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GEO-ENVIRONMENTAL & GEOTECHNICAL ASSESSMENT (GROUND INVESTIGATION) REPORT

Zone 5 & ESA Harwell Campus
Didcot
OX11 0FD

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Report Title: **Geo-environmental & Geotechnical Assessment Ground Investigation Report for Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD**

Report Status: **Final**

Job No: **P4397J2609/SC**

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Version	Date	Issued By	Comment

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CONTENTS

Page

EXECUTIVE SUMMARY

Site Details	**Site Address**	Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD
	National Grid	E: 448164, N: 186576
	Site Area	8.45ha
	Proposed Development	The proposed development is to comprise the construction of new commercial buildings mainly consisting of offices.
Encountered Conditions	**Scope of Works**	The assessment incorporated a desk study to determine the site's setting to inform a preliminary risk assessment followed by an intrusive investigation to confirm the ground and groundwater conditions and support the development of a geotechnical and geo-environmental assessment. As part of the Desk Study (Jomas, August 2022), it was discovered that there were reports of radioactive waste disposal in a former "Catapult Pit" in the south of site, which was subsequently remediated by the UKAEA. The UKAEA were contacted in the hope of acquiring further information, however, no response was received as and such, Jomas' investigation specifically avoided this feature. Similarly, the historic use of the site (military airbase and UKAEA land) means that there is the potential for radioactivity within soils and potential for radon gas. Advice regarding this should be sought from a specialist consultant. Other areas identified as potential hotspots of radioactivity were also purposely avoided as part of Jomas' investigation.
	Ground Conditions	The ground conditions encountered beneath a horizon of topsoil (where applicable) comprised Made Ground to depths ranging between 0.2m to >1.2m, over brown sandy gravelly CLAY / firm greyish white gravelly CLAY (Head Deposits) to depths ranging between 0.5m and >2.0m over Structureless CHALK recovered as very stiff greyish white CLAY (Zig Zag Chalk Formation/West Melbury Marly Chalk Formation to a maximum proven depth of 8.8m.
	Groundwater	Groundwater was not encountered during drilling and subsequent return monitoring.
Geo-environmental Assessment Summary and Recommendations		Following generic risk assessments, no elevated concentrations of contaminants were detected in soils in excess of generic assessment criteria for the protection of human health within a commercial end-use scenario. No asbestos containing materials or fibres were detected in the Made Ground samples analysed in the laboratory. A significant risk to plant growth has not been identified. The risk to end users associated with vapour risk inhalation from soils is considered negligible. A significant risk to controlled waters has not been identified. Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary. WAC testing has indicated topsoil won't be able to go to an inert tip, as would be expected due to high organic content, but that other natural soils should qualify for

<table>
<tr><td colspan="2"></td><td>this (subject to approval by the landfill operator who might request additional testing once soils are stockpiled).

Note that a preliminary waste classification assessment in accordance with WM3 has not been carried out as this was outside of our commissioned scope of works. Made Ground soils have therefore not currently been classified as being either Hazardous or Non-hazardous for off-site disposal purposes.</td></tr>
<tr><td rowspan="4">Geotechnical Considerations</td><td>Foundations</td><td>Based on the ground and groundwater conditions encountered, conventional shallow foundations may be suitable for the proposed development.

It is considered that traditional strip/trench-fill foundations up to 1m wide may be formed within the underlying deposits of Chalk at a minimum depth of 0.9m for an allowable bearing capacity of 110kPa. Alternatively, pad foundations with minimum dimensions of 1.2m x 1.2m could be formed, for an allowable bearing capacity of 160kPa. Total and differential settlements should be contained within tolerable limits.

Foundations must be deepened to found beneath Made Ground or where building near trees in accordance with NHBC guidance for soils of medium volume change potential (Chalk deposits).

Alternatively, a piled foundation would be suitable and indicative pile carrying capacities are given below.

To comply with BS EN 1997 and the guidance given by the Federation of Piling Specialists the ground must be proven to a minimum of 5m below the proposed toe of the piles. Consequently, values below 4mbgl are given indicatively in grey italics and a piling specialist should be consulted.

<table>
<tr><th rowspan="2">Pile toe depth (mbgl)</th><th colspan="3">Pile diameter (mm)</th></tr>
<tr><th>450</th><th>600</th><th>800</th></tr>
<tr><th colspan="4">Indicative Allowable Pile Capacity (kN)</th></tr>
<tr><td>4</td><td>130</td><td>202</td><td>320</td></tr>
<tr><td>6</td><td>224</td><td>341</td><td>529</td></tr>
<tr><td>8</td><td>342</td><td>511</td><td>781</td></tr>
<tr><td>9</td><td>410</td><td>609</td><td>922</td></tr>
</table>
</td></tr>
<tr><td>Sulphates</td><td>Buried concrete for foundations should be designed to Class DS-1 (AC-1).</td></tr>
<tr><td>Ground Floor Slabs</td><td>Given the presence of shrinkable soils, it is recommended that suspended floor slabs are used with an adequate void designed according to NHBC Standards.

As a guide, initial modelling indicates a requirement for a sub-floor void of at least 300mm due to the presence of shrinkable soils of high volume change potential (Head deposits).</td></tr>
<tr><td>Excavations</td><td>Temporary excavations within the Made Ground and granular soils are unlikely to remain stable and some form of temporary support or battering back to a safe angle is likely to be required.

Temporary excavations within the cohesive soils are likely to remain relatively stable in the short term though some spalling may be anticipated.</td></tr>
</table>

		Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.
	Road Pavements	Preliminary CBR design values of 2.5%, 3% and 5% are recommended for pavements constructed within the Made Ground, Head deposits and Chalk, respectively.
	Surface Water Drainage	Based on the results of in-situ soil infiltration testing, conventional soakaways may be suitable but infiltration rates have been found to be variable across the site. Therefore, it is recommended that further testing be undertaken at specific location and depths where soakaways are intended to be installed. A drainage engineer should be consulted for design in accordance with the recommendations provided in BRE DG 365 (2016): Soakaway design.
Recommended Further Work		The following works are recommended: • Production of a Materials Management Plan (MMP) prior to commencement of works to ensure legal compliance of on-site soil movement; • Seek approval of the Generic Quantitative Risk Assessment and Soil Gas Assessment from the Local Authority, NHBC and other relevant stakeholders; • Seek confirmation of the water supply pipe requirements by the appropriate service provider. • Consult a specialist regarding potential risk of radiological contamination in terms of human health and waste disposal.
This Draft Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report ref. P4397J2609.		

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Harwell Campus GP Ltd ("The Client") has commissioned Jomas Associates Ltd ('Jomas') to undertake an investigation of the geotechnical and geo-environmental factors pertaining to the proposed development at a site referred to as Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD (herein referred to as 'the site'). The site's location is presented in Figure 1.

1.1.2 A Phase 1 Desk Study has been produced for the site and issued separately (detailed in Table 1.1 below), followed by an intrusive investigation (detailed in this report).

1.1.3 An intrusive investigation has been undertaken in accordance with Jomas' proposal dated 20 May 2022.

1.2 Proposed Development

1.2.1 The proposed development is to comprise the construction of new commercial buildings mainly consisting of offices. No firm design plans have been decided yet but an indicative site layout has been provided and is included as Figure 3 in Appendix 1.

1.2.2 For the purpose of geo-environmental assessment and selection of generic assessment criteria, the development is considered "commercial".

1.2.3 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation are as follows:

- To undertake an intrusive investigation, to determine the ground and groundwater conditions as well as to assess the nature and extent of contaminants (if any) potentially present at the site;
- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA land contamination risk management (LCRM); and,
- To determine soil properties to inform the preliminary geotechnical assessment for foundations, drainage, excavation stability and recommendations for further action (if required).

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- Intrusive ground investigation to determine shallow ground conditions, and potential for contamination to be present at the site;
- Undertaking of laboratory chemical and geotechnical testing upon samples obtained;

- Return ground gas/groundwater monitoring;
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Previous Documentation

1.5.1 Prior to the commencement of this investigation Jomas prepared a Desk Study for the site, as detailed in Table 1.1:

Table 1.1: Previous Reports

Title	Author	Reference	Date
Desk Study/Preliminary Risk Assessment Report for Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD	Jomas Associates Ltd	P4397J2609/SC Final v1.0	09 August 2022

1.6 Limitations

1.6.1 Jomas has prepared this report for the sole use of Harwell Campus GP Ltd, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas has actual knowledge to the contrary, information obtained from public sources or provided to Jomas by site personnel and other information sources, have been assumed to be correct. Jomas does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.6.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.6.4 Any reports provided to Jomas have been reviewed in good faith. Jomas cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.6.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.6.6 **This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.**

2 DESK STUDY SUMMARY

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	Zone 5 & ESA Harwell Campus
Address of Site	Harwell Didcot OX11 0FD
Approx. National Grid Ref.	448164 186576
Site Area (Approx)	8.45ha
Site Occupation	Mixed recreational sports field and open space
Local Authority	Vale of White Horse District Council
Proposed Site Use	Commercial, predominantly offices

2.2 Site Walkover

2.2.1 A site Walkover survey was undertaken by Jomas on the 25 July 2022.

Table 2.2: Site Description

Area	Item	Details
On-site:	**Current Uses:**	The site is a large overgrown grassy field accessible to the public. No waste was noted on site.
	Evidence of historic uses:	There was no evidence of historic uses of the site.
	Surfaces:	Much of the site is soft landscaping. There are areas of hard cover predominantly for car parking areas or roadways, predominantly in the south of the site. The hard cover is a mixture of concrete, asphalt and block paving.
	Vegetation:	Much of the vegetation around site is either overgrown grass or trees. There are a large number of trees around site, with many located along the eastern and northern site boundaries. None of the vegetation seen appeared to be exhibiting any evidence of distress.
	Topography/Slope Stability:	Overall, the site reduces in level slightly from south to north. A swale is present in the north east of the site. Low bunds are located along the north eastern and northern boundary.

Area	Item	Details
	Drainage:	The site appears to be connected to normal drainage facilities. Drain covers are situated around the site. No obvious evidence of drainage issues.
	Services:	Streetlights observed along the car park boundary. Manhole covers were also observed along the north-eastern and eastern boundary.
	Controlled waters:	No controlled waters were noted on site.
	Tanks:	None observed
Neighbouring land:	**North:**	Fermi Avenue, Ricardo Energy and Environment and Element Six Global Innovation Centre.
	East:	Newbury Road
	South:	Frome Road and trees.
	West:	Road 7, ongoing construction works at Diamond Light Source and ongoing construction works at/beyond the European Space Agency.

2.2.2 Site photographs taken during the site walkover can be found as Figure 2, in Appendix 1.

2.3 Summary of Preliminary Risk Assessment (Desk Study)

2.3.1 As detailed in Table 1.1, a Phase 1 Desk Study report has been produced for the site and issued separately (Jomas Associates Ltd – P4397J2609 – August 2022). The findings of the Phase 1 Desk Study are presented in the following section. Reference should be made to the original reports and documents for further details. Comments made in the following section regarding possible ground conditions on the site and within the surrounding area are based purely on the desk study. Where appropriate, this information will be used in the later sections of this report as supplementary information to assist in the evaluation of the ground conditions and aid the identification of geotechnical and geochemical constraints and hazards that could impact on the scheme.

2.3.2 A review of earliest available (1877) historical map indicates that the site was undeveloped, likely agricultural land. By the map dated 1912, two buildings and a road are shown in the south east of the site. Aerial photography from 1944 indicates the presence of numerous aircraft and runways suggesting a military airfield use. By the 1970s, the runways are no longer shown and a sports field is shown on site. No significant changes then occur up to the most recent maps.

2.3.3 The land within which the site is situated was formerly an RAF airfield, before being taken over by the AERE (later UKAEA). A catapult pit located in the south east of Jomas' study site was constructed by the RAF but then used by AERE as a waste transit pit for the storage of radioactive materials, before being backfilled in the 1950s. At the turn of the millennium, UKAEA investigated and subsequently remediated/restored the catapult pit and infilled it with clean material. The feature is still visible on aerial imagery but was not observed during Jomas' walkover.

2.3.4 The British Geological Survey indicates that the site is directly underlain by superficial deposits of Head. In the south of site, these superficial deposits are underlain by solid deposits of the Zig Zag Chalk Formation which in turn is underlain by deposits of the West Melbury Marly Chalk

Formation. These deposits also subcrop in the north-east of site directly under the Head deposits.

2.3.5 The superficial deposits underlying the site are identified as a Secondary Undifferentiated Aquifer with both underlying solid deposits identified as Principal aquifers.

2.3.6 A review of the Enviro+Geoinsight Report indicates that there are no source protection zones within 500m of the site.

2.3.7 There are no active groundwater, surface water or potable water abstractions reported within 1km of the site.

2.3.8 There are no surface water features or water networks reported within 250m of the site

2.3.9 There are no Environment Agency Zone 2 or Zone 3 floodplains reported within 250m of the site.

2.3.10 Correspondence with the Local Authority revealed that they are aware that chlorinated solvent contamination is present in the groundwater beneath the wider Harwell area from chlorinated organic solvents linked to the disposal of chemical wastes into unlined pits.

2.3.11 It was recommended that an intrusive investigation be undertaken to clarify potential risks to the identified receptors, and assess the extent of made ground soils present at the site.

2.3.12 Soil gas monitoring was not considered necessary given the lack of potential sources of significant ground gas generation.

2.3.13 The conceptual site model is reproduced in Table 2.3 overleaf.

2.3.14 The catapult pit in the south of site has apparently been remediated, but further information has been requested from UKAEA for details of this.

2.3.15 Advice regarding potential radioactivity within soils as a result of past military/UKAEA use should be sought from a specialist consultant.

Table 2.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment

• Potential for contamination associated with previous site use (RAF base/aircraft usage) – on site (S1)
• Potential for Made Ground associated with removal of previous structures (S2)
  ○ Bungalow structures in SE of site
  ○ Runways
• Infilled catapult pit in south of site (S3)
• Low bunds of unknown composition in north and east of site (S4)
• Reported chlorinated solvent contamination within groundwater from disposal of waste in unlined pits – off site (S5)
	• Ingestion and dermal contact with contaminated soil (P1)
	• Inhalation or contact with potentially contaminated dust and vapours (P2)
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
		• Construction workers (R1)
		• Maintenance workers (R2)
		• Neighbouring site users (R3)
		• Future site users (R4)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
			Medium	Low	Moderate	GI – Ground Investigation
						
						*Assessment relates to typical ground gases of carbon dioxide and methane only. Possible risk associated with radon gas resulting from historic military/atomic energy use may require specialist assessment.

	• Accumulation and migration of soil gases (P5)		Severe	Unlikely*	Low*	
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3) • Horizontal and vertical migration of contaminants within groundwater (P4)	• Neighbouring site users (R3) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled Waters- Principal aquifer in the Zig Zag Chalk Formation and West Melbury Marly Chalk Formation (R6)	Medium	Low	Moderate	

3 GROUND INVESTIGATION

3.1 Scope of Works

3.1.1 A ground investigation was undertaken between 7th September and 15th September.

3.1.2 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, is presented in Table 3.1 below.

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved	Justification
Windowless Sample Boreholes	8	WS1-8	Max depth 2.00m bgl	Obtain shallow samples for laboratory chemical and geotechnical testing. To allow in-situ geotechnical testing.
Cable Percussion Boreholes	7	BH1-7	Max depth 8.80m bgl	Obtain deeper samples for laboratory geotechnical testing. To allow in-situ geotechnical testing.
Trial Pits	16	TP1-16	Max depth 3.50m bgl	Obtain shallow samples for laboratory chemical and geotechnical testing. TP14 and TP15 were completed to allow inspection of an existing buried utility pipe. To allow soil infiltration testing (see below).
Soil Infiltration Testing	5	TP4, TP6, TP11, TP13 and TP16	Max depth 3.50m bgl	To provide infiltration rates and inform the suitability of soakaways.
CBR Testing by DCP method	12	CBR1-12	Max depth 1m bgl	In-situ geotechnical testing to aid preliminary road/pavement design.
Monitoring Wells	12	BH1-7 WS2, WS3, WS5, WS7 and WS8	Max depth 8m bgl	Gas and groundwater monitoring wells.

3.1.3 The ground investigation was undertaken in accordance with British Standard BS5930:2015+A1:2020 "Code of practice for ground investigations", British Standard BS10175:2011+A2:2017 "Investigation of potentially contaminated sites - code of practice", NHBC Standards, Chapter 4.1 and AGS Guidelines for Good Practice in Site Investigations.

3.1.4 Exploratory hole positions are shown on the exploratory hole location plan presented in Figure 2, Appendix 1. The exploratory hole records are included in Appendix 2.

3.1.5 As part of the Desk Study (Jomas, August 2022further information was sought from UKAEA regarding the apparently remediated "catapult pit". However, no response was received as and such, Jomas' investigation specifically avoided this feature.

3.1.6 Where monitoring well installations were not installed, the exploratory holes were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated so that no depression was left.

3.2 In-situ Geotechnical Testing

3.2.1 In-situ geotechnical testing included Standard Penetration Tests. The determined 'N' values have been used to determine the relative density of granular materials and have been used with standard correlations to infer various other derived geotechnical parameters including the undrained shear strength of the cohesive strata. The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

3.2.2 In-situ California Bearing Ratios (CBRs) were determined using a TRL dynamic cone penetrometer (DCP) and the methodology laid out in IAN 73/06. The CBR values have then been calculated using the methodology laid out in both IAN 73/06 and TRL 587. Copies of the test results and calculations are provided in Appendix 7.

3.2.3 The determination of infiltration rates for the underlying ground was undertaken by carrying out tests in general accordance with BRE 365. Copies of the results and calculations are provided in Appendix 6.

3.3 Laboratory Analysis

3.3.1 A programme of laboratory testing, scheduled by Jomas Associates Limited, was carried out on selected samples of Made Ground and natural strata.

Chemical Testing

3.3.2 Chemical testing of soils was undertaken by i2 Analytical Limited, which holds UKAS and MCERTS accreditations for a wide range of determinands.

3.3.3 The samples were analysed for a wide range of contaminants as shown in Table 3.2 below:

Table 3.2: Chemical Tests Scheduled

	No. of tests	
Test Suite	**Made Ground / Topsoil**	**Natural**
Basic Suite 3	6	8
Basic Suite 5	6	1
Hydrocarbon Suite	6	1
Coal Tar	3	1
Asbestos Screen & ID	12	0
Jomas Modified BRE SD-1 Suite	1	14
Waste Acceptance Criteria	2	2

3.3.4 The determinands contained in the Basic Suite 3 are as detailed in Table 3.3 below. Basic Suite 5 contains the same determinands but without the hydrocarbon compounds to avoid overlapping with the extended hydrocarbon testing.

3.3.5 The Hydrocarbon Suite includes TPHCWG, PAH, phenols and VOCs including BTEX & MTBE.

Table 3.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	1	Y (MCERTS)	ICPMS
Cadmium	0.2	Y (MCERTS)	ICPMS
Chromium	1	Y (MCERTS)	ICPMS
Chromium (Hexavalent)	4	Y (MCERTS)	Colorimetry
Lead	1	Y (MCERTS)	ICPMS
Mercury	0.3	Y (MCERTS)	ICPMS
Nickel	1	Y (MCERTS)	ICPMS
Selenium	1	Y (MCERTS)	ICPMS
Copper	1	Y (MCERTS)	ICPMS
Zinc	1	Y (MCERTS)	ICPMS
Boron (Water Soluble)	0.2	Y (MCERTS)	ICPMS
pH Value	0.1 units	Y (MCERTS)	Electrometric
Sulphate (Water Soluble)	0.0125g/l	Y (MCERTS)	Ion Chromatography
Total Cyanide	1	Y (MCERTS)	Colorimetry
Speciated/Total PAH	0.05/0.80	Y (MCERTS)	GCFID
Phenols	1	Y (MCERTS)	HPLC
Total Petroleum Hydrocarbons (banded)	-	N Y (MCERTS)	Gas Chromatography

3.3.6 The laboratory test results are included in Appendix 3.

Geotechnical Laboratory Testing

3.3.7 In addition to the contamination assessment, soil samples were submitted to the UKAS Accredited laboratory of i2 Analytical Ltd. for a series of geotechnical analyses.

