	368.913	mg/kg	0.0369 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		7.1	mg/kg		5.893	mg/kg	0.000589 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.23	mg/kg		0.191	mg/kg	0.0000191 %	✓	
14	acenaphthene		201-469-6	83-32-9		6.7	mg/kg		5.561	mg/kg	0.000556 %	✓	

#		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									
15		fluorene				5.4	mg/kg		4.482	mg/kg	0.000448 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				32	mg/kg		26.56	mg/kg	0.00266 %	✓	
			201-581-5	85-01-8									
17		anthracene				7.9	mg/kg		6.557	mg/kg	0.000656 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				21	mg/kg		17.43	mg/kg	0.00174 %	✓	
			205-912-4	206-44-0									
19		pyrene				22	mg/kg		18.26	mg/kg	0.00183 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				11	mg/kg		9.13	mg/kg	0.000913 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				10	mg/kg		8.3	mg/kg	0.00083 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				9.8	mg/kg		8.134	mg/kg	0.000813 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				3.4	mg/kg		2.822	mg/kg	0.000282 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				9.1	mg/kg		7.553	mg/kg	0.000755 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				3.4	mg/kg		2.822	mg/kg	0.000282 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.9	mg/kg		0.747	mg/kg	0.0000747 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				4	mg/kg		3.32	mg/kg	0.000332 %	✓	
			205-883-8	191-24-2									
28		TPH (C6 to C40) petroleum group				199.6	mg/kg		165.668	mg/kg	0.0166 %	✓	
				TPH									
29		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
30		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
31		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
32		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**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:	0.107 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.0166%)

Classification of sample: BH201

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

Sample details

Sample name:
BH201
Sample Depth:
0.05-0.80 m
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		10.1	pH		10.1	pH	10.1 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		12	mg/kg	1.32	13.784	mg/kg	0.00138 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.5	mg/kg	1.285	0.559	mg/kg	0.0000435 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		17	mg/kg	1.462	21.616	mg/kg	0.00216 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		98	mg/kg	1.126	95.993	mg/kg	0.0096 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	100	mg/kg		87	mg/kg	0.0087 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.4	mg/kg	1.353	0.471	mg/kg	0.0000471 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		15	mg/kg	1.579	20.612	mg/kg	0.00206 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		120	mg/kg	2.469	257.795	mg/kg	0.0258 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.17	mg/kg		0.148	mg/kg	0.0000148 %	✓	
14	acenaphthene		201-469-6	83-32-9		1.7	mg/kg		1.479	mg/kg	0.000148 %	✓	

#		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									
15	●	fluorene				1.5	mg/kg		1.305	mg/kg	0.000131 %	✓	
			201-695-5	86-73-7									
16	●	phenanthrene				11	mg/kg		9.57	mg/kg	0.000957 %	✓	
			201-581-5	85-01-8									
17	●	anthracene				2.7	mg/kg		2.349	mg/kg	0.000235 %	✓	
			204-371-1	120-12-7									
18	●	fluoranthene				10	mg/kg		8.7	mg/kg	0.00087 %	✓	
			205-912-4	206-44-0									
19	●	pyrene				10	mg/kg		8.7	mg/kg	0.00087 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				4.6	mg/kg		4.002	mg/kg	0.0004 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				4.4	mg/kg		3.828	mg/kg	0.000383 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				4.8	mg/kg		4.176	mg/kg	0.000418 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.5	mg/kg		1.305	mg/kg	0.000131 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				4.4	mg/kg		3.828	mg/kg	0.000383 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				1.9	mg/kg		1.653	mg/kg	0.000165 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.35	mg/kg		0.305	mg/kg	0.0000305 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				2.2	mg/kg		1.914	mg/kg	0.000191 %	✓	
			205-883-8	191-24-2									
										Total:	0.0557 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH202

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

Sample details

Sample name:
BH202
Sample Depth:
0.00-1.00 m
Moisture content:
8.8%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		11.1	pH		11.1	pH	11.1 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11	mg/kg	1.32	13.246	mg/kg	0.00132 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.5	mg/kg	1.285	0.586	mg/kg	0.0000456 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19	mg/kg	1.462	25.326	mg/kg	0.00253 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		100	mg/kg	1.126	102.681	mg/kg	0.0103 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	120	mg/kg		109.44	mg/kg	0.0109 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16	mg/kg	1.579	23.048	mg/kg	0.0023 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		140	mg/kg	2.469	315.28	mg/kg	0.0315 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.39	mg/kg		0.356	mg/kg	0.0000356 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.12	mg/kg		0.109	mg/kg	0.0000109 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.49	mg/kg		0.447	mg/kg	0.0000447 %	✓	