3.3.8 This testing was designed to classify the samples and to obtain parameters (either directly or sufficient to allow relevant correlations to be used) relevant to the technical objectives of the investigation.

3.3.9 The following laboratory geotechnical testing was carried out:

Table 3.4: Laboratory Geotechnical Analysis

Methodology	Test Description	Number of tests
BS1377:1990	Moisture Content Determination	30
BS1377:1990	Liquid and Plastic Limit Determination (Atterberg Limits)	30
BS1377:1990	Particle Size Distribution - Sieving	9
BS1377:1990	Method for saturated moisture content of Chalk	6

3.3.10 In addition, 14No. soil samples were analysed for a modified BRE Special Digest 1 suite (acid and water soluble sulphate, total sulphur and pH) to assist with the ACEC classification for buried concrete.

3.3.11 The laboratory test results are included in Appendix 4.

4 GROUND CONDITIONS ENCOUNTERED

4.1 General

4.1.1 A factual record of the conditions encountered during the physical investigation of the site is presented in the following section.

4.2 Ground Conditions

4.2.1 The ground conditions encountered were broadly consistent with those anticipated, i.e. a thickness of Topsoil overlying superficial deposits of Head over the Zig Zag Chalk Formation and/or West Melbury Marly Chalk Formation, and are summarised in Table 4.1 below.

Table 4.1: Ground Conditions Encountered

Stratum and Description	Encountered from (mbgl)	Base of strata (mbgl)	Thickness range (m)
Brown sandy gravel / gravelly clay with occasional rootlets. Sand is fine to coarse. Gravel consists of fine to coarse, angular to subrounded flint and chalk. (MADE GROUND- TOPSOIL)	0.00 – 0.30	0.2 – 1.2	0.2 – >1.2
Concrete/Asphalt *Only encountered within WS1, WS8, TP1, TP2, TP3, TP11* (MADE GROUND)	0.0 – 0.6	0.20 – 0.70	0.10 – 0.30
Gravel comprising angular concrete and asphalt (MADE GROUND) *WS8 only*	0.20	>1.20 [base not proven]	>1.0 [thickness not proven]
Firm greyish white gravelly CLAY. Gravel consists of asphalt fragments. (MADE GROUND) *TP12 only*	0.20	0.55	0.35
Brown sandy gravelly CLAY / firm greyish white gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, angular to subrounded flint and chalk. (HEAD)	0.2 – 0.5	0.5 – >2.0	0.20 - >1.80
Structureless CHALK recovered as very stiff** greyish white CLAY with occasional orange staining. (ZIG ZAG CHALK FORMATION) *BH1-BH2, WS2-WS4, TP1-TP4*	0.5 - 1.6	>1.5 - >8.8 [base not proven]	>0.4 - >7.5 [thickness not proven]
Structureless CHALK recovered as stiff to very stiff** greyish white CLAY with occasional orange staining. (WEST MELBURY MARLY CHALK FORMATION) *BH3 – BH7, WS6-WS7, TP5 – TP14*	0.35 - 1.30	>1.5 - >6.3 [base not proven]	>0.70 - >5.00 [thickness not proven]

***Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature*

4.2.2 The depth of Made Ground was not proven within WS1 or WS8. These locations targeted former runways that were in place when the site was utilised by the RAF. The description of

the Made Ground and refusal of windowless sampling drilling equipment in these locations is indicative of the remnants of these historic features.

4.3 Groundwater

4.3.1 No groundwater strikes were noted during the intrusive ground investigation.

4.3.2 4No. return groundwater monitoring visits were carried out between 21st September and 12th October 2022. The results are presented in Appendix 5 and are summarised below.

Table 4.2: Groundwater Monitoring Summary

Exploratory Hole ID	Depth Encountered (mbgl)	Depth to Base of Well – as gauged (mbgl)	Strata targeted by response zone
BH1	DRY	7.84 - 7.90	Head and Zig Zag Chalk Formation Chalk
BH2	DRY	6.63 - 6.70	Zig Zag Chalk Formation Chalk
BH3	DRY	4.84 - 5.88	Head and West Melbury Chalk Formation
BH4	DRY	5.30 - 5.32	West Melbury Chalk Formation
BH5	DRY	4.41	West Melbury Chalk Formation
BH6	DRY	4.37 - 4.41	West Melbury Chalk Formation
BH7	DRY	4.30 - 4.43	West Melbury Chalk Formation
WS2	DRY	1.71 - 1.77	Zig Zag Chalk Formation Chalk
WS5	DRY	1.90 - 1.93	Head
WS7	DRY	1.75	West Melbury Chalk Formation
WS8	DRY	0.70 - 0.74	Made Ground

4.3.3 It should be noted that changes in groundwater levels can occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a standpipe or piezometer installed within appropriate response zones. Changes in groundwater level can have a direct effect on excavation stability and dewatering requirements, and cohesive soils can soften under rising or high groundwater levels.

4.4 Physical and Olfactory Evidence of Contamination

4.4.1 With the exception of asphalt fragment noted within the Made Ground of WS1, WS8 and TP12, no other visual or olfactory evidence of potential contamination was identified within the investigation positions.

4.5 Limitations

4.5.1 During the intrusive ground investigation, the 7No. cable percussive boreholes all refused at depths of between 5m bgl and 8.8m bgl on hard deposits of chalk. The boreholes were terminated after between 30 and 50 minutes of chiselling.

4.5.2 As discussed above in paragraph 4.2.2, WS1 and WS8 refused in Made Ground deposits at depths of 0.7m and 1.2m bgl. All other windowless sampling holes refused at 2m bgl due hard deposits of chalk.

4.5.3 The possible presence of natural and/or manmade obstructions on site cannot be discounted.

5 RISK ASSESSMENT – ANALYTICAL FRAMEWORK

5.1 Context and Objectives

5.1.1 This section seeks to evaluate the level of chronic risk pertaining to human health and the environment which may result from both the existing use and proposed future use of the site. It makes use of the ground investigation findings, as described in the previous sections, to evaluate further the potential pollutant linkages identified in the desk study. A combination of qualitative and quantitative techniques is used, as described below.

5.1.2 The purpose of generic quantitative risk assessment is to compare concentrations of contaminants found on site against generic assessment criteria (GAC) to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed assessment is required. The approaches detailed all broadly fit within a tiered assessment structure in line with the framework set out in the Department of Environment, Food and Rural Affairs (DEFRA), EA and Institute for Environment and Health Publication, Guidelines for Environmental Risk Assessment and Management.

5.2 Analytical Framework – Soils

5.2.1 There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

5.2.2 The soil analytical test results have been compared to Suitable 4 Use Levels (S4UL) published by the Chartered Institute of Environmental Health in order to assess the potential long-term risks to human health posed by contaminants in the soils. S4UL'S have been derived for a range of land uses and Soil Organic Matter contents. They represent the minimal or tolerable risk, above which further assessment of the risks or remedial action may be required.

5.2.3 In the absence of a S4UL recommended concentration, other available general assessment criteria (GAC), including the Category 4 Screening Levels (C4SL) published by DEFRA have been used. Site-specific assessments are undertaken wherever possible and/or applicable. All assessments are carried out in accordance with the CLEA protocol.

5.2.4 The assessment criteria used for the screening of determinands within soils are identified within Table 5.1.

Table 5.1: Selected Assessment Criteria - Contaminants in Soils

Substance Group	Determinand(s)	Assessment Criteria Selected
Organic Substances		
Non-halogenated Hydrocarbons	Total Petroleum Hydrocarbons (TPHCWG banded)	S4UL
	Total Phenols	S4UL
Polycyclic Aromatic Hydrocarbons (PAH-16)	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene	S4UL
Volatile Organic Compounds (VOCs/sVOCs).	Toluene, Ethylbenzene, Benzene, Xylenes	S4UL
Inorganic Substances		
Heavy Metals and Metalloids	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc	S4UL
	Copper, Zinc, Nickel	BS: 3882 (2015).
Cyanides	Free Cyanide	CLEA v1.06
Sulphates	Water Soluble Sulphate	BRE Special Digest 1:2005

5.2.5 It is understood that the site is to be converted to provide commercial units (mainly offices) with associated soft landscaping. As a result, the site has been assessed with regards to a commercial end use scenario.

5.2.6 Published GAC have been selected as those derived assuming a SOM of 1% to allow for a conservative assessment.

5.3 BRE

5.3.1 The BRE Special Digest 1:2005, 'Concrete in Aggressive Ground' is used with soluble sulphate and pH results to assess the aggressive chemical environment of future underground concrete structures at the site.

5.4 Analytical Framework – Groundwater and Leachate

5.4.1 The requirement to protect groundwater from pollution is outlined in Groundwater Protection: Principles and Practice (GP3, EA, August 2013, v1.1).

5.4.2 Where undertaken, the groundwater quality analysis comprises a Level 1 assessment in accordance with the EA Remedial Targets Methodology Document (EA, 2006).

5.4.3 The criteria used by Jomas' in the Level 1 assessment of groundwater and leachate quality are shown in Table 5.2.

Table 5.2: Selected Assessment Criteria - Contaminants in Water

Substance Group	Determinand(s)	Assessment Criteria Selected
Metals	Arsenic, Boron, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel,	EQS/DWS
	Zinc	EQS
	Selenium	DWS
PAHs	Sum of Four – benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene	DWS
PAH	Anthracene, Naphthalene	EQS
PAHs	Benzo(a)pyrene	EQS/ DWS
PAHs	Remainder	LEC
Total Petroleum Hydrocarbons	Aliphatic C5-C6, Aliphatic >C6-C8, Aliphatic >C8-C10. Aliphatic >C10-C12, Aliphatic >C12-C16, Aliphatic >C16-C21, Aromatic C5-C7, Aromatic >C7-C8, Aromatic >C8-C10, Aromatic >C10-C12, Aromatic >C12-C16, Aromatic >C16-C21, Aromatic> C21-C35	/WHO
Benzene	Benzene	EQS/ DWS
Toluene	Toluene	EQS/ WHO
Ethylbenzene	Ethylbenzene	WHO
Xylene	Xylene	EQS/WHO

Environmental Quality Standards EQS

Environmental Quality Standards (EQS) have been released by the EA for dangerous substances, as identified by the EC Dangerous Substances Directive. EQS can vary for each substance, for the hardness of the water and can be different for fresh, estuarine or coastal waters.

WHO Health

These screening criteria have been taken from the World Health Organisation Guidelines for Drinking Water Quality (2017). The health value is a guideline value representing the concentration of a contaminant that does not result in any significant risk to the receptor over a lifetime of exposure.

Further criteria have been obtained from 'Petroleum Products in Drinking-water' - Background document for development of WHO Guidelines for Drinking-water Quality (2005).

UK Drinking Water Standards (DWS)

These comprise screening criteria provided by the Drinking Water Inspectorate (DWI) in the Water Supply (Water Quality) Regulations 2018.

6 GENERIC QUANTITATIVE RISK ASSESSMENT – SOIL DATA

6.1 Screening of Soil Chemical Analysis Results – Human Health Risk Assessment

6.1.1 Laboratory analysis for soils is summarised in Table 6.1 to Table 6.4. Raw laboratory data is included in Appendix 3.

6.1.2 Results have been screened against generic assessment criteria for a "commercial" end use, assuming 1% soil organic matter.

Table 6.1: Soil Laboratory Test Results - Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No. Exceeding
Arsenic	mg/kg	21	S4UL	640	5.9	24	0
Cadmium	mg/kg	21	S4UL	190	<0.2	0.5	0
Chromium	mg/kg	21	S4UL	8600	12	50	0
Lead	mg/kg	21	C4SL	2330	6.4	98	0
Mercury	mg/kg	21	S4UL	320	<0.3	<0.3	0
Nickel	mg/kg	21	S4UL	980	9.4	46	0
Copper	mg/kg	21	S4UL	68000	4	31	0
Zinc	mg/kg	21	S4UL	730000	25	350	0
Total Cyanide [A]	mg/kg	21	CLEA v 1.06	33	<1	<1	0
Selenium	mg/kg	21	S4UL	12000	<1.0	<1.0	0
Boron Water Soluble	mg/kg	21	S4UL	240000	0.4	3.3	0
Phenols	mg/kg	21	S4UL	440	<1	1.2	0

Notes: [A] Generic assessment criteria derived for free inorganic cyanide.

Table 6.2: Soil Laboratory Test Results - Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Naphthalene	mg/kg	21	S4UL	190	<0.05	2.8	0
Acenaphthylene	mg/kg	21	S4UL	83000	<0.05	<0.05	0
Acenaphthene	mg/kg	21	S4UL	84000	<0.05	6.5	0
Fluorene	mg/kg	21	S4UL	63000	<0.05	4.5	0
Phenanthrene	mg/kg	21	S4UL	22000	<0.05	46	0
Anthracene	mg/kg	21	S4UL	520000	<0.05	12	0
Fluoranthene	mg/kg	21	S4UL	23000	<0.05	34	0
Pyrene	mg/kg	21	S4UL	54000	<0.05	27	0
Benzo(a)anthracene	mg/kg	21	S4UL	170	<0.05	11	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Chrysene	mg/kg	21	S4UL	350	<0.05	9	0
Benzo(b)fluoranthene	mg/kg	21	S4UL	44	<0.05	8.5	0
Benzo(k)fluoranthene	mg/kg	21	S4UL	1200	<0.05	3.8	0
Benzo(a)pyrene	mg/kg	21	S4UL	35	<0.05	7.4	0
Indeno(123-cd)pyrene	mg/kg	21	S4UL	500	<0.05	2.9	0
Dibenzo(ah)anthracene	mg/kg	21	S4UL	3.5	<0.05	0.85	0
Benzo(ghi)perylene	mg/kg	21	S4UL	3900	<0.05	3.2	0
Total PAH	mg/kg	21	-	-	<0.8	179.5	-

Table 6.3: Soil Laboratory Test Results - Total Petroleum Hydrocarbons (TPH)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C_8-C_{10}	mg/kg	14	S4UL	2000	<0.1	<0.1	0
>C_{10}-C_{12}	mg/kg	14	S4UL	9700	<2	<2	0
>C_{12}-C_{16}	mg/kg	14	S4UL	36000	<4	<4	0
>C_{16}-C_{21}	mg/kg	14	S4UL	28000	<1	22	0
>C_{21}-C_{40}	mg/kg	14	S4UL	28000	<10	84	0
Total TPH	mg/kg	14	-	-	<17.1	112	-

Note: *The lower value of guidelines for Aromatic/Aliphatics has been selected

Table 6.4: Soil Laboratory Analysis Results - Total Petroleum Hydrocarbons (TPHCWG)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_5-C_6 Aliphatic	mg/kg	7	S4UL	3200	<0.001	<0.001	0
>C_6-C_8 Aliphatic	mg/kg	7	S4UL	7800	<0.001	<0.001	0
>C_8-C_{10} Aliphatic	mg/kg	7	S4UL	2000	<0.001	<0.001	0
>C_{10}-C_{12} Aliphatic	mg/kg	7	S4UL	9700	<1.0	2.4	0
>C_{12}-C_{16} Aliphatic	mg/kg	7	S4UL	59000	<2	39	0
>C_{16}-C_{35} Aliphatic	mg/kg	7	S4UL	1600000	<16	285	0
>C_5-C_7 Aromatic	mg/kg	7	S4UL	26000	<0.001	<0.001	0
>C_7-C_8 Aromatic	mg/kg	7	S4UL	56000	<0.001	<0.001	0
>C_8-C_{10} Aromatic	mg/kg	7	S4UL	3500	<0.001	<0.001	0
>C_{10}-C_{12} Aromatic	mg/kg	7	S4UL	16000	<1.0	3.8	0
>C_{12}-C_{16} Aromatic	mg/kg	7	S4UL	36000	<2	34	0
>C_{16}-C_{21} Aromatic	mg/kg	7	S4UL	28000	<10	120	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_{21}-C_{35} Aromatic	mg/kg	7	S4UL	28000	<10	340	0
Total TPH (Ali/Aro)	mg/kg	7	-	-	<20	810	-

6.2 Asbestos in Soil

6.2.1 14No samples of the Made Ground were screened in the laboratory for the presence of asbestos. The results of the analysis are summarised below in Table 6.5 below.

Table 6.5: Asbestos Analysis - Summary

Sample	Screening Result	Quantification result (%)	Comments
WS1 - 0.1mbgl	None Detected	N/A	N/A
WS2 - 0.2mbgl	None Detected	N/A	N/A
WS3 - 0.1mbgl	None Detected	N/A	N/A
WS4 – 0.1mbgl	None Detected	N/A	N/A
WS5 – 0.1mbgl	None Detected	N/A	N/A
WS6 – 0.1mbgl	None Detected	N/A	N/A
WS7 – 0.25mbgl	None Detected	N/A	N/A
WS8 – 0.1mbgl	None Detected	N/A	N/A
WS8 – 1mbgl	None Detected	N/A	N/A
BH1 – 0.5mbgl	None Detected	N/A	N/A
BH2 – 0.3mbgl	None Detected	N/A	N/A
TP2 – 0.5mbgl	None Detected	N/A	N/A
TP3 – 0.4mbgl	None Detected	N/A	N/A
TP12 – 0.3mbgl	None Detected	N/A	N/A

6.2.2 No asbestos containing materials (ACM) or fibres were reported in samples analysed in the laboratory.

6.3 Volatile Organic Compounds

6.3.1 In addition to the suites outlined previously, 7No samples were tested for the presence of volatile organic compounds (VOCs) including BTEX compounds (benzene, toluene, ethylbenzene, xylene).

6.3.2 No VOCs were reported above the laboratory detection limit within any of the samples tested.

6.4 Coal Tar

6.4.1 4No. samples obtained from locations of former runways (WS8, TP2, TP3 and TP12) were analysed for the presence of coal tar, though this was not identified within any of the samples tested.

6.5 Vapour Risk Assessment from a Soil Source

6.5.1 As outlined in the tables above, no organic compounds have been found in excess of their generic screening criteria for the protection of human health within a 'commercial' end-use scenario. The generic screening criteria considers all possible pathways between the source and the receptor.

6.5.2 Furthermore, no visual or olfactory evidence of hydrocarbon/volatile contamination was reported during the course of the investigation.

6.5.3 Therefore, it is considered that there is a negligible risk to end users of the proposed development associated with vapour risk inhalation from soils.

6.6 Summary of Human Health Generic Quantitative Risk Assessment

6.6.1 In summary, no exceedances of contaminants above the GAC were recorded in any of the soil samples tested.

6.7 Screening of Soil Chemical Analysis Results – Potential Risks to Plant Growth

6.7.1 Zinc, copper and nickel are phytotoxins and could therefore inhibit plant growth in soft landscaped areas. Concentrations measured in soil for these determinands have been compared with the pH dependent values given in BS:3882 (2015). This does not constitute a full BS:3882 topsoil test.

6.7.2 Table 6.6 shows the soil analytical results compared with the relevant screening values, adopting a pH value of greater than 7, as indicated by the results of the laboratory analysis.

Table 6.6: Soil Laboratory Analysis Results - Phytotoxic Determinands

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Nickel	110	9.4	46	0
Copper	200	4	31	0
Zinc	300	25	350	1No WS8 at 0.1mbgl

6.7.3 One sample has recorded Zinc in excess of the threshold level. The current soil in that location may not satisfy the requirements of BS:3882 but as no signs of dieback or vegetation distress were observed, it is not considered to be significantly detrimental to plant growth.

6.8 Screening for Water Pipes Materials

6.8.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Table 6.7 below summarises the findings of the assessment:

Table 6.7: Screening Guide for Water Pipes

Determinand	No. of tests	Threshold for Polyethylene Pipes* (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Total VOCs	7	0.5	<0.056	<0.056	0
BTEX	7	0.1	<0.005	<0.005	0
MTBE	7	0.1	<0.001	<0.001	0
EC5-EC10	21	1	<0.006	<0.1	0
EC10-EC16	21	10	<6	56.2	2No WS8 at 0.5mbgl TP12 at 0.3mbgl
EC16-EC40	21	500	<11	745	1No TP12 at 0.3mbgl
Naphthalene	21	5	<0.05	2.8	0
Phenols	21	2	<1	1.2	0

** UK Water Industry Research (2010) Source Guidance for Selection of Water Supply Pipes to be Used in Brownfield Sites. Report No. 10/WM/03/21.*

6.8.3 The above suggests that upgraded pipe work may be required.

6.8.4 Alternatively, it may be possible to utilise other protection methods including (but not limited to):

- Diversion of the pipe,
- Localised remediation
- Embedding the pipe in a sufficient thickness of clean granular material

6.8.5 The water supply pipe requirements for this site should be discussed at an early stage with the relevant utility provider.

6.9 Assessment of Soil Analytical Data with Respect to Controlled Waters

6.9.1 At the Preliminary Risk Assessment (Desk Study) stage, risks to controlled waters were considered moderate.

6.9.2 The following controlled waters receptors were identified:

- Principal aquifer in the Zig Zag Chalk Formation and West Melbury Marly Chalk Formation

6.9.3 With reference to Section 4.4, no visual / olfactory evidence of potentially mobile contamination was encountered. Further assessment of the risk to controlled waters is provided in Section 7, with the evaluation of leachate analytical data.

6.10 Waste Characterisation

6.10.1 Waste Acceptance Criteria testing results are summarised in Table 6.8 below.

Table 6.8: Waste Acceptance Criteria Testing Summary

Sample	Material Type	Exceeds *"Inert Waste Landfill"* Thresholds?	Exceeds *"Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill"* Thresholds?	Exceeds *"Hazardous Waste Landfill"* Thresholds?	Notes
WS1 at 0.5mbgl	Made Ground	No	No	No	-
WS3 at 0.1mbgl	Topsoil	Yes	No	No	Exceeds inert waste landfill thresholds for pH and TOC
BH3 at 0.6mbgl	Head	No	No	No	-
TP4 at 0.4mbgl	Head	No	No	No	-

6.10.3 Waste Acceptance Criteria (WAC) testing indicates that topsoil will not be able to be disposed of as inert waste, as would be expected due to high organic content. Made Ground and other natural soils should qualify for inert waste (subject to approval by the landfill operator who might request additional testing once soils are stockpiled.

6.10.4 Note that a preliminary waste classification assessment in accordance with WM3 has not been carried out as this was outside of our commissioned scope of works. Made Ground soils have therefore not currently been classified as being either Hazardous or Non-hazardous for off-site disposal purposes.

6.10.5 In addition, as recommended within the Desk Study (Jomas, August 2022), a specialist should be consulted regarding potential radioactivity within soils to determine appropriate disposal methods.

6.10.6 The above comments are given as guidance and should be confirmed by the waste disposal facility accepting the waste. The waste disposal facility may have their own classification methodology and are under no obligation to honour the comments given above.

7 GENERIC QUANTITATIVE RISK ASSESSMENT – LEACHATE DATA

7.1 Groundwater Sampling

7.1.1 11No monitoring wells were installed, and a monitoring visit was conducted on 21st September 2022 to attempt to obtain samples of groundwater by low flow methodology. However, all the monitoring wells were reported as dry to the base.

7.1.2 Subsequently, 5No. soil samples obtained during the initial investigation were submitted for leachate analysis.

7.2 Assessment of Leachate Analytical Data with Respect to Controlled Waters

7.2.1 The results of the laboratory testing are summarised in Table 7.1 to Table 7.2 below and compared to GAC for controlled waters receptors. Analytical laboratory certificates are presented in Appendix 3.

Table 7.1: Groundwater Laboratory Analysis Results – Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No of Exceedances
Arsenic	µg/l	5	10	DWS	<1.0	3.3	0
	µg/l		50	EQS	<1.0	3.3	0
Cadmium	µg/l	5	5	DWS	<0.08	<0.08	0
	µg/l		0.25	EQS	<0.08	<0.08	0
Chromium	µg/l	5	50	DWS	0.8	16	0
	µg/l		4.7	EQS	0.8	16	1No.: WS8 at 0.5mbgl
Lead	µg/l	5	10	DWS	2.7	4.4	0
	µg/l		1.2*	EQS	2.7	4.4	5No.: WS1 at 0.1mbgl WS6 at 0.5mbgl WS8 at 0.5mbgl BH5 at 0.30mbgl TP1 at 0.4mbgl
Nickel	µg/l	5	20	DWS	4	6.1	0
	µg/l		4*	EQS	4	6.1	4No.: WS1 at 0.1mbgl WS6 at 0.5mbgl BH5 at 0.30mbgl TP1 at 0.4mbgl
Copper	µg/l	5	1.0	EQS	8.7	21	5No.: WS1 at 0.1mbgl WS6 at 0.5mbgl WS8 at 0.5mbgl BH5 at 0.30mbgl TP1 at 0.4mbgl
			2000	DWS	8.7	21	0
Zinc	µg/l	5	10.9*	EQS	8.6	15	3No.: WS1 at 0.1mbgl BH5 at 0.30mbgl TP1 at 0.4mbgl

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No of Exceedances
Mercury	µg/l	5	1.0	DWS	<0.5	<0.5	0
	µg/l	5	0.07	EQS	<0.5	<0.5	0
Selenium	µg/l	5	10	DWS	<4	9.3	0
Boron	µg/l	5	1000	DWS	10	21	0
	µg/l		2000	EQS	10	21	0
Cyanide (Total)	µg/l	5	50	DWS	<10	<10	0
	µg/l		1	EQS	<10	<10	0
Phenols (Total)	µg/l	5	7.7	EQS	<10	<10	0

* bioavailable concentration

**bioavailable concentration + ambient background concentration dissolved for Thames Groundwater (2 µg/L)

Table 7.2: Groundwater Analysis Results - Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. samples tested	Screening Criteria		Min.	Max.	No. of Exceedances
Naphthalene	µg/l	5	2.0	EQS	<0.01	<0.01	0
Acenaphthylene	µg/l	5	-	-	<0.01	<0.01	0
Acenaphthene	µg/l	5	-	-	<0.01	<0.01	0
Fluorene	µg/l	5	-	-	<0.01	<0.01	0
Phenanthrene	µg/l	5	-	-	<0.01	<0.01	0
Anthracene	µg/l	5	0.1	EQS	<0.01	<0.01	0
Fluoranthene	µg/l	5	0.0063	EQS	<0.01	<0.01	0
Pyrene	µg/l	5	-	-	<0.01	<0.01	0
Benzo(a)anthracene	µg/l	5	-	-	<0.01	<0.01	0
Chrysene	µg/l	5	-	-	<0.01	<0.01	0
Benzo(b)fluoranthene	µg/l	5	0.017	EQS	<0.01	<0.01	0
Benzo(k)fluoranthene	µg/l	5	0.017	EQS	<0.01	<0.01	0
Benzo(a)pyrene	µg/l	5	0.01	DWS	<0.01	<0.01	0
	µg/l	5	0.00017	EQS	<0.01	<0.01	0
Indeno(a,h)anthracene	µg/l	5	-	-	<0.01	<0.01	0
Dibenzo(ah)anthracene	µg/l	5	-	-	<0.01	<0.01	0
Benzo(g,h,i)perylene	µg/l	5	0.0082	EQS	<0.01	<0.01	0
Sum of four Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(ghi)perylene Indeno(123-cd)pyrene	µg/l	5	0.1	DWS	<0.04	<0.04	0

7.2.2 In addition to the suite outlined above, the 5No.samples were also analysed for TPHCWG and suite of volatile organic compounds (VOCs) including BTEX compounds. None of the compounds analysed for were reported above the laboratory method detection limit.

7.2.3 Concentrations of chromium, lead, nickel, copper and zinc were found to exceed environmental water quality standard.

7.2.4 The only controlled waters receptors identified by the preliminary risk assessment were the Principal Aquifers within the Zig Zag Chalk Formation and West Melbury Marly Chalk Formation. As no groundwater was reported during drilling or subsequent monitoring (to a depth of 8m), and no nearby surface water features or abstractions have been identified, a significant risk to controlled waters has not been identified.

8 SOIL GAS RISK ASSESSMENT

8.1 Soil Gas Results

8.1.1 Four return monitoring visits have been undertaken between 21 September 2022 and 12 October 2022, to monitor wells installed within boreholes at the site for soil gas concentrations and groundwater levels.

8.1.2 During these visits atmospheric pressure ranged between 987mb and 1012mb. During these visits pressure trends observed were generally falling.

8.1.3 At the request of the client, installed wells BH5 and WS7 were backfilled with bentonite, headworks removed, and ground surface reinstated with surrounding soil after the first monitoring visit.

8.1.4 The results of the monitoring undertaken are summarised in Table 8.1 below, with the monitoring records presented in Appendix 5.

Table 8.1: Summary of Gas Monitoring Data

Hole No.	Number of monitoring events	CH_4 (%)	CO_2 (%)	O_2 (%)	VOCs (ppm)	Steady Flow Rate (l/hr)	Peak Flow Rate (l/hr)	Depth to water (mbgl)	Well Response Zone as installed (top/bottom) (mbgl)	Strata targeted by response zone
BH1	4	0.0-0.2	0.8 – 1.6	19.2 – 20.2	0.0 – 0.3	-0.3 - +0.3	-0.5 - +0.3	Dry	0.8 to 8	Head and Zig Zag Chalk Formation Chalk
BH2	4	0.0-0.1	0.1 – 0.3	20.1– 21.3	0.0 – 0.3	-0.1 - +0.2	-0.1 - +0.2	Dry	1 to 8	Zig Zag Chalk Formation Chalk
BH3	4	0.0-0.1	0.7 – 0.8	20.2 – 20.7	0.0 – 1.0	-0.0 - +0.2	-0.0 - +0.2	Dry	1 to 5	Head and West Melbury Chalk Formation
BH4	4	0.0-0.2	0.1 – 0.4	20.2 – 20.9	0.0 – 0.3	+0.0 - +0.2	+0.0 - +0.2	Dry	1 to 5.5	West Melbury Chalk Formation
BH5*	1	0.0	0.9	20.4	0.0	+0.2	+0.2	Dry	1 to 4.7	West Melbury Chalk Formation
BH6	4	0.0-0.1	0.0	19.9 – 20.7	0.0 – 0.3	+0.0 - +0.1	+0.0 - +0.1	Dry	1 to 5	West Melbury Chalk Formation
BH7	4	0.0-0.1	0.6 - 1.3	19.8 – 20.5	0.0 -13.5	+0.0 - +0.2	+0.0 - +0.2	Dry	1 to 5	West Melbury Chalk Formation
WS2	4	0.0-0.2	0.6 - 0.9	20.3 - 21.8	0.0 – 0.4	+0.0 - +0.2	+0.0 - +0.2	Dry	1 to 2	Zig Zag Chalk Formation Chalk
WS5	4	0.0-0.1	0.7 - 2.3	19.2 - 20.8	0.0 – 0.2	-0.1 - +0.2	-0.1 - +0.2	Dry	1 to 2	Head
WS7*	1	0.0	0.9	20.5	0.0	+0.3	+0.3	Dry	1 to 2	West Melbury Chalk Formation
WS8	4	0.0-0.2	0.0 - 0.1	20.7 - 20.9	0.0 – 0.4	+0.0 - +0.2	+0.0 - +0.2	Dry	0.5 to 1	Made Ground

* wells removed on 21/09/22

8.2 Screening of Results

8.2.1 As shown in Table 8.1, the maximum concentrations of methane and carbon dioxide recorded were 0.2% and 2.3% v/v respectively. The maximum concentration of Volatile Organic Compounds measured was 13.5 ppm. The maximum gas flow rate recorded was -0.5l/hr.

8.2.2 The soil gas assessment method is based on that proposed by Wilson & Card (1999), which was a development of a method proposed in CIRIA publication R149 (CIRIA, 1995). The method uses both gas concentrations and borehole flow rates to define a characteristic situation based on the limiting borehole gas volume flow for methane and carbon dioxide. In both these methods, the limiting borehole gas volume flow is renamed as the Gas Screening Value (GSV).

8.2.3 The Gas Screening Value (litres of gas per hour) is calculated by using the following equation

GSV = (Concentration/100) X Flow rate

Where concentration is measured in percent (%)
and flow rate is measured in litres per hour (l/hr)

8.2.4 In accordance with CIRIA C665, worst case conditions are used in the calculation of GSVs for the site. These have been summarised below in Table 8.2.

8.2.5 The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.

Table 8.2: Summary of Gas Monitoring Data and Gas Screening Value

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO_2	2.3	0.5	**0.0115**	**CS1**
CH_4	0.2	0.5	**0.001**	**CS1**

8.2.6 Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary.

8.2.1 BS 8576:2013 has been used to derived threshold levels for carbon monoxide and volatile organic compounds.

8.2.2 Given the recorded levels it is not considered that additional protection measures need to be incorporated to protect end users from the recorded carbon monoxide concentrations.

8.2.1 PID screening of the monitoring well headspace has revealed maximum concentrations of VOCs of 13.5ppm. No visual or olfactory evidence of hydrocarbon contamination was observed during the investigation, and no VOCs were reported above laboratory detection limits in soil or leachate analyses. Therefore, it is considered that the PID screening of monitoring wells confirms the assessment that risks to human health receptors via vapour inhalation pathways are negligible.

8.2.2 As noted within the Desk Study (Jomas, August 2022), sources of radon gas may be present beyond the natural background level for the surrounding area due to the site history and association with potentially radioactive materials. This should be assessed further by suitably qualified personnel prior to determining whether newly built structures require radon protection.

9 GEO-ENVIRONMENTAL ASSESSMENT SUMMARY AND RECOMMENDATIONS

9.1 Land Quality Impact Summary

9.1.1 Following the ground investigation, the following is noted:

- It is understood that the proposed development is to comprise the construction of new commercial buildings mainly consisting of offices.
- Following generic risk assessments, no elevated concentrations of contaminants were detected in soils in excess of generic assessment criteria for the protection of human health within a commercial end-use scenario.
- No asbestos containing materials or fibres were detected in the Made Ground samples analysed in the laboratory.
- Any visual asbestos materials may be removed by hand, with extensive dust control measures required during the soil screening operations for the protection of site workers and nearby residents. It should be noted that asbestos fibres will not be visible to the naked eye.
- A significant risk to plant growth has not been identified.
- The risk to end users associated with vapour risk inhalation from soils is considered negligible.
- A significant risk to controlled waters has not been identified.
- Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.
- WAC testing indicates most may be disposed of as inert waste. However, a hazardous waste assessment has not been undertaken. In addition, a specialist should be consulted regarding the potential radioactivity within soils to determine appropriate disposal methods.
- Following the land contamination assessment, no further assessment or risk mitigation is required, and the site can be considered suitable for the proposed use. However, further assessment may be required regarding potential radioactivity within soils as a result of past military/UKAEA use, and advice should be sought from a specialist consultant.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably

qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

9.1.2 The above conclusions are made subject to approval by the statutory regulatory bodies.

9.2 Review of Pollutant Linkages Following Ground Investigation

9.2.1 The site CSM has been revised and updated from that suggested in the desk study in view of the ground investigation data, including soil laboratory analysis results. Table 9.1 highlights whether pollutant linkages identified in the original CSM are still relevant following the risk assessment, or whether pollutant linkages, not previously identified, exist.

Table 9.1: Plausible Pollutants Linkages Summary (Pre-Remediation)

Potential Source (from desk study)	Pathway	Receptor	Relevant Pollutant Linkage?	Comment

• Potential for contamination associated with previous site use (RAF base/aircraft usage) – on site (S1)
• Potential for Made Ground associated with removal of previous structures (S2)
  ○ Bungalow structures in SE of site
  ○ Runways
• Infilled catapult pit in south of site (S3)
• Low bunds of unknown composition in north and east of site (S4)
• Reported chlorinated solvent contamination within groundwater from disposal of waste in unlined pits – off site (S5)
	• Ingestion and dermal contact with contaminated soil (P1)
	• Inhalation or contact with potentially contaminated dust and vapours (P2)
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
		• Construction workers (R1)
		• Maintenance workers (R2)
		• Neighbouring site users (R3)
		• Future site users (R4)
		• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
			Y	See section 9.1 above for remedial measures.
				
				The findings of this report should be included in the construction health and safety file, with adequate measures put in place for the protection of construction and maintenance workers.
				
				Contact should be made with relevant utility providers to confirm if upgraded materials are required.
				
				The concrete classification to protect buried concrete is discussed in Section 11.3**Error! Reference source not found.**

	• Accumulation and migration of soil gases (P5)		**N**	Site has been characterised as CS1 and no gas protection measures are deemed necessary.
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3) • Horizontal and vertical migration of contaminants within groundwater (P4)	• Neighbouring site users (R3) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled Waters- Principal aquifer in the Zig Zag Chalk Formation and West Melbury Marly Chalk Formation (R6)	**N**	A significant risk to controlled waters has not been identified. The concrete classification to protect buried concrete is discussed in Section 11.3

10 DERIVATION OF GEOTECHNICAL PARAMETERS

10.1 Introduction

10.1.1 A summary of ground conditions obtained from the ground investigation and the derived geotechnical parameters is provided below.

10.2 Plasticity of Cohesive Materials

10.2.1 Atterberg Limit determination was undertaken on 30No. samples of Head, Zig Zag Chalk formation and West Melbury Marly Chalk Formation, at depths ranging from 0.5 to 9mbgl.

10.2.2 Plasticity Index values in deposits of head ranged from 13% to 55% and were indicative of low to very high plasticity, as illustrated in Figure 10.1 below.

10.2.3 Plasticity Index values in the Zig Zag Chalk Formation ranged from 16% to 24% and were indicative of medium plasticity, as illustrated in Figure 10.1 below.