#		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									
15	●	fluorene				0.46	mg/kg		0.42	mg/kg	0.000042 %	✓	
			201-695-5	86-73-7									
16	●	phenanthrene				3.8	mg/kg		3.466	mg/kg	0.000347 %	✓	
			201-581-5	85-01-8									
17	●	anthracene				0.89	mg/kg		0.812	mg/kg	0.0000812 %	✓	
			204-371-1	120-12-7									
18	●	fluoranthene				4.1	mg/kg		3.739	mg/kg	0.000374 %	✓	
			205-912-4	206-44-0									
19	●	pyrene				4.1	mg/kg		3.739	mg/kg	0.000374 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.9	mg/kg		1.733	mg/kg	0.000173 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.9	mg/kg		1.733	mg/kg	0.000173 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.1	mg/kg		1.915	mg/kg	0.000192 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.7	mg/kg		0.638	mg/kg	0.0000638 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2	mg/kg		1.824	mg/kg	0.000182 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				0.9	mg/kg		0.821	mg/kg	0.0000821 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.14	mg/kg		0.128	mg/kg	0.0000128 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				1.1	mg/kg		1.003	mg/kg	0.0001 %	✓	
			205-883-8	191-24-2									
										Total:	0.0618 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP205

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

Sample details

Sample name:
TP205
Sample Depth:
1.50-2.00 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% 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		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS207b

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

Sample details

Sample name:
WS207b
Sample Depth:
3.80-4.20 m
Moisture content:
7.8%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.8% 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		PH		8.1 pH		8.1 pH	8.1 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS208

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

Sample details

Sample name:
WS208
Sample Depth:
2.50-3.00 m
Moisture content:
6.6%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.6% 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		PH		7.7 pH		7.7 pH	7.7 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS210

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

Sample details

Sample name:
WS210
Sample Depth:
1.50-1.80 m
Moisture content:
4.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 4.4% 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		PH		7.7 pH		7.7 pH	7.7 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH201[2]

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

Sample details

Sample name:
BH201[2]
Sample Depth:
6.70-6.80 m
Moisture content:
8%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8% 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				5.7 pH		5.7 pH	5.7 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH201[3]

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

Sample details

Sample name:
BH201[3]
Sample Depth:
10.00-10.20 m
Moisture content:
9.3%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.3% 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		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH201[4]

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

Sample details

Sample name:
BH201[4]
Sample Depth:
17.72-17.80 m
Moisture content:
9.3%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.3% 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				8.5 pH		8.5 pH	8.5 pH		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH202[2]

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

Sample details

Sample name:
BH202[2]
Sample Depth:
14.00-14.20 m
Moisture content:
8.3%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.3% 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		PH		8.5 pH		8.5 pH	8.5 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH202[3]

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

Sample details

Sample name:
BH202[3]
Sample Depth:
24.00-24.10 m
Moisture content:
8.7%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.7% 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				8.6 pH		8.6 pH	8.6 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS205d[2]

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

Sample details

Sample name:
WS205d[2]
Sample Depth:
3.00-3.60 m
Moisture content:
5.1%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.1% 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		PH		8.2 pH		8.2 pH	8.2 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

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.

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

lead compounds with the exception of those specified elsewhere in this Annex

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: 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

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

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

- **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

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Absence of hexavalent chromium indicates it unlikely that lead chromate is present within the site soils.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc sulphate}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2024.347.6405.11699 (12 Dec 2024)
HazWasteOnline Database: 2024.347.6405.11699 (12 Dec 2024)

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
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024

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Analytical Report Number : 24-053872

Project / Site name:	Vision, Manchester	**Samples received on:**	14/11/2024
Your job number:	C5504	**Samples instructed on/ Analysis started on:**	14/11/2024
Your order number:	638	**Analysis completed by:**	21/11/2024
Report Issue Number:	1	**Report issued on:**	21/11/2024
Samples Analysed:	2 10:1 WAC samples		

Signed: [redacted]