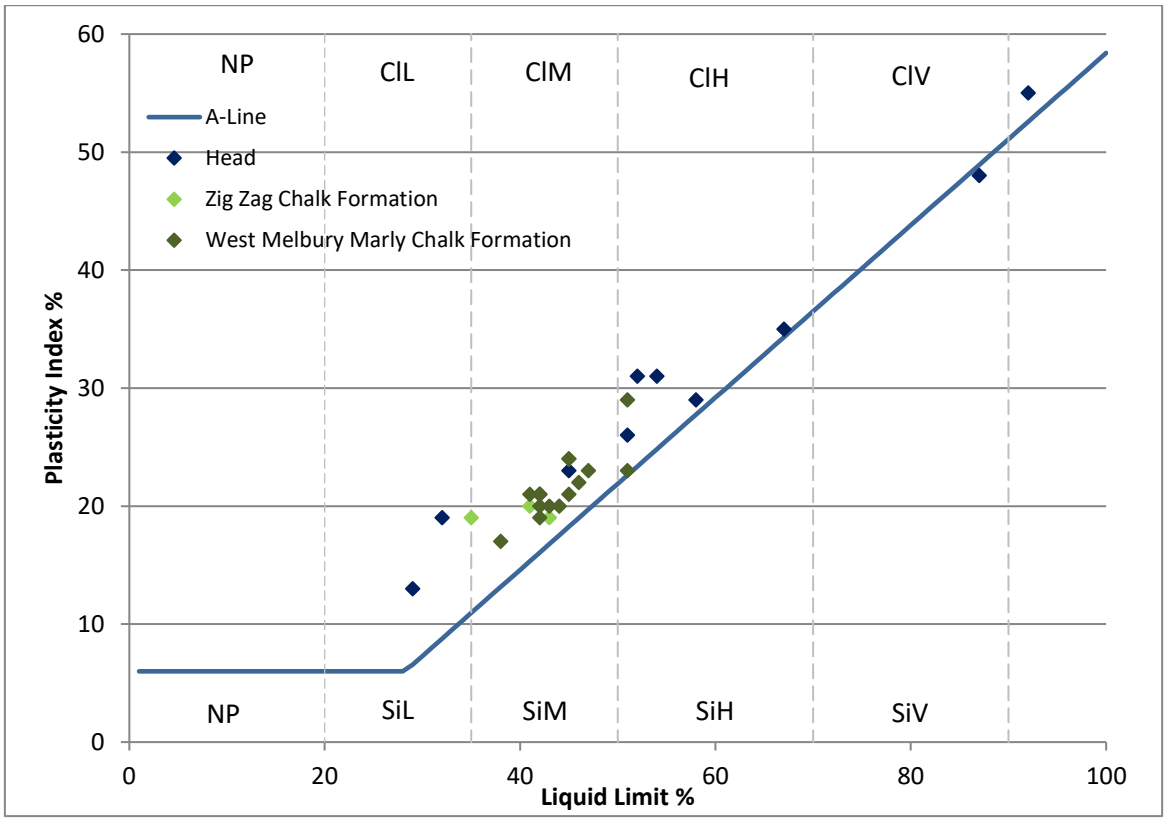
10.2.4 Plasticity Index values in the West Melbury Marly Chalk Formation ranged from 17% to 29% and were indicative of medium to high plasticity, as illustrated in Figure 10.1 below.

10.2.5 Modified Plasticity Index values in deposits of head ranged from 7.28% to 45.1%, indicating the presence of both non-shrinkable soils and those with a low to high volume change potential.

10.2.6 Modified Plasticity Index values in the Zig Zag Chalk Formation ranged from 16% to 24%, indicating soils with low to medium volume change potential.

10.2.7 Modified Plasticity Index values in the West Melbury Marly Chalk Formation ranged from 11.5% to 29%, indicating soils with low to medium volume change potential.

Figure 10.1: Plasticity Chart

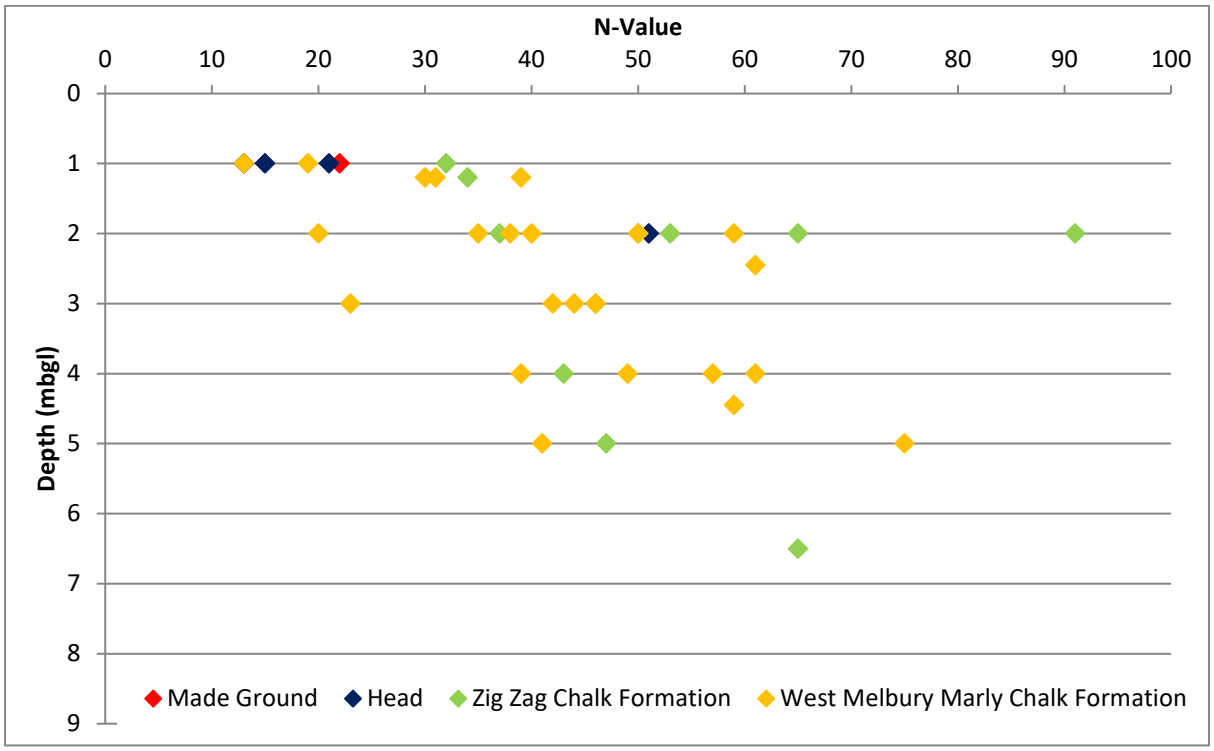


10.3 Standard Penetration Tests

10.3.1 Standard Penetration Tests were undertaken at regular intervals throughout the windowless sample boreholes and cable percussive boreholes. The results of the SPTs are plotted against depth in Figure 10.2 below.

10.3.2 N_{equi} results have been calculated where the full 300mm of penetration could not be achieved for 50 or more blows. Where the penetration after 50 blows is low due to the presence of hard strata, the test is deemed to be a refusal and no value is calculated.

Figure 10.2: SPT 'N' Value v Depth



10.3.3 The results show a general trend of increasing N value with depth.

10.4 Undrained Shear Strength

10.4.1 Figure 10.3 below shows the undrained shear strength inferred by the correlation suggested by Stroud (1974);

$c_u = f_1 \times N$ can be applied,

in which
c_u= mass shear strength (kN)
f_1 = constant
N= SPT Value achieved during boring operations

10.4.2 In the above equation f_1 is dependent on the plasticity of the material that the SPT is being carried out in. As the plasticity indices were shown to be greater than 25% a value for f_1 of 4.5 has been adopted after Tomlinson (2001).

10.4.3 The graph below shows the shear strength profile of the encountered cohesive materials at the site, based on the SPT to shear strength correlation described above.

Figure 10.3: Undrained Shear Strength v Depth

10.4.4 It should be pointed out that the correlation between SPT 'N' value and undrained shear strength of weathered chalk is based on the material being recovered as structureless, stiff to very stiff clay. In reality, correlation can vary greatly, as pointed out in CIRIA R143, and therefore the results should be treated with some circumspection.

10.4.5 Rotary drilling, including the retrieval of cores, may allow for unconfined compressive strength testing of chalk specimens, to provide a more accurate measurement of the compressive strength of chalk.

10.5 Coefficient of Compressibility

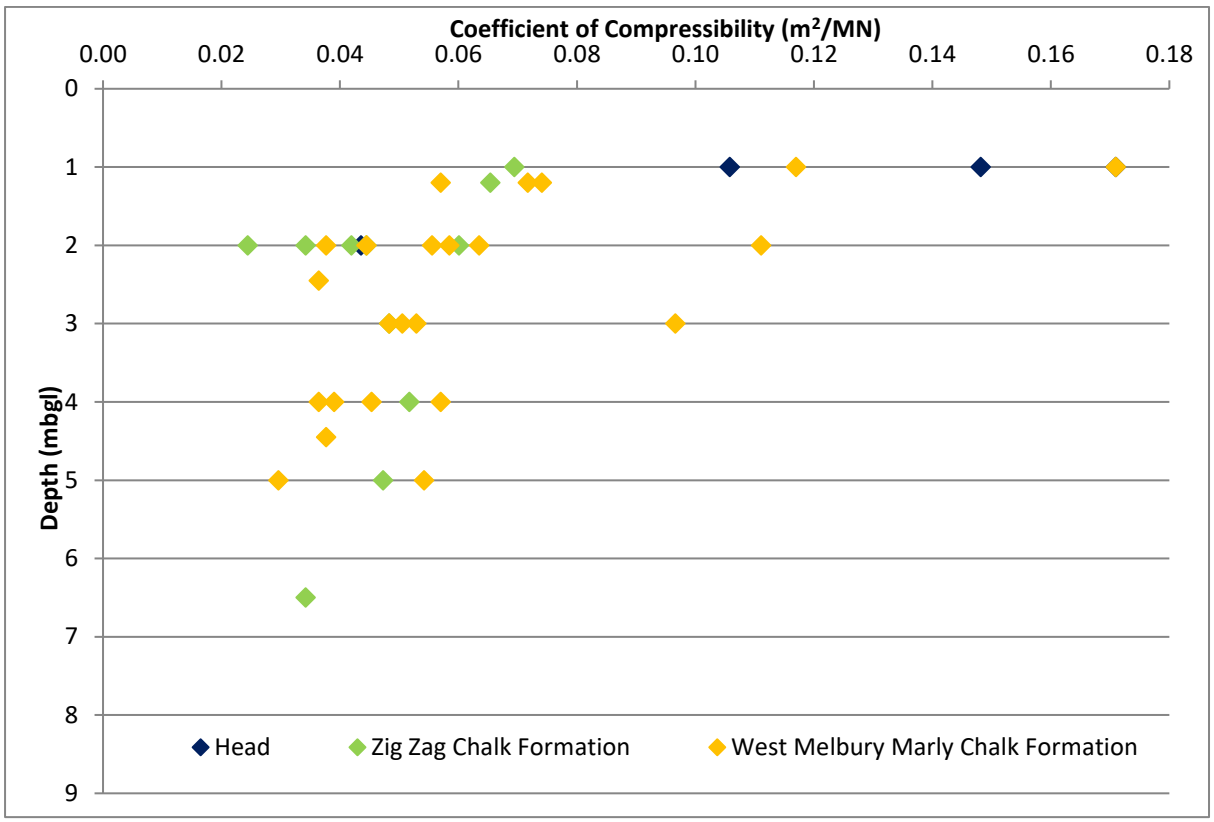
10.5.1 Stroud and Butler (1974) developed a relationship between the coefficient of compressibility (m_v) and SPT 'N' value.

$m_v = 1/ f_2 \times N$ can be applied,

in which
m_v = coefficient of compressibility (m^2/MN)
f_2 = constant dependant on the plasticity index
N = SPT Value achieved during boring operations

10.5.2 Using the plasticity indices obtained and the graphs provided in Tomlinson (2001) a value of f_2 of 0.45 has been taken and used with the SPT 'N' values to infer coefficient of compressibility (m_v).

Figure 10.4: Coefficient of Volume Compressibility (m_v) v Depth



10.5.3 At shallow depth, the results indicate soils of low to medium compressibility, becoming soils of very low compressibility with increasing depth.

10.5.4 The reduction in compressibility is as would be expected for a material which is completely weathered structureless rock.

10.5.5 It should be noted that the settlement of chalk is likely to be controlled by the stiffness of the material.

10.6 Bulk Density

10.6.1 In the absence of geotechnical laboratory test results, the correlations and suggested values for both cohesive and granular materials given in BS8004:2015 have been used. The derived bulk densities are summarised below in Table 10.1.

Table 10.1: Derived Bulk Densities

Strata	Unit Weight (kN/m³)
Made Ground	17

Strata	Unit Weight (kN/m³)
Head	18
Zig Zag Chalk Formation	20
West Melbury Marly Chalk Formation	20

10.7 Effective Angle of Shearing Resistance / Angle of Friction

10.7.1 In cohesive soils, the effective angle of shearing resistance can be derived from the plasticity index of the soil, using the following equation presented in BS8004:2015.

$$\emptyset' = 42 - (12.5xLOG10(PI))$$

Where PI = Plasticity Index.

10.7.2 Values have been calculated for all available Plasticity Index results and are presented inTable 10.2.

Table 10.2 Derived Angles of Shearing Resistance

Stratum	Derived Angle of Shearing Resistance (°)
Head	20.2 – 28.1
Zig Zag Chalk Formation	24.7 - 26.9
West Melbury Marly Chalk Formation	23.7 – 26.6

10.7.3 In granular materials, the effective angle of friction can be derived directly from shear box testing, or indirectly using the methodology outlined in Table 1 of BS8004:2015, using a combination of the SPT N-Values, Particle Size Distribution of the soil, and the field descriptions of angularity of the gravel fraction. This method assumes that the fines content of the material is less than 15%. An alternative method is to refer to the correlation between angle of friction and SPT N-values postulated by Peck *et al* (1967) and reproduced in Tomlinson (2001).

10.8 Stiffness Moduli

10.8.1 In cohesive materials, the undrained stiffness modulus (Young's Modulus) can be derived using the correlation with SPT N-Values, presented in CIRIA Report R143.

$$\underline{Eu = 1.2 * N}$$

10.8.2 The drained Young's Modulus for cohesive material (with the exception of London Clay) can also be derived from the SPT-N values, as follows:

$$\underline{E' = 0.9N}$$

10.8.3 In granular materials, the drained Young's Modulus can be derived using the following correlation:

$$\underline{E' = N}$$

10.8.4 In chalk, the SPT can be used to provide a rough estimate of settlements, which are dependent on the stiffness of the material. CIRIA R143 refers to a correlation by Stroud which provides a conservative estimate of settlement, on the basis that

$$\underline{E' = 5N}$$

10.9 Summary of Derived General Properties

10.9.1 Based on the analysis of the ground investigation data and past experience with similar deposits, the following derived general parameters are given in Table 10.3.

Table 10.3 Derived Geotechnical Parameters

Property*	Head Deposits	Zig Zag Chalk Formation	West Melbury Marly Chalk Formation
Unit Weight[1)]	18	20	20
Drained Friction, φ' (◦)	20 – 28	24.5 – 27	23.5 - 26.5
Drained Cohesion, c' (kPa)	0	0	0
SPT 'N' Value	13 - 51	32 - 91	13 - 75
Undrained Young's Modulus, E_u (MPa)[4)]	15.6 - 61.2	38.4 – 109.2	15.6 - 90
Drained Young's Modulus E' (MPa) [5)]	11.7 – 45.9	28.8 – 81.9	11.7 – 67.5
Drained Young's Modulus E' (MPa) [6)]	-	160 – 455	65 – 375
Undrained Shear Strength, c_u (kPa)[7)]	58 - 229	144 – 409	58 - 337
Plasticity Index (%)	13 - 55	16 – 24	17 - 29
Modified Plasticity Index (%)	7.28 – 45.1	16 - 24	17 - 29
Volume Change Potential [NHBC]	Low to High	Low to Medium	Low to Medium
Modulus of Volume Compressibility, m_v (m^2/MN)[8)]	0.039 – 0.171	0.022 – 0.063	0.030 – 0.111

[1)] Derived from Figures 1 and 2 of BS8004:2015

[2)] Calculated from: φ' = (42°- 12.5log10I_p) for 5% ≤ I_p ≤ 100% Where, I_p is the soil's plasticity index (BS8004:2015).

[3)] Calculated from Table 1 of BS8004:2015 (Granular Soils with less than 15% fines) OR Correlation between N value and Φ (see chart in Guides and Standards – Relation of N-values and Friction Angle by Peck et al)

[4)] Calculated from: E_u = 1.2 N MPa, based on the guidance given in CIRIA Report 143.

[5)] Calculated from E' = 0.9 N MPa, based on the guidance given in CIRIA Report 143 (COHESIVE SOILS)

[6)] Calculated from E' = 5 N MPa, based on the guidance given in CIRIA Report 143 (CHALK)

Property*	Head Deposits	Zig Zag Chalk Formation	West Melbury Marly Chalk Formation

[7)] The undrained shear strength (c_u) of the cohesive soils was correlated to the SPT "N" values using Stroud (1974), where $c_u=f_1N$ and f_1 is factor related to the Plasticity Index (PI) of the clay (a value of f_1 equal to 5.0 for PI ≤ 25% and a value of f_1 value equal to 4.5 for PI>25).

[8)] Calculated from: $m_v = 1/f_2$ N m^2/MN, f_2 is a coefficient proposed by Stroud and Butler (1975) and varies with Plasticity Index (PI) as presented in Figure 27 of CIRIA Report 27 or $10/c_u$.

11 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

11.1 General

11.1.1 Subsequent to intrusive investigation of the site and receipt of the laboratory test results, the following geotechnical assessments have been made.

11.2 Proposed Foundations

General

11.2.1 Topsoil should be stripped from beneath proposed structures ahead of development.

11.2.2 Made Ground is not considered to provide suitable bearing strata due to its low and variable bearing properties, and the unacceptable risk of total and differential settlement.

11.2.3 All foundations should be deepened beneath these deposits and any soft/loose soils encountered in order to found within underlying competent strata.

11.2.4 Heave precautions will be required against the side of foundations and ground beams in accordance with the requirements set out in NHBC Standards Chapter 4.2. the Head deposits may be treated as being of high volume change potential and the chalk as being of medium volume change potential.

Conventional Foundations

11.2.5 Based on the ground and groundwater conditions encountered, conventional shallow foundations are likely to be suitable for the proposed development.

11.2.6 It is considered that traditional strip/trench-fill foundations up to 1m wide may be formed within the underlying deposits of Chalk at a minimum depth of 0.9m for an allowable bearing capacity of 110kPa. Alternatively, pad foundations with minimum dimensions of 1.2m x 1.2m could be formed, for an allowable bearing capacity of 160kPa. Total and differential settlements should be contained within tolerable limits.

11.2.7 Foundations must be deepened to found beneath Made Ground or where building near trees in accordance with NHBC guidance for soils of medium volume change potential (Chalk deposits).

11.2.8 Where foundations need to change levels as a result, the foundations should be stepped and reinforced. These steps should be no deeper than half of the width of the foundation and each step should not exceed 0.5m.

11.2.9 If foundations span different strata, e.g. sand and clay, they should either be deepened to terminate in a single soil stratum, or suitable reinforcement included (to be detailed by the structural engineer).

11.2.10 Foundations greater than 2.50m deep would require structure-specific design by a structural engineer.

11.2.11 Where any unexpected or soft ground conditions are encountered during the groundworks, works in that area should cease and the advice of a suitably qualified geotechnical engineer sought.

Piled Foundations

11.2.12 In the event that conventional foundations are not suitable, e.g. due to the required depth of construction, high structural loads, the presence of deeper zones of Made Ground or very soft and loose soils and/or where tree influence would dictate conventional foundations exceeding 2.5mbgl, an alternative such as piled foundations would be considered suitable.