Joanna Wawrzeczko
Senior Reporting Specialist
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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-053872
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379534	379535
Sample Reference				WS205d	TP208
Sample Number				None Supplied	None Supplied
Depth (m)				0.00-1.00	0.00-1.00
Date Sampled				04/11/2024	08/11/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	40.2	41.5
Moisture Content	%	0.01	NONE	9.8	17
Total mass of sample received	kg	0.1	NONE	0.8	0.8
General Inorganics					
pH (L005B)	pH Units	N/A	MCERTS	9.6	8.1
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.8	1.5
Loss on Ignition @ 450°C	%	0.2	MCERTS	2.4	4.6
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	43	17
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	0.12	7.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.23
Acenaphthene	mg/kg	0.05	MCERTS	0.17	6.7
Fluorene	mg/kg	0.05	MCERTS	0.15	5.4
Phenanthrene	mg/kg	0.05	MCERTS	1.4	32
Anthracene	mg/kg	0.05	MCERTS	0.32	7.9
Fluoranthene	mg/kg	0.05	MCERTS	2.3	21
Pyrene	mg/kg	0.05	MCERTS	2.3	22
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.1	11
Chrysene	mg/kg	0.05	MCERTS	1.1	10
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.2	9.8
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.62	3.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	9.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.6	3.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.09	0.9
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.66	4
Coronene	mg/kg	0.05	NONE	0.27	1.6
Total PAH					
Total WAC-17 PAHs	mg/kg	0.85	NONE	13.6	155
Petroleum Hydrocarbons					
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	31	< 10
VOCs					
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
Total BTEX	µg/kg	10	MCERTS	< 10	< 10

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-053872
Project / Site name: Vision, Manchester
Your Order No: 638

Lab Sample Number				379534	379535
Sample Reference				WS205d	TP208
Sample Number				None Supplied	None Supplied
Depth (m)				0.00-1.00	0.00-1.00
Date Sampled				04/11/2024	08/11/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
PCBs by GC-MS					
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Waste Acceptance Criteria Analytical Results

Report No:	**24-053872**						
					Client:	**BSL**	
Location	**Vision, Manchester**						
Lab Reference (Sample Number)	379534				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	04/11/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS205d						
Depth (m)	0.00-1.00						
Solid Waste Analysis							
TOC (%)**	0.8				3%	5%	6%
Loss on Ignition (%) **	2.4				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	31				500	--	--
Total PAH (WAC-17) (mg/kg)	13.6				100	--	--
pH (units)**	9.6				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	43				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	0.00106			0.0106	0.5	2	25
Barium *	0.00725			0.0725	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0022			0.022	0.5	10	70
Copper *	0.019			0.19	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00110			0.0110	0.5	10	30
Nickel *	0.00033			0.0033	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	0.0031			0.031	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0010			0.010	4	50	200
Chloride *	0.92			9.2	800	15000	25000
Fluoride*	0.15			1.5	10	150	500
Sulphate *	26			260	1000	20000	50000
TDS*	99			990	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	4.71			47.1	500	800	1000
Leach Test Information							
Stone Content (%)	40.2						
Sample Mass (kg)	0.8						
Dry Matter (%)	90						
Moisture (%)	9.8						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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The results included within the report are representative of the samples submitted for analysis.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-053872**						
					Client:	**BSL**	
Location	**Vision, Manchester**						
Lab Reference (Sample Number)	379535				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	08/11/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP208						
Depth (m)	0.00-1.00						
Solid Waste Analysis							
TOC (%)**	1.5				3%	5%	6%
Loss on Ignition (%) **	4.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	155				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	17				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	0.00548			0.0548	0.5	2	25
Barium *	0.0159			0.159	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0025			0.025	0.5	10	70
Copper *	0.019			0.19	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00206			0.0206	0.5	10	30
Nickel *	0.0011			0.011	0.4	10	40
Lead *	0.011			0.11	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.018			0.18	4	50	200
Chloride *	2.2			22	800	15000	25000
Fluoride*	0.25			2.5	10	150	500
Sulphate *	4.8			48	1000	20000	50000
TDS*	48			480	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.96			79.6	500	800	1000
Leach Test Information							
Stone Content (%)	41.5						
Sample Mass (kg)	0.8						
Dry Matter (%)	83						
Moisture (%)	17						

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

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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The results included within the report are representative of the samples submitted for analysis.

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* 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 *
379534	WS205d	None Supplied	0.00-1.00	Brown loam and sand with gravel and brick
379535	TP208	None Supplied	0.00-1.00	Brown loam and clay with vegetation and stones

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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
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

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Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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.

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 - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Sample Deviation Report

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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.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS205d	N/A	S	379534	c	BTEX and/or Volatile organic compounds in soil	L073B	c
WS205d	N/A	S	379534	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS205d	N/A	S	379534	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088-PL	c

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