11.2.13 Preliminary load capacities calculated for varying diameter of CFA piles taken into the Chalk are given in Table 11.1. The design should be used for preliminary purposes only as the actual working load is dependent on the type of pile and method of installation.

Table 11.1: Indicative Pile Capacities (kN)

Pile toe depth (mbgl)	Pile diameter (mm)		
	450	600	800
	Indicative Allowable Pile Capacity (kN)		
4	130	202	320
6	*224*	*341*	*529*
8	*342*	*511*	*781*
9	*410*	*609*	*922*

11.2.14 To comply with BS EN 1997 and the guidance given by the Federation of Piling Specialists the ground must be proven to a minimum of 5m below the proposed toe of the piles. Consequently, values below 4mbgl are given indicatively in grey italics and a piling specialist should be consulted.

11.2.15 The construction of a piled foundation is a specialist job and the advice of a reputable local contractor familiar with the type of ground and groundwater conditions encountered on this site should be sought prior to finalising the design.

11.2.16 These working loads have been calculated on the basis of the ground and groundwater conditions encountered in the boreholes and assume the following:

- The contribution to the working load on the upper 1.0m has been ignored due to the presence of Made Ground.
- Partial factors were applied on the sum of the end bearing and skin friction working loads as defined by BS EN 1997 using Design Approach 1 Combination 2.
- No allowance has been made for additional forces acting on the pile shaft, such as negative skin friction, or loading due to desiccation or heave forces.
- Groundwater level was adopted as 8mbgl.

11.2.17 The preliminary working loads given are applicable to single vertically loaded piles. Where groups of piles are to be constructed, the working load of each individual pile should be reduced appropriately and a calculation made to check for the factor of safety against block failure.

11.2.18 A temporary working platform is likely to be required. In addition, some form of temporary drainage may also be required to prevent the working platform becoming waterlogged or deteriorating during use. A working platform should be designed in accordance with BRE BR470, or similar design standard.

11.2.19 The site overlies a Principal Aquifer and as such the foundation solution adopted should not introduce migration pathways for potential mobile contaminants from the overlying materials. The Environment Agency have a preference for Continuous Flight Auger (CFA) piles undertaken within geology designated as an aquifer as it reduces this risk. It is possible that the Environment Agency will require a Foundation Works Risk Assessment to be undertaken prior to any foundation works being undertaken. Liaison with the Environment Agency will be required in this respect.

Raft Foundations

11.2.20 Alternatively, a raft foundation may be a suitable option.

11.2.21 Such a foundation should be formed on a suitable thickness of well-engineered granular sub-base, should provide an allowable bearing capacity of 100kN/m^2.

11.2.22 Prior to laying the suitable thickness of well-engineered granular sub-base, the formation level should be inspected by a suitably qualified and experienced specialist. Any loose or soft material should be removed to a suitable depth and replaced with well-graded, properly compacted granular fill or lean mix concrete. The formation should be blinded if left exposed for more than a few hours or if inclement weather is experienced.

11.2.23 In order to keep settlements within tolerable limits, the raft foundation should comprise a continuously well reinforced slab beneath the building.

11.2.24 In addition, reinforced concrete beams / thickening of the raft may be required beneath the structural walls or beneath lines of columns.

11.2.25 Any existing granular sub-base or granular Made Ground could potentially be lifted and re-engineered.

11.3 Aggressive Ground Conditions

11.3.1 Sulphate attack on building foundations occurs where sulphate solutions react with the various products of hydration in Ordinary Portland Cement (OPC) or converted High-Alumina Cement (HAC). The reaction is expansive, and therefore disruptive, not only due to the formation of minute cracks, but also due to loss of cohesion in the matrix.

11.3.2 In accordance with BRE Special Digest 1, the characteristic values of sulphate used to determine the concrete classification are determined using the methodology summarised in Table 11.2 below.

Table 11.2: Concrete in the Ground Characteristic Value Determination

No Samples in the dataset	Method for determining the sulphate characteristic value
1 - 4	Highest value
5 - 9	Mean of the top 2No highest results

10 or greater	Mean of the top 20% highest results

11.3.3 Table 11.3 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 11.3: Concrete in the Ground Class

Stratum	No Samples	pH range	Characteristic WS Sulphate (mg/l)	Characteristic Total Potential Sulphate (%)[1)]	Design Sulphate Class	ACEC Class
Made Ground/Topsoil	11	7.5 – 11.1	35.7	n/a	DS-1	AC-1
Head	16	7.0 – 8.8	39.3	n/a	DS-1	AC-1
Chalk	9	8.3 – 9.1	7.5	n/a	DS-1	AC-1

1) Applies to soils containing more than 0.3% of Oxidisable Sulphides, calculated in accordance with BRE SD-1

11.3.4 Analysis of the results indicates that the underlying soils do not contain appreciable concentrations of Oxidisable Sulphates and therefore the Design Class is dependent on the soluble sulphate content and pH only.

11.3.5 The concrete structures, including foundations, will need to be designed in accordance with BS EN 1992-1-1:2004+A1:2014. It is recommended that the advice of this publication be taken for the design and specification of all sub-surface concrete.

11.4 Ground Floor Slabs

11.4.1 Given the presence of shrinkable soils, it is recommended that suspended floor slabs are used with an adequate void designed according to NHBC Standards. As a guide, initial modelling indicates a requirement for a sub-floor void of at least 300mm due to the presence of shrinkable soils of high volume change potential (Head deposits).

11.5 Excavations

11.5.1 Temporary excavations within the Made Ground and granular soils are unlikely to remain stable and some form of temporary support or battering back to a safe angle is likely to be required.

11.5.2 Temporary excavations within the cohesive soils are likely to remain relatively stable in the short term though some spalling may be anticipated.

11.5.3 Ground works should always be designed in such a manner to avoid entry into excavations by construction or maintenance personnel. However, in the event that such works cannot be avoided or designed out, they should only be undertaken in accordance with a safe system of work, following an appropriate risk assessment and in accordance with any legislative requirements, e.g. Confined Spaces Regulations.

11.6 Road Pavements

11.6.1 Table 11.4 summarises the results of the in-situ CBR testing.

Table 11.4: Summary of CBR Test Results

Position	Depth Range (mm)	Average DCP CBR (%)
CBR1	200 – 300	47.7
	300 – 500	11.6
	500 – 950	5.0
CBR2	50 – 300	11.4
	300 – 650	28.5
	650 – 850	83
	850 – 900	275
CBR3	50 – 300	12.4
	300 – 600	18.7
	600 – 750	42.3
	750 – 950	34.2
CBR4	50 – 150	18.2
	150 – 400	11.4
	450 – 750	36.9
	800 – 900	31.5
CBR5	50 – 250	11.6
	250 – 400	19.1
	400 – 600	22.2
	600 – 950	50.8
CBR6	50 – 200	6.9
	200 – 950	18.1
CBR7	50 – 400	10.3
	400 – 750	30
	750 – 900	43.7
	400 – 900	34.9
CBR8	100 – 350	11.4
	350 – 450	20.9
	450 – 850	9.0
	850 – 1000	19.1
CBR9	50 – 200	13.8
	200 – 400	31.5
	400 – 450	275
CBR10	100 – 250	19.1

Position	Depth Range (mm)	Average DCP CBR (%)
	250 – 450	36.9
	450 – 950	27.8
CBR11	50 – 150	10.3
	150 – 300	29.7
	300 – 350	69.4
	350 – 400	275
CBR12	50 – 150	5.1
	150 – 400	15.6
	450 – 700	11.3
	700 – 950	19.8

11.6.2 The engineering characteristics of Made Ground are variable and the results of in-situ testing do not predict the overall settlements that may occur. It would therefore be prudent to assume a CBR value of 2.5% for the preliminary design of pavements constructed upon Made Ground.

11.6.3 In-situ CBR testing using a TRL DCP gives only a short-term estimated value, which may be influenced by seasonal variations in the moisture content of the soil or due to resistance against local granular inclusions.

11.6.4 Based on the test results, and with reference to the equilibrium suction-index CBR values provided in the Transport Road Research Laboratory (TRRL) Laboratory Report 1132 (1984), a preliminary CBR value of 3% and 5% are recommended for pavements constructed within the Head deposits and Chalk, respectively .

11.6.5 The near-surface soils are deemed to be of low permeability and should therefore be treated as being not frost susceptible.

11.6.6 Additional CBR testing should be undertaken after detailed design is complete to confirm suitability.

11.7 Surface Water Drainage

BRE 365 Soakage Tests

11.7.1 Table 11.5 summarises the soakage rates, which were calculated based on the results of the soakage testing:

Table 11.5: Summary of BRE 365 Soakage Test Results

Position	Geology	Calculated Infiltration Rates (m/s)		
		1st cycle	2nd Cycle	3rd Cycle
TP4	Zig Zag Chalk Formation	N/D	N/D	*
TP6	West Melbury Marly Chalk Formation	7.6×10^{-6}	1.2×10^{-5}	*
TP11	West Melbury Marly Chalk Formation	N/D	*	*
TP13	Head and West Melbury Marly Chalk Formation	5.7×10^{-6}	6.8×10^{-5}	*
TP16	Zig Zag Chalk Formation	N/D	*	*

N/D: Not determined due to insufficient fall in head over a minimum two-day period

*No time to attempt 2nd/3rd cycle

11.7.2 Based on the above results and ground conditions encountered, conventional soakaways may be suitable but results but infiltration rates have been found to be variable across the site.

11.7.3 Therefore it is recommended that further testing be undertaken at specific locations and depths where soakaways are intended to be installed.

11.7.4 A drainage engineer should be consulted for design in accordance with the recommendations provided in BRE DG 365 (2016): Soakaway design.

11.8 Groundwater Control

11.8.1 Groundwater was not encountered during drilling or subsequent monitoring (to a depth of 8m).

11.8.2 Subject to seasonal variations, any groundwater encountered during site works could be readily dealt with by conventional pumping from a sump used to collate waters.

11.8.3 Surface water or rainfall ingress may freely drain through the chalk, but if this does not occur, then they too could be dealt with by traditional sump and pump.

12 REFERENCES

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APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME	Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD	**CLIENT**	Harwell Campus GP Ltd
TITLE	Site Location Plan	**PROJECT NO.**	P4397J2609
DATE	25/07/2022	**FIGURE NO.**	1

PROJECT NAME	Zone 5 & ESA Harwell Campus, Didcot, OX11 0FD	**CLIENT**	Harwell Campus GP Ltd
TITLE	Completed GI Plan	**PROJECT NO.**	P4397J2609
DATE	August 2022	**FIGURE NO.**	2

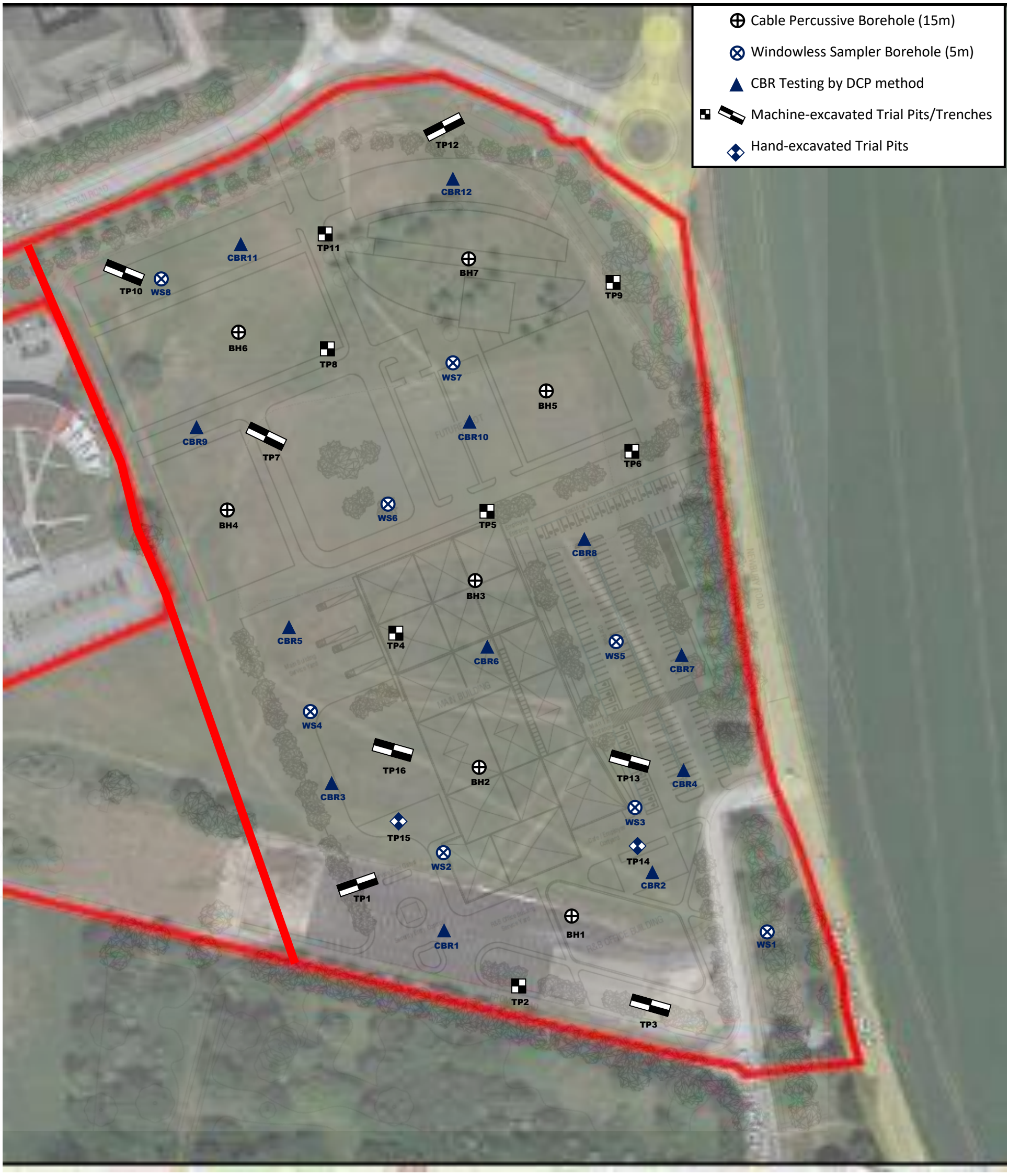

FIGURE 3 - PROPOSED DEVELOPMENT PLAN

Scale Bar

WIP

Revision	Description	Date	Drawn	Checked

SCOTT BROWNRIGG

77 Endell Street
London WC2H 9DZ
T +44 (0)20 7240 7766
W scottbrownrigg.com

Client's Name
HARWELL

Job Title
RESILIENCE PROJECT

Drawing Title
SITE CONSTRAINTS & ANALYSIS PLAN

Scale
1 : 500 @A0

Practice Project No.	Originator	Volume	Level	Type	Role	Number
20157-	SBR-	ZZ-	00-	DR-	A-	00110

Suitability Code Status Rev

APPENDIX 2 – EXPLORATORY HOLE RECORDS

CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.15
Logged By:	JAR	Date Commenced:	08/09/2022
Checked By:	SC	Date Completed:	08/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 45minutes with no progression.

3: Easting: 448288.776 | Northing: 186438.211

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00					
ES	0.30										0.30		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint and occasional concrete. (MADE GROUND)	
ES	0.60								0.50				Firm* brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, sub-rounded to sub-angular flint and occasional chalk (HEAD)	
D	1.00								1.00		1.30			
									1.50				CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (ZIG ZAG CHALK FORMATION)	
SPT	1.95	9	11	14	15	15	6	50						
D	2.00	For 6mm in R6							2.00					
									2.50					
SPT	2.95	11	12	16	19	15		50						
D	3.00	For 22mm in R4							3.00					
									3.50					
SPT	3.95	12	13	20	30			50						
D	4.00	For 50mm in R4							4.00					
									4.50					
SPT	4.95	4	13	18	20	12		50						
D	5.00	For 4mm in R5							5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH1
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.15
Logged By:	JAR	Date Commenced:	08/09/2022
Checked By:	SC	Date Completed:	08/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 45minutes with no progression.

3: Easting: 448288.776 | Northing: 186438.211

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	5.00								5.00				CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (ZIG ZAG CHALK FORMATION)	
									5.50					
D	6.00								6.00					
									6.50					
D	7.00								7.00					
									7.50					
SPT	7.95	6	12	15	17	18		50						
D	8.00								8.00					
	For 37mm in R5													
									8.50					
SPT	8.80	25		50				50			8.80			
D	9.00								9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.35
Logged By:	JAR	Date Commenced:	08/09/2022
Checked By:	SC	Date Completed:	08/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 45minutes with no progression

3: Easting: 448258.57 | Northing: 186478.475

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00					
ES	0.30										0.30		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)	
ES	0.60								0.50		0.60		Firm* brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, sub-rounded to sub-angular flint and occasional chalk (HEAD)	
D	1.00								1.00				CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (ZIG ZAG CHALK FORMATION)	
SPT	1.20	5	8	8	10	8	8	34						
									1.50					
SPT D	2.00	8	10	10	7	10	10	37	2.00					
									2.50					
SPT D	3.00	10	11	10	11	12	13	46	3.00					
									3.50					
SPT D	4.00	8	10	10	10	12	11	43	4.00					
									4.50					
SPT D	5.00	10	11	10	12	12	13	47	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH2
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.35
Logged By:	JAR	Date Commenced:	08/09/2022
Checked By:	SC	Date Completed:	08/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 45minutes with no progression

3: Easting: 448258.57 | Northing: 186478.475

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
SPT	5.00	10	11	10	12	12	13	47	5.00				CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (ZIG ZAG CHALK FORMATION)	
D														
									5.50					
D	6.00								6.00					
SPT	6.50	12	13	12	13	15	10	50	6.50					
	For 20mm in R6													
D	7.00								7.00					
									7.50					
SPT	8.00	25		50				50	8.00		8.00			
	For 48mm R1. For 65mm R3													
SPT		25		50				50						
	For 30mm R1. For 70mm R3													
D														
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH3		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.54
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 30minutes with no progression

3: Easting: 448262.368 | Northing: 186546.291

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)	
ES	0.30										0.20			
ES	0.60								0.50				Firm* brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, sub-rounded to sub-angular flint and occasional chalk (HEAD)	
D	1.00								1.00					
											1.30			
									1.50				CHALK recovered as stiff to very stiff** greyish white CLAY with occasional orange staining (WEST MELBURY MARLY CHALK FORMATION)	
SPT D	1.95 2.00	2	3	4	5	5	6	20	2.00					
									2.50					
SPT D	2.95 3.00	3	3	4	5	7	7	23	3.00					
									3.50					
SPT D	3.95 4.00	3	5	7	9	12	11	39	4.00					
									4.50					
SPT D	4.95 5.00	4	6	9	10	9	13	41	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH3
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.54
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No Water Strike Recorded

2: Chiselling for 30minutes with no progression

3: Easting: 448262.368 | Northing: 186546.291

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	5.00								5.00				CHALK recovered as stiff to very stiff** greyish white CLAY with occasional orange staining (WEST MELBURY MARLY CHALK FORMATION)	
									5.50					
SPT	6.00	25		50				50	6.00					
	For 45mm R1. For 55mm R3													
D											6.30			
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH4		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.59
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 50minutes with no progression

3: Easting: 448160.866 | Northing: 186575.177

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint and occasional concrete. (MADE GROUND)	
											0.35			
									0.50				Firm* greyish white CHALK (West Melbury Marly Chalk Formation)	
									1.00					
SPT	1.20	7	8	8	10	11	10	39						
									1.50					
SPT	2.00	8	8	8	10	10	12	40	2.00					
									2.50					
SPT	3.00	10	10	10	11	12	13	46	3.00					
									3.50					
SPT	4.00	12	10	12	13	13	12	50	4.00					
	For 20mm in R6													
									4.50					
SPT	5.00	20	5	17	18	15		50	5.00		5.00			
	For 30mm R2 ,For 45mm in R5													

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH4		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.59
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 50minutes with no progression

3: Easting: 448160.866 | Northing: 186575.177

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
SPT	5.00	20	5	17	18	15		50	5.00					
	For 30mm R2 ,For 45mm in R5													
SPT	5.50	25		50				50	5.50					
	For 35mm in R1, For 70mm in R3													
SPT		25		50				50						
	For 50mm in R1, For 70mm in R2													
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH5		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	116.95
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 40minutes with no progression

3: Easting: 448285.521 | Northing: 186601.757

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)	
ES	0.30										0.20		Firm* brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, sub-rounded to sub-angular flint and occasional chalk (HEAD)	
ES	0.60								0.50					
											0.90			
D	1.00								1.00				CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (WEST MELBURY MARLY CHALK FORMATION)	
									1.50					
SPT	1.65	10	11	15	17	18		50						
	For 9mm in R5													
D	2.00								2.00					
SPT	2.45	7	9	11	14	16	9	50						
	For 22mm in R6								2.50					
D	3.00								3.00					
SPT	3.45	8	11	20	30			50						
	For 17mm in R4								3.50					
D	4.00								4.00					
SPT	4.45	7	9	12	13	15	10	50						
	For 29mm in R6								4.50					
D	5.00								5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH5		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	116.95
Logged By:	JAR	Date Commenced:	09/09/2022
Checked By:	SC	Date Completed:	09/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 40minutes with no progression

3: Easting: 448285.521 | Northing: 186601.757

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
D	5.00											CHALK recovered as very stiff** greyish white CLAY with occasional orange staining (WEST MELBURY MARLY CHALK FORMATION)	
SPT	5.45	15	10	50				50					
D	5.50	For 36mm R2. For 20mm R3											
SPT	5.70	25		50				50		5.70			
		For 55mm in R1. For 37mm in R3											

5.00
5.50
6.00
6.50
7.00
7.50
8.00
8.50
9.00
9.50
10.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH6		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.71
Logged By:	JAR	Date Commenced:	10/09/2022
Checked By:	SC	Date Completed:	10/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 30minutes with no progression

3: Easting: 448174.14 | Northing: 186631.657

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint and occasional concrete. (MADE GROUND)	
											0.40			
									0.50				CHALK recovered as stiff to very stiff** greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)	
									1.00					
SPT	1.20	5	6	7	8	7	8	30						
									1.50					
SPT	2.00	8	8	10	8	10	10	38	2.00					
									2.50					
SPT	3.00	10	11	10	10	11	11	42	3.00					
									3.50					
SPT	4.00	10	12	12	12	13	12	49	4.00					
									4.50					
SPT	5.00	15	10	15	18	17		50	5.00		5.00			
	For 50mm R5.													
SPT		25		50				50						
	For 25mm R2, For 65mm R3.													

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH7
Site Address:	Zone 5 and ESA Harwell Campus, Didcot, OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.52
Logged By:	JAR	Date Commenced:	10/09/2022
Checked By:	SC	Date Completed:	10/09/2022
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: NO Water Strike Recorded

2: Chiselling for 30minutes with no progression

3: Easting: 448256.041 | Northing: 186665.294

4: *Field description | **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)	
											0.35		CHALK recovered as very stiff** greyish white CLAY (WEST MELBURY MARLY CHALK FORMATION)	
									0.50					
SPT	1.20	10	8	8	7	8	8	31	1.00					
									1.50					
SPT	2.00	8	7	8	7	10	10	35	2.00					
									2.50					
SPT	3.00	10	8	11	10	11	12	44	3.00					
									3.50					
SPT	4.00	10	13	12	13	13	12	50	4.00					
	For 40mm in R6													
									4.50					
SPT	5.00	20	5	18	20			38	5.00		5.00			
SPT		25		50				50						
	For 50mm in R1, For 75mm in R3													

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP1		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.41
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.10	Width:	1.00	Depth:	1.60

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448212.573 | Northing: 186450.126

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.10		Asphalt (MADE GROUND)
				0.30		Concrete (MADE GROUND)
ES	0.40			0.50		Brown sandy gravelly clay. Sand is fine to coarse. Gravel consists of fine to coarse, sub-angular to sub-rounded flint and occasional chalk. (HEAD)
D	1.20			1.60		CHALK recovered as stiff* greyish white CLAY. (ZIG ZAG CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP2		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.23
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.30	Width:	1.00	Depth:	3.20

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448282.126 | Northing: 186409.345

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.10		Asphalt (MADE GROUND)
				0.30		Concrete (MADE GROUND)
ES	0.50			0.60		Brown and black sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-angular to sub-rounded flint, occasional chalk and rare asphalt (MADE GROUND)
D	1.50			3.20		CHALK recovered as stiff* greyish white stained orange CLAY. (ZIG ZAG CHALK FORMATION)

0.00 — 0.50 — 1.00 — 1.50 — 2.00 — 2.50 — 3.00 — 3.50 — 4.00 — 4.50 — 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP3		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.61
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.00	Width:	1.00	Depth:	1.50

Remarks

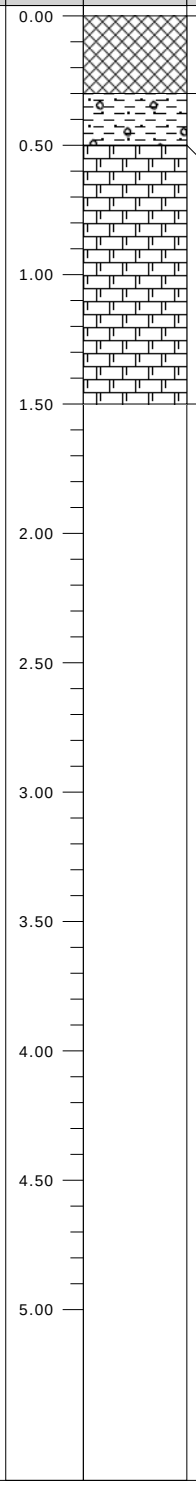
1: * - Field Observation

2: No groundwater reported

3: Easting: 448326.611 | Northing: 186410.419

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.30		Concrete (MADE GROUND)
ES	0.40			0.50		Brown and black sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-angular to sub-rounded flint, chalk and rare asphalt (MADE GROUND)
D	1.20			1.50		CHALK recovered as stiff* greyish white stained orange CLAY. (ZIG ZAG CHALK FORMATION)



Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP4						
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD				Project No:	P4397J2609	
Client:	Harwell Campus GP Ltd				Ground Level:	118.09	
Logged By:	JAR				Date Commenced:	13/09/2022	
Checked By:	SC				Date Completed:	13/09/2022	
Type and diameter of equipment:	JCB 3CX				Sheet No:	1 Of 1	
Pit Dimension:	Length:	2.50	Width:	1.00	Depth:	3.30	

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448228.638 | Northing: 186536.328

4: Soil infiltration testing undertaken within trial pit

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.00		
				0.20		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.40			0.50		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-rounded to sub-angular flint and occasional chalk (HEAD)
D	1.50			3.30		CHALK recovered as stiff* greyish white CLAY. (ZIG ZAG CHALK FORMATION)

0.00 — 0.50 — 1.00 — 1.50 — 2.00 — 2.50 — 3.00 — 3.50 — 4.00 — 4.50 — 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

TRIAL PIT RECORD

Exploratory Hole No:	TP5		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.31
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.30	Width:	1.00	Depth:	3.00

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448262.987 | Northing: 186580.144

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.20		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.40			0.60		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and occasional chalk (HEAD)
D	1.20			3.00		CHALK recovered as stiff* greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP6		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	116.72
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.50	Width:	1.00	Depth:	3.10

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448312.81 | Northing: 186593.667

4: Soil infiltration testing undertaken within trial pit

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.30		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.80		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and occasional chalk (HEAD)
D	1.20			3.10		CHALK recovered as stiff* greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP7		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.28
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.20	Width:	1.00	Depth:	1.60

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448183.576 | Northing: 186603.517

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.20		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.60		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
D	1.20			1.60		CHALK recovered as greyish white GRAVEL. (WEST MELBURY MARLY CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP8		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.69
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	sc	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.50	Width:	1.00	Depth:	3.20

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448214.239 | Northing: 186614.004

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.30		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.60		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
D	1.20			3.20		CHALK recovered as greyish white GRAVEL with rare orange staining (WEST MELBURY MARLY CHALK FORMATION)
D	2.40					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP9		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	116.89
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.50	Width:	1.00	Depth:	2.90

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448307.762 | Northing: 186629.032

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.30		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.70		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
D	1.20			2.90		CHALK recovered as stiff* greyish white GRAVEL with rare orange staining (WEST MELBURY MARLY CHALK FORMATION)
D	2.40					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP10		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	119.13
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.30	Width:	1.00	Depth:	1.50

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448125.149 | Northing: 186645.466

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.40		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.80		Brown sandy gravelly CLAY. Sand is fine to coarse, sub-rounded to sub-angular. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
D	1.20			1.50		CHALK recovered as stiff* greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP11		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.29
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	2.50	Width:	1.00	Depth:	3.50

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448204.648 | Northing: 186665.052

4: Soil infiltration testing undertaken within trial pit

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.20		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (MADE GROUND -Topsoil)
				0.50		Concrete (MADE GROUND)
ES	0.80			1.20		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
D	1.20			3.50		CHALK recovered as stiff* greyish white CLAY with occasional orange staining. (WEST MELBURY MARLY CHALK FORMATION)
D	2.00					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP12		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.41
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.10	Width:	1.00	Depth:	1.50

Remarks

1: * - Field Observation

2: No groundwater reported

3: Easting: 448241.4 | Northing: 186706.987

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.20		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (MADE GROUND - Topsoil)
ES	0.50			0.55		Very firm* greysih white garvelly clay. Gravel cosists of asphalt fragment. (MADE GROUND)
				0.65		Concrete. (MADE GROUND)
D	1.20			1.50		CHALK recovered as stiff* greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP13		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	
Logged By:	JAR	Date Commenced:	14/09/2022
Checked By:	SC	Date Completed:	14/09/2022
Type and diameter of equipment:	JCB 3CX	Sheet No:	1 Of 1

Pit Dimension:	Length:	3.20	Width:	1.00	Depth:	2.80

Remarks

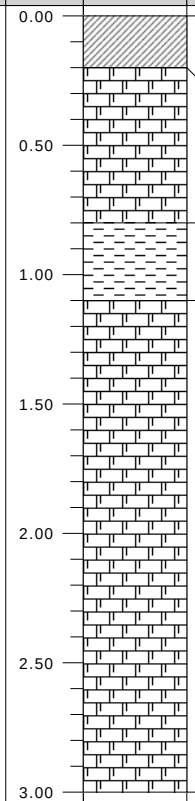
1: * - Field Observation

2: No groundwater reported

3: Soil infiltration testing undertaken within trial pit

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.20		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
ES	0.50			0.80		Firm* greyish white CHALK. (HEAD)
D	1.00			1.10		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-rounded to sub-angular flint and occasional chalk (HEAD)
D	1.20			3.00		CHALK recovered as stiff* greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)
D	2.40					



Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

Exploratory Hole No:	TP16		
Site Address:	Zone 5 and ESA Harwell Campus, Didcot , OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	
Logged By:	JAR	Date Commenced:	15/09/2022
Checked By:	SC	Date Completed:	15/09/2022
Type and diameter of equipment:		Sheet No:	1 Of 1

Pit Dimension:	Length:	3.10	Width:	1.00	Depth:	3.10

Remarks

1: *Field description

2: No groundwater reported

3: Soil infiltration testing undertaken within trial pit

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
				0.00		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, sub-rounded to sub-angular flint. (TOPSOIL)
				0.20		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-rounded to sub-angular flint and chalk (HEAD)
				0.70		CHALK recovered as stiff* greyish white CLAY. (ZIG ZAG CHALK FORMATION)
				3.10		

0.00, 0.50, 1.00, 1.50, 2.00, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS1		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.85
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	SC	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description

2: Groundwater not reported

3: Easting: 448358.586 | Northing: 186441.819

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
ES	0.10								0.00				Brown sandy gravel, with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, angular to sub-rounded flint. (MADE GROUND - Topsoil)	
											0.20			
ES	0.50								0.50				Brown sandy gravelly clay. Sand is fine to coarse. Gravel consists of fine to coarse sub-angular to sub-rounded flint and chalk. (MADE GROUND)	
											0.60			
											0.65		Asphalt. (MADE GROUND)	
											0.70		Concrete. (MADE GROUND)	
									1.00					
									1.50					
									2.00					
									2.50					
									3.00					
									3.50					
									4.00					
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS2		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.39
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	SC	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description

2: Groundwater not reported

3: Easting: 448248.621 | Northing: 186459.109

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.10									0.20		Brown sandy gravel, with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, angular to sub-rounded flint. (TOPSOIL)	
ES	0.50									0.80		Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse sub-angular to sub-rounded flint and chalk. (HEAD)	
D	1.00											Structureless CHALK recovered as very stiff** greyish white CLAY. (ZIG ZAG CHALK FORMATION)	
SPT		3	3	6	6	8	12	32					
D	2.00									2.00			
SPT		7	10	13	22	26	30	91					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS3
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.97
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	SC	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description

2: Groundwater not reported

3: Easting: 448324.658 | Northing: 186470.738

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.10									0.20		Brown sandy gravel. Sand is fine to coarse. Gravel consists of medium to coarse angular to sub-rounded flint. (TOPSOIL)	
ES	0.50											Stiff** brown sandy gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel consists of fine to coarse sub-angular to sub-rounded flint and chalk. (HEAD)	
D	1.00												
SPT		2	4	4	6	5	6	21					
										1.60		Structureless CHALK recovered as very stiff** greyish white CLAY. (ZIG ZAG CHALK FORMATION)	
D	2.00									2.00			
SPT		4	6	12	13	13	12	50					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS4		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.39
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	sc	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field Description

2: No Groundwater Reported

3: Easting: 448183.848 | Northing: 186512.503

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.10									0.40		Brown sandy gravel, with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, angular to sub-rounded flint. (TOPSOIL)	
ES	0.50									1.50		Firm** brown sandy gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel consists of fine to coarse, sub-angular to sub-rounded flint and chalk. (HEAD)	
D	1.00												
SPT		2	3	3	3	4	3	13					
										2.00		Structureless CHALK recovered as very stiff** greyish white CLAY. (ZIG ZAG CHALK FORMATION)	
D	2.00												
SPT		8	7	12	14	13	14	53					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS5		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.30
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	SC	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field Observation

2: No groundwater encountered

3: Easting: 448246.918 | Northing: 186615.493

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.10									0.20		Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, angular to sub-rounded flint. (TOPSOIL)	
ES	0.60											Greyish white clayey CHALK. (HEAD)	
D	1.00									1.00			
SPT		3	3	4	3	4	4	15				Firm rapidly becoming veyr stiff** brown sandy gravelly CLAY. Sand is fine to coarse. Gravel consists of fine to coarse, sub-angular to sub-rounded chalk and flint. (HEAD)	
D	2.00									2.00			
SPT		2	4	14	12	13	12	51					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS6		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.72
Logged By:	JAR	Date Commenced:	12/09/2022
Checked By:	SC	Date Completed:	12/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field Description

2: No groundwater reported

3: Easting: 448218.592 | Northing: 186575.211

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
ES	0.20								0.00				Brown sandy gravel with occasional rootlets. Sand is fine to coarse. Gravel consists of medium to coarse, angular to sub-rounded flint. (TOPSOIL)	
ES	0.50								0.50		0.50		Structureless CHALK recovered as firm** rapidly becoming very stiff** greyish white CLAY. (WEST MELBURY MARLY CHALK FORMATION)	
SPT	1.00	2	2	3	3	3	4	13	1.00					
									1.50					
D	2.00								2.00		2.00			
SPT		8	12	14	14	16	15	59	2.00					
									2.50					
									3.00					
									3.50					
									4.00					
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS7		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	117.30
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description

2: No groundwater reported

3: Easting: 448246.908 | Northing: 186615.484

4: **Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.25									0.25		Soft consistency* brown gravelly clay with occasional rootlets. Gravel consists of fine to coarse flint. (TOPSOIL)	
ES	0.50									0.80		Stiff consistency* light brown gravelly CLAY. Gravel consists of fine angular chalk and flint. (HEAD)	
ES	1.00											Structureless CHALK recovered as stiff to very stiff** grey silty CLAY. (WEST MELBURY MARLY CHALK FORMATION)	
SPT		3	3	4	4	5	6	19					
D	2.00									2.00			
SPT		8	9	12	12	13	13	50					

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS8		
Site Address:	Zone 5 & ESA Harwell Campus, Didcot OX11 0FD	Project No:	P4397J2609
Client:	Harwell Campus GP Ltd	Ground Level:	118.79
Logged By:	JAR	Date Commenced:	13/09/2022
Checked By:	SC	Date Completed:	13/09/2022
Type and diameter of equipment:	Windowless Sampler Rig	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field Description

2: No groundwater reported

3: Easting: 448138.135 | Northing: 186641.197

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.10									0.10		Soft consistency* brown sandy clay with occasional rootlets. Sand is fine to coarse. (MADE GROUND - Topsoil)	
										0.20		Concrete Slab (MADE GROUND).	
ES	0.50											Gravel comprising angular concrete and asphalt. (MADE GROUND)	
D	1.00												
SPT		3	3	4	5	13		22		1.20			

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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APPENDIX 3 – CHEMICAL LABORATORY TEST RESULTS

Shaw Carter
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Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

e: Jomas Associates -

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

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 22-85708

Project / Site name:	Zone 5 and ESA Harwell campus, Didcot OX11	**Samples received on:**	20/09/2022
Your job number:	JJ2609	**Samples instructed on/ Analysis started on:**	22/09/2022
Your order number:	P4397JJ2609.14	**Analysis completed by:**	30/09/2022
Report Issue Number:	1	**Report issued on:**	30/09/2022
Samples Analysed:	5 leachate samples - 22 soil samples		

Signed:

Dominika Warjan
Junior 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

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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.

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433418	2433419	2433420	2433421	2433422
Sample Reference				WS1	WS2	WS3	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	8.2	8.7	7.1	13
Total mass of sample received	kg	0.001	NONE	1	1	1	1	1
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	DSA
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.5	8.1	7.6	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1100	770	1000	250	910
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.007	0.0053	0.0079	0.0015	0.0044
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	7	5.3	7.9	1.5	4.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.38	1.7	< 0.05	< 0.05	3.6
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.45	< 0.05	< 0.05	0.96
Fluoranthene	mg/kg	0.05	MCERTS	1.3	7.2	0.63	< 0.05	7
Pyrene	mg/kg	0.05	MCERTS	1.2	6.6	0.58	< 0.05	6.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.88	5	0.38	< 0.05	3.3
Chrysene	mg/kg	0.05	MCERTS	0.66	3.3	0.32	< 0.05	2.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.92	3.9	0.44	< 0.05	2.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.55	3.4	0.28	< 0.05	2.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.94	4.8	0.43	< 0.05	3.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.54	2.7	< 0.05	< 0.05	1.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.7	< 0.05	< 0.05	0.37
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.66	3.1	< 0.05	< 0.05	2.1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	8	42.9	3.06	< 0.80	36.4
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	13	11	11	8.2
Boron (water soluble)	mg/kg	0.2	MCERTS	2.9	2.2	2.5	0.7	1.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.5	0.4	< 0.2	0.5
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	33	26	30	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	10	14	7.9	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	36	38	36	16	98
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	27	24	24	17
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	71	81	66	44	62

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433418	2433419	2433420	2433421	2433422
Sample Reference				WS1	WS2	WS3	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	32	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	37	-	-	-	-
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	-	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	-	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	-	22	< 1.0	< 1.0	13
TPH (C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	-	84	< 10	< 10	51
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433418	2433419	2433420	2433421	2433422
Sample Reference				WS1	WS2	WS3	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-

Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	-	-	-
Total Residue	mg/kg	10	NONE	-	-	-	-	-

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

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433423	2433424	2433425	2433426	2433427
Sample Reference				WS6	WS7	WS8	WS8	WS8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.25	0.10	0.50	1.00
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	51	-
Moisture Content	%	0.01	NONE	9.3	11	15	9.3	-
Total mass of sample received	kg	0.001	NONE	1	1	1	1	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	N/A	DSA
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.7	7.9	11.1	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Total Sulphate as SO4	mg/kg	50	MCERTS	650	930	2000	4800	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.011	0.011	0.0035	0.056	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	10.9	11.1	3.5	56.1	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.2	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.9	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.38	3.5	0.58	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.37	3.3	0.67	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.19	1.9	0.58	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.24	2.2	0.4	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.24	2.6	0.89	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.22	1.7	0.27	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.25	2.4	0.73	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6	0.46	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.37	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.9	0.52	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	1.89	22.7	5.1	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	12	7.4	24	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.5	2.3	3.3	1.3	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	0.5	< 0.2	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	41	14	23	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7.4	9.7	24	31	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	21	66	70	15	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	26	11	17	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	58	350	42	-

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433423	2433424	2433425	2433426	2433427
Sample Reference				WS6	WS7	WS8	WS8	WS8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.25	0.10	0.50	1.00
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	< 1.0	2.1	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	< 2.0	39	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	< 8.0	71	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	< 8.0	180	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	-	< 10	290	-
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	< 2.0	7.5	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	14	20	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	84	52	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	< 10	-	98	79	-
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	-	< 4.0	-	-	-
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPH (C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	-	< 10	-	-	-
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433423	2433424	2433425	2433426	2433427
Sample Reference				WS6	WS7	WS8	WS8	WS8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.25	0.10	0.50	1.00
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	-

Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	-	Not Identified	-
Total Residue	mg/kg	10	NONE	-	-	-	390	-

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

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433428	2433429	2433430	2433431	2433432
Sample Reference				BH1	BH2	TP2	TP3	TP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.30	0.50	0.40	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	15	17	13	12
Total mass of sample received	kg	0.001	NONE	1	1	1	1	1
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	DSA	GFI	GFI	GFI	N/A
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8	7.3	8.1	8.5	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	750	1000	270	340	190
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.016	0.024	0.0086	0.026	< 0.0013
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.5	24.2	8.6	25.5	< 1.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.41	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	3.6	0.41	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	3.2	0.36	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2	0.25	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.7	0.26	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	0.2	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	0.25	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2	0.28	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.24	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	20.3	2.01	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	9	9.8	19	14
Boron (water soluble)	mg/kg	0.2	MCERTS	1.5	2.2	0.6	1.4	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	24	27	41	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	10	6.4	13	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	37	22	15	19	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	21	22	46	39
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	68	52	42	63	45

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433428	2433429	2433430	2433431	2433432
Sample Reference				BH1	BH2	TP2	TP3	TP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.30	0.50	0.40	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	-	< 2.0	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-	< 8.0	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-	< 8.0	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	-	-	< 10	< 10	-
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	-	< 2.0	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-	< 10	< 10	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-	< 10	< 10	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	-	-	< 10	< 10	-
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	< 2.0
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	-	-	< 4.0
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	13	< 1.0	-	-	< 1.0
TPH (C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	52	< 10	-	-	< 10
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Chloroethane	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
Benzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433428	2433429	2433430	2433431	2433432
Sample Reference				BH1	BH2	TP2	TP3	TP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.30	0.50	0.40	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Styrene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Tribromomethane	µg/kg	1	NONE	-	-	< 1.0	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	< 1.0	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	< 1.0	-

Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	Not Identified	Not Identified	-
Total Residue	mg/kg	10	NONE	-	-	< 10	< 10	-

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

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433433	2433434	2433435	2433436	2433437
Sample Reference				TP5	TP6	TP7	TP9	TP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.50	0.50	0.50
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	4.8	11	8.9	11	6
Total mass of sample received	kg	0.001	NONE	1	1	0.6	0.6	0.6
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	7	8	8.3	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	370	240	180	600	200
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0024	0.0023	0.0016	0.0081	0.0014
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	2.4	2.3	1.6	8.1	1.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	15	9.6	5.9	8.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1	0.4	0.9	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	47	35	18	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7.2	10	6.7	4	5.7
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	16	15	6.4	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	41	26	18	22
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	41	69	50	25	42

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433433	2433434	2433435	2433436	2433437
Sample Reference				TP5	TP6	TP7	TP9	TP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.50	0.50	0.50
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433433	2433434	2433435	2433436	2433437
Sample Reference				TP5	TP6	TP7	TP9	TP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.50	0.50	0.50
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-

Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	-	-	-
Total Residue	mg/kg	10	NONE	-	-	-	-	-

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

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433438	2433439
Sample Reference				TP11	TP12
Sample Number				None Supplied	None Supplied
Depth (m)				0.80	0.30
Date Sampled				21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	2.9
Total mass of sample received	kg	0.001	NONE	0.6	0.3
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	GFI
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.1	9.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	200	750
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0094	0.04
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	9.4	39.5
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	2.8
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	6.5
Fluorene	mg/kg	0.05	MCERTS	< 0.05	4.5
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	46
Anthracene	mg/kg	0.05	MCERTS	< 0.05	12
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	34
Pyrene	mg/kg	0.05	MCERTS	< 0.05	27
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	11
Chrysene	mg/kg	0.05	MCERTS	< 0.05	9
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	8.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.8
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	7.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	2.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.85
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	3.2
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	180
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	7.5
Boron (water soluble)	mg/kg	0.2	MCERTS	1	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	50	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	5.7
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	9.4
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	71	30

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433438	2433439
Sample Reference				TP11	TP12
Sample Number				None Supplied	None Supplied
Depth (m)				0.80	0.30
Date Sampled				21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Monoaromatics & Oxygenates					
Benzene	µg/kg	1	MCERTS	-	< 1.0
Toluene	µg/kg	1	MCERTS	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0
Petroleum Hydrocarbons					
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	< 0.1	-
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	2.4
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	16
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	35
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	250
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	-	310
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	-	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	3.8
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	34
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	120
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	340
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	-	500
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	< 2.0	-
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	< 4.0	-
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	< 1.0	-
TPH (C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10	-
VOCs					
Chloromethane	µg/kg	1	ISO 17025	-	< 1.0
Chloroethane	µg/kg	1	NONE	-	< 1.0
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0
Benzene	µg/kg	1	MCERTS	-	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11
Your Order No: P4397JJ2609.14

Lab Sample Number				2433438	2433439
Sample Reference				TP11	TP12
Sample Number				None Supplied	None Supplied
Depth (m)				0.80	0.30
Date Sampled				21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0
Toluene	µg/kg	1	MCERTS	-	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0
Styrene	µg/kg	1	MCERTS	-	< 1.0
Tribromomethane	µg/kg	1	NONE	-	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0

Miscellaneous Organics

Coal Tar		N/A	NONE	-	Not Identified
Total Residue	mg/kg	10	NONE	-	530

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

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

Your Order No: P4397JJ2609.14

Lab Sample Number				2433440	2433441	2433442	2433443	2433444
Sample Reference				WS1	WS6	WS8	BH5	TP1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.30	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH (automated)	pH Units	N/A	ISO 17025	7.6	8.2	10.7	7.9	7.8
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO_4	µg/l	100	ISO 17025	1790	1020	6810	1820	2440
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	3.3	< 1.0	1.1
Boron (dissolved)	µg/l	10	ISO 17025	17	10	14	13	21
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.5	1.2	16	0.8	2.3
Copper (dissolved)	µg/l	0.7	ISO 17025	21	8.7	15	21	9.1
Lead (dissolved)	µg/l	1	ISO 17025	3.8	4.4	2.7	4.2	4.4
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	4.4	4.6	4	6.1	5
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	5.6	9.3	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	15	10	8.6	15	12
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

Your Order No: P4397JJ2609.14

Lab Sample Number				2433440	2433441	2433442	2433443	2433444
Sample Reference				WS1	WS6	WS8	BH5	TP1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.30	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH1 (C10 - C40) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH2 (C6 - C10) HS_1D_TOTAL	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH C6 - C40 EH+HS_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C5 - C6 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) HS+EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH (C6 - C10) HS_1D_TOTAL	mg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
TPH (C10 - C12) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH (C12 - C16) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH (C16 - C21) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH (C21 - C40) EH_1D_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
Chloromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Analytical Report Number: 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

Your Order No: P4397JJ2609.14

Lab Sample Number				2433440	2433441	2433442	2433443	2433444
Sample Reference				WS1	WS6	WS8	BH5	TP1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	0.50	0.30	0.40
Date Sampled				21/09/2022	21/09/2022	21/09/2022	21/09/2022	21/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Cis-1,3-dichloropropene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ter-Butylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,3-Trichlorobenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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

Analytical Report Number : 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

* 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 *
2433418	WS1	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2433419	WS2	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
2433420	WS3	None Supplied	0.1	Brown clay and loam with vegetation.
2433421	WS4	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
2433422	WS5	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2433423	WS6	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
2433424	WS7	None Supplied	0.25	Brown clay and sand with gravel and vegetation.
2433425	WS8	None Supplied	0.1	Brown loam with gravel and vegetation.
2433426	WS8	None Supplied	0.5	Brown sand with vegetation and stones.
2433428	BH1	None Supplied	0.5	Brown clay and sand with gravel and vegetation.
2433429	BH2	None Supplied	0.3	Brown clay and sand with gravel and vegetation.
2433430	TP2	None Supplied	0.5	Brown clay and sand with gravel.
2433431	TP3	None Supplied	0.4	Brown clay and sand with gravel.
2433432	TP4	None Supplied	0.4	Brown clay and sand with gravel.
2433433	TP5	None Supplied	0.4	Brown sandy clay with gravel and vegetation.
2433434	TP6	None Supplied	0.5	Brown sandy clay with gravel and vegetation.
2433435	TP7	None Supplied	0.5	Brown sandy clay with gravel and vegetation.
2433436	TP9	None Supplied	0.5	Brown sandy clay with gravel and vegetation.
2433437	TP10	None Supplied	0.5	Brown sandy clay with gravel and vegetation.
2433438	TP11	None Supplied	0.8	Brown clay and sand with gravel and vegetation.
2433439	TP12	None Supplied	0.3	Brown sand with gravel and vegetation.

Analytical Report Number : 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
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	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	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.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate	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 (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025

Analytical Report Number : 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPH2 (Leachates)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	ISO 17025
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
TPH in (Leachate)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method, TPH with carbon banding.	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Coal Tar in Soil	DCM Extraction with qualitative interpretation via GC/MS	In-house method	L064-PL	D	NONE
TPH C6 - C40 (leachate)	Determination of TPH in leachate by HS-GC-MS and GC-MS	In-house method	L070-PL	W	NONE
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
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

Analytical Report Number : 22-85708
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

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Analytical Report Number : 22-86273

Project / Site name:	Zone 5 and ESA Harwell Campus, Didcot OX11	**Samples received on:**	20/09/2022
Your job number:	JJ2609	**Samples instructed on/ Analysis started on:**	26/09/2022
Your order number:	P4397JJ2609.16	**Analysis completed by:**	03/10/2022
Report Issue Number:	1	**Report issued on:**	03/10/2022
Samples Analysed:	13 soil samples		

Signed:

Dominika Warjan
Junior 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

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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.

Analytical Report Number: 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11
Your Order No: P4397JJ2609.16

Lab Sample Number				2437112	2437113	2437114	2437115	2437116
Sample Reference				WS3	WS3	WS4	WS5	WS7
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.00	0.50	0.60	1.00
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	53	< 0.1	33	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.9	14	6.5	7.9	17
Total mass of sample received	kg	0.001	NONE	1	0.6	1	1	1.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	8.9	7.9	8.7	8.8
Total Sulphate as SO4	mg/kg	50	MCERTS	270	460	120	410	570
Total Sulphate as SO4	%	0.005	MCERTS	0.027	0.046	0.012	0.041	0.057
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0034	< 0.0013	0.0055	0.0014	0.0022
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	3.4	< 1.3	5.5	1.4	2.2
Total Sulphur	mg/kg	50	MCERTS	140	170	66	170	240
Total Sulphur	%	0.005	MCERTS	0.014	0.017	0.007	0.017	0.024

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

Analytical Report Number: 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11
Your Order No: P4397JJ2609.16

Lab Sample Number				2437117	2437118	2437119	2437120	2437121
Sample Reference				WS7	BH1	BH1	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.00	0.60	2.00	1.00	3.00
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	17	18	18	19
Total mass of sample received	kg	0.001	NONE	0.9	0.6	0.6	0.6	0.6

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.1	8.8	8.8	9	8.3
Total Sulphate as SO4	mg/kg	50	MCERTS	470	440	470	360	430
Total Sulphate as SO4	%	0.005	MCERTS	0.047	0.044	0.047	0.036	0.043
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0016	0.0034	0.0088	0.0058	0.0067
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1.6	3.4	8.8	5.8	6.7
Total Sulphur	mg/kg	50	MCERTS	180	190	230	190	230
Total Sulphur	%	0.005	MCERTS	0.018	0.019	0.023	0.019	0.023

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

Analytical Report Number: 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11
Your Order No: P4397JJ2609.16

Lab Sample Number				2437122	2437123	2437124
Sample Reference				BH3	BH3	BH5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	4.00	3.00
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	18	18
Total mass of sample received	kg	0.001	NONE	0.6	0.6	0.6

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	9	8.6
Total Sulphate as SO4	mg/kg	50	MCERTS	590	470	520
Total Sulphate as SO4	%	0.005	MCERTS	0.059	0.047	0.052
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0068	0.0031	0.0044
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	6.8	3.1	4.4
Total Sulphur	mg/kg	50	MCERTS	390	190	210
Total Sulphur	%	0.005	MCERTS	0.039	0.019	0.021

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

Analytical Report Number : 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11

* 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 *
2437112	WS3	None Supplied	0.5	Brown clay and sand with stones and gravel
2437113	WS3	None Supplied	2	Brown clay and sand with gravel.
2437114	WS4	None Supplied	0.5	Brown clay and sand with stones and gravel
2437115	WS5	None Supplied	0.6	Brown clay and sand with gravel.
2437116	WS7	None Supplied	1	Brown clay and sand with gravel.
2437117	WS7	None Supplied	2	Brown clay and sand with gravel.
2437118	BH1	None Supplied	0.6	Brown clay and sand with gravel.
2437119	BH1	None Supplied	2	Brown clay and sand with gravel.
2437120	BH2	None Supplied	1	Brown clay and sand with gravel.
2437121	BH2	None Supplied	3	Brown clay and sand with gravel.
2437122	BH3	None Supplied	0.2	Brown clay and loam with gravel and vegetation.
2437123	BH3	None Supplied	4	Brown clay and sand with gravel.
2437124	BH5	None Supplied	3	Brown clay and sand with gravel.

Analytical Report Number : 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11

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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
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.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

Analytical Report Number : 22-86273
Project / Site name: Zone 5 and ESA Harwell Campus, Didcot OX11

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

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	None Supplied	S	2437118	a	None Supplied	None Supplied	None Supplied
BH1	None Supplied	S	2437119	a	None Supplied	None Supplied	None Supplied
BH2	None Supplied	S	2437120	a	None Supplied	None Supplied	None Supplied
BH2	None Supplied	S	2437121	a	None Supplied	None Supplied	None Supplied
BH3	None Supplied	S	2437122	a	None Supplied	None Supplied	None Supplied
BH3	None Supplied	S	2437123	a	None Supplied	None Supplied	None Supplied
BH5	None Supplied	S	2437124	a	None Supplied	None Supplied	None Supplied
WS3	None Supplied	S	2437112	a	None Supplied	None Supplied	None Supplied
WS3	None Supplied	S	2437113	a	None Supplied	None Supplied	None Supplied
WS4	None Supplied	S	2437114	a	None Supplied	None Supplied	None Supplied
WS5	None Supplied	S	2437115	a	None Supplied	None Supplied	None Supplied
WS7	None Supplied	S	2437116	a	None Supplied	None Supplied	None Supplied
WS7	None Supplied	S	2437117	a	None Supplied	None Supplied	None Supplied

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Analytical Report Number : 22-85715

Project / Site name:	Zone 5 and ESA Harwell campus, Didcot OX11	**Samples received on:**	20/09/2022
Your job number:	JJ2609	**Samples instructed on/ Analysis started on:**	22/09/2022
Your order number:	P4397JJ2609.14	**Analysis completed by:**	03/10/2022
Report Issue Number:	1	**Report issued on:**	03/10/2022
Samples Analysed:	4 10:1 WAC Samples		

Signed:

Adam Fenwick
Technical Reviewer
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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Waste Acceptance Criteria Analytical Results

Report No:	**22-85715**						
					Client:	**JOMASASSOC**	
Location	**Zone 5 and ESA Harwell campus, Didcot OX11**						
Lab Reference (Sample Number)	2433479 / 2433480				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	21/09/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS1 0.50						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	1.8				3%	5%	6%
Loss on Ignition (%) **	4.2				--	--	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)	7.32				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	3.8				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0085			0.0758	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0015			0.013	0.5	10	70
Copper *	0.015			0.14	2	50	100
Mercury *	0.0009			0.0079	0.01	0.2	2
Molybdenum *	0.0010			0.0086	0.5	10	30
Nickel *	0.0043			0.039	0.4	10	40
Lead *	0.0045			0.040	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 *	0.012			0.11	4	50	200
Chloride *	0.89			8.0	800	15000	25000
Fluoride	1.0			8.9	10	150	500
Sulphate *	1.0			9.3	1000	20000	50000
TDS*	60			540	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	10.8			96.8	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.0						
Dry Matter (%)	91						
Moisture (%)	9.2						

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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Waste Acceptance Criteria Analytical Results

Report No:	**22-85715**						
					Client:	**JOMASASSOC**	
Location	**Zone 5 and ESA Harwell campus, Didcot OX11**						
Lab Reference (Sample Number)	2433481 / 2433482				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	21/09/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS3 0.10						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	3.9				3%	5%	6%
Loss on Ignition (%) **	8.5				--	--	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)	3.60				100	--	--
pH (units)**	7.8				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	3.3				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0042			0.0356	0.5	2	25
Barium *	0.0145			0.122	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0013			0.011	0.5	10	70
Copper *	0.041			0.35	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0011			0.0095	0.5	10	30
Nickel *	0.0054			0.045	0.4	10	40
Lead *	0.0041			0.034	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 *	0.011			0.093	4	50	200
Chloride *	1.6			14	800	15000	25000
Fluoride	0.13			1.1	10	150	500
Sulphate *	2.0			17	1000	20000	50000
TDS*	100			880	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	23.6			200	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.0						
Dry Matter (%)	91						
Moisture (%)	8.7						

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.

i2 Analytical
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Croxley Green Business Park
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email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-85715**						
					Client:	**JOMASASSOC**	
Location	**Zone 5 and ESA Harwell campus, Didcot OX11**						
Lab Reference (Sample Number)	2433483 / 2433484				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	21/09/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH3 0.60						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	0.2				3%	5%	6%
Loss on Ignition (%) **	2.0				--	--	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)	< 0.85				100	--	--
pH (units)**	8.0				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.6				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0022			0.0188	0.5	2	25
Barium *	0.0072			0.0617	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0012			0.011	0.5	10	70
Copper *	0.0072			0.062	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0010			0.0088	0.5	10	30
Nickel *	0.0036			0.031	0.4	10	40
Lead *	0.0024			0.020	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 *	0.0088			0.075	4	50	200
Chloride *	0.78			6.6	800	15000	25000
Fluoride	0.56			4.8	10	150	500
Sulphate *	0.81			7.0	1000	20000	50000
TDS*	55			470	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.47			55.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.60						
Dry Matter (%)	82						
Moisture (%)	18						

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.

i2 Analytical
7 Woodshots Meadow
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Watford, WD18 8YS

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Waste Acceptance Criteria Analytical Results

Report No:	**22-85715**						
					Client:	**JOMASASSOC**	
Location	**Zone 5 and ESA Harwell campus, Didcot OX11**						
Lab Reference (Sample Number)	2433485 / 2433486				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	21/09/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP4 0.40						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	0.5				3%	5%	6%
Loss on Ignition (%) **	2.7				--	--	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)	< 0.85				100	--	--
pH (units)**	7.9				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.2				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0014			0.0126	0.5	2	25
Barium *	0.0074			0.0653	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0019			0.017	0.5	10	70
Copper *	0.018			0.16	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0065			0.057	0.4	10	40
Lead *	0.0051			0.045	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 *	0.014			0.12	4	50	200
Chloride *	0.64			5.7	800	15000	25000
Fluoride	0.82			7.2	10	150	500
Sulphate *	0.78			6.9	1000	20000	50000
TDS*	57			500	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	10.2			89.6	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.0						
Dry Matter (%)	88						
Moisture (%)	12						

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.

Analytical Report Number : 22-85715
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

* 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 *
2433479	WS1	0.5	None Supplied	Brown clay and loam with gravel and vegetation.
2433481	WS3	0.1	None Supplied	Brown clay and loam with vegetation.
2433483	BH3	0.6	None Supplied	Brown clay and sand with gravel and vegetation.
2433485	TP4	0.4	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 22-85715
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

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
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	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""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	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
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073-PL	W	MCERTS
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""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	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-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025

Analytical Report Number : 22-85715
Project / Site name: Zone 5 and ESA Harwell campus, Didcot OX11

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
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
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

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Analytical Report Number : 22-86914

Project / Site name:	Zone 5 & ESA Harwell Campus, Didcot OX11	**Samples received on:**	20/09/2022
Your job number:	JJ2609	**Samples instructed on/ Analysis started on:**	26/09/2022
Your order number:	P4397JJ2609.16	**Analysis completed by:**	04/10/2022
Report Issue Number:	1	**Report issued on:**	04/10/2022
Samples Analysed:	2 soil samples		

Signed:

Dominika Warjan
Junior 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

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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.

Analytical Report Number: 22-86914
Project / Site name: Zone 5 & ESA Harwell Campus, Didcot OX11
Your Order No: P4397JJ2609.16

Lab Sample Number				2441120	2441121
Sample Reference				BH1	BH5
Sample Number				None Supplied	None Supplied
Depth (m)				6.00	0.40-0.80
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	12
Total mass of sample received	kg	0.001	NONE	1.1	1.1

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.8	8.1
Total Sulphate as SO4	mg/kg	50	MCERTS	650	710
Total Sulphate as SO4	%	0.005	MCERTS	0.065	0.071
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.004	0.0067
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	4	6.7
Total Sulphur	mg/kg	50	MCERTS	250	360
Total Sulphur	%	0.005	MCERTS	0.025	0.036

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

Analytical Report Number : 22-86914
Project / Site name: Zone 5 & ESA Harwell Campus, Didcot OX11

* 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 *
2441120	BH1	None Supplied	6	Brown clay and sand with gravel and vegetation.
2441121	BH5	None Supplied	0.40-0.80	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 22-86914
Project / Site name: Zone 5 & ESA Harwell Campus, Didcot OX11

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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
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.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

Sample Deviation Report

Analytical Report Number : 22-86914
Project / Site name: Zone 5 & ESA Harwell Campus, Didcot OX11

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

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	None Supplied	S	2441120	a	None Supplied	None Supplied	None Supplied
BH5	None Supplied	S	2441121	a	None Supplied	None Supplied	None Supplied

APPENDIX 4 – GEOTECHNICAL LABORATORY TEST RESULTS

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

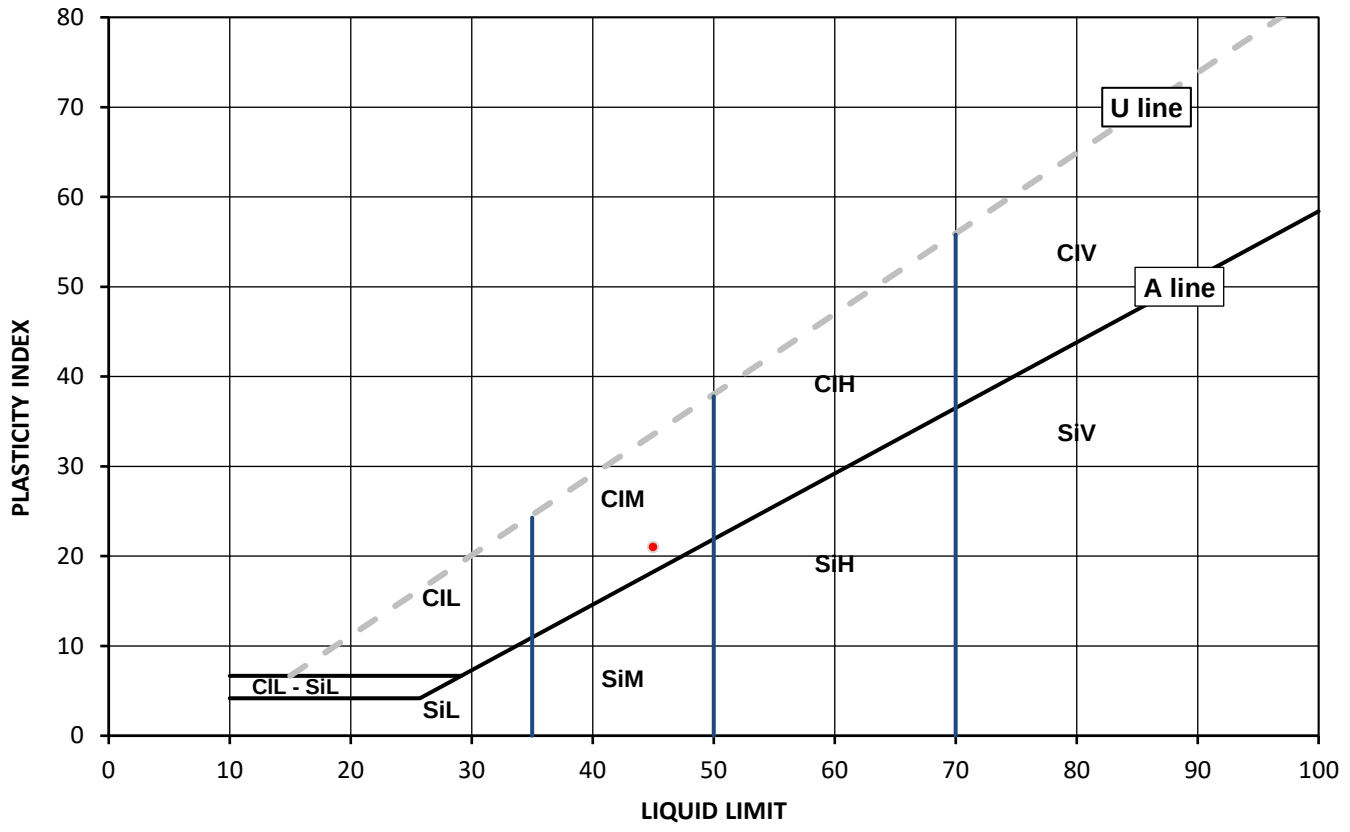
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434473	Depth Top [m]:	9.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	45	24	21	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

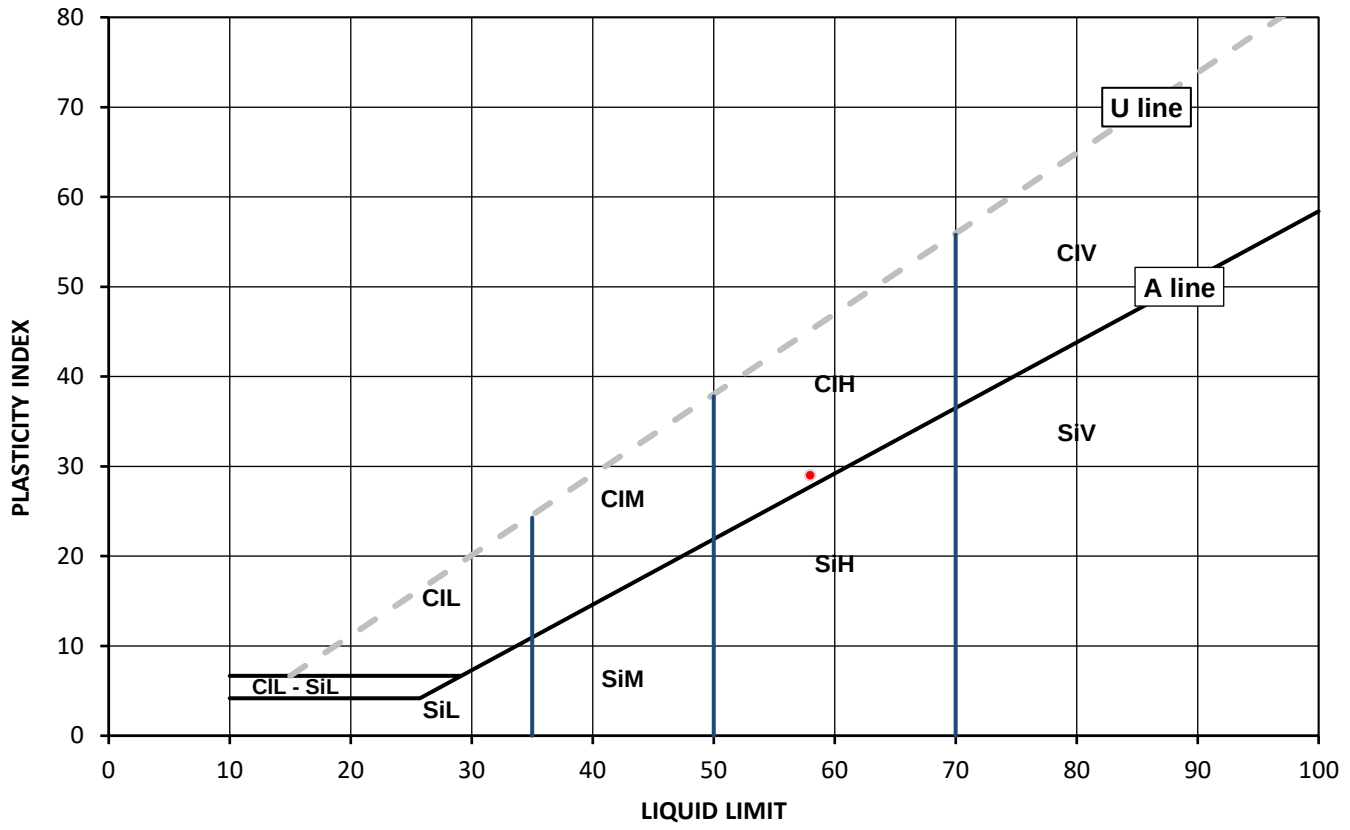
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434474	Depth Top [m]:	0.60
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	58	29	29	74



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

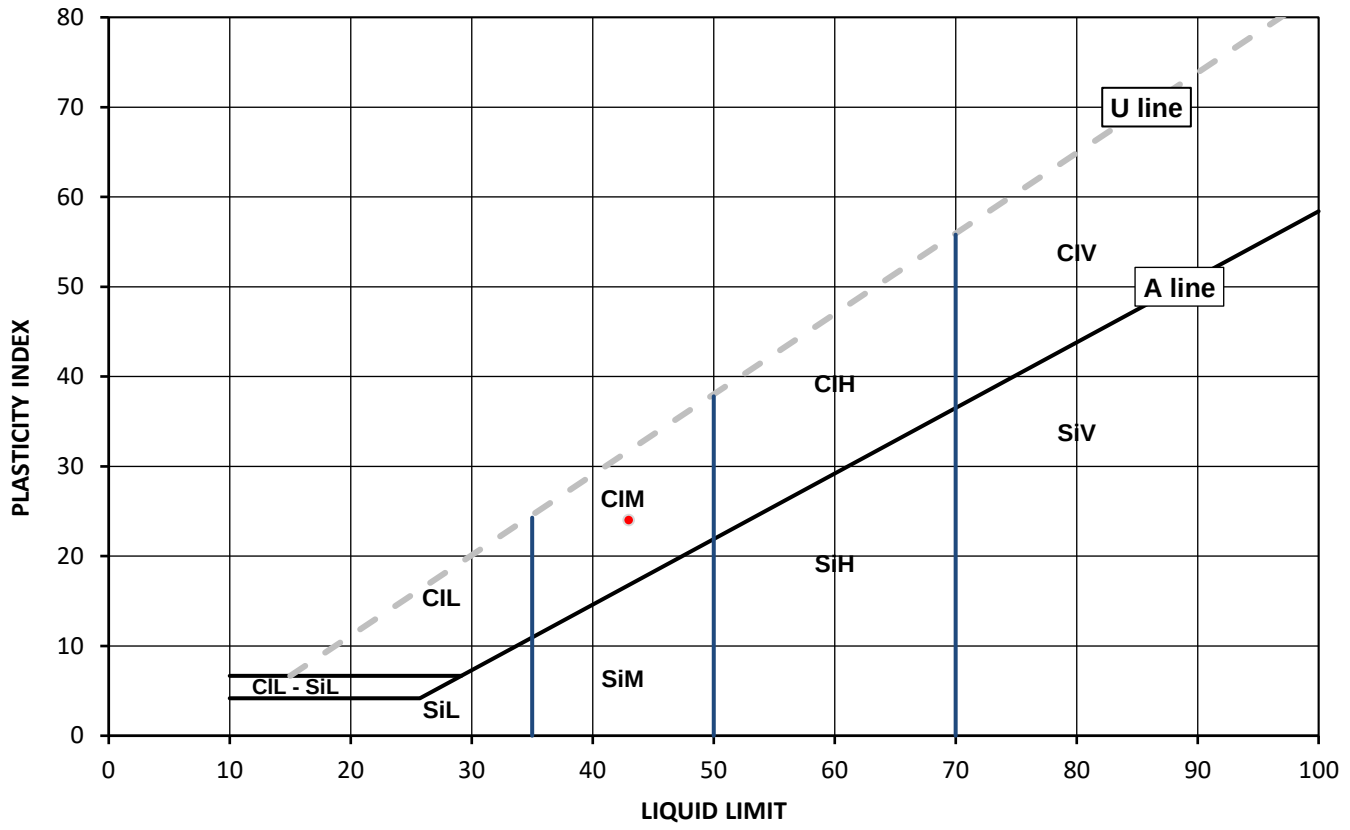
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434476	Depth Top [m]:	4.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
32	43	19	24	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

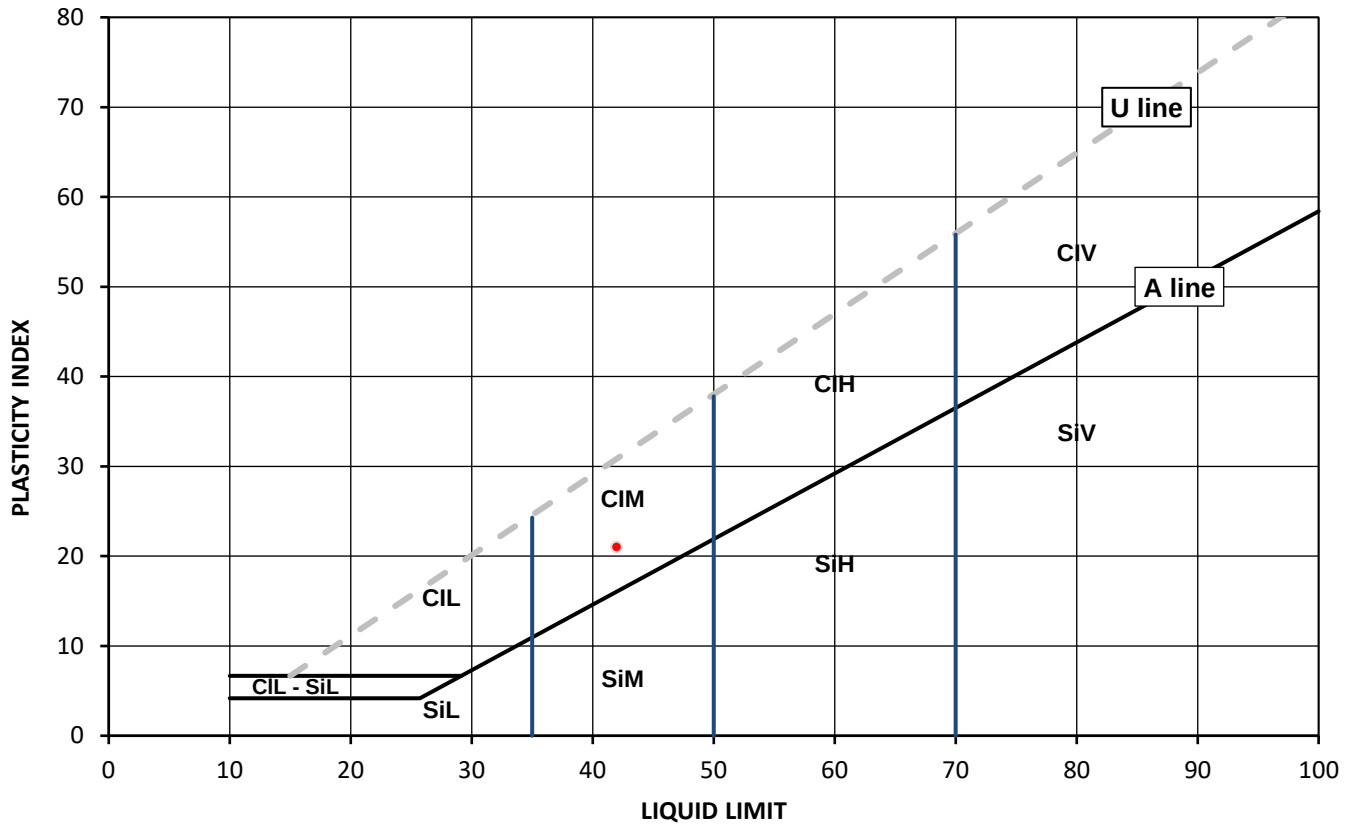
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434477	Depth Top [m]:	6.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
37	42	21	21	93



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Date Reported: 10/10/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

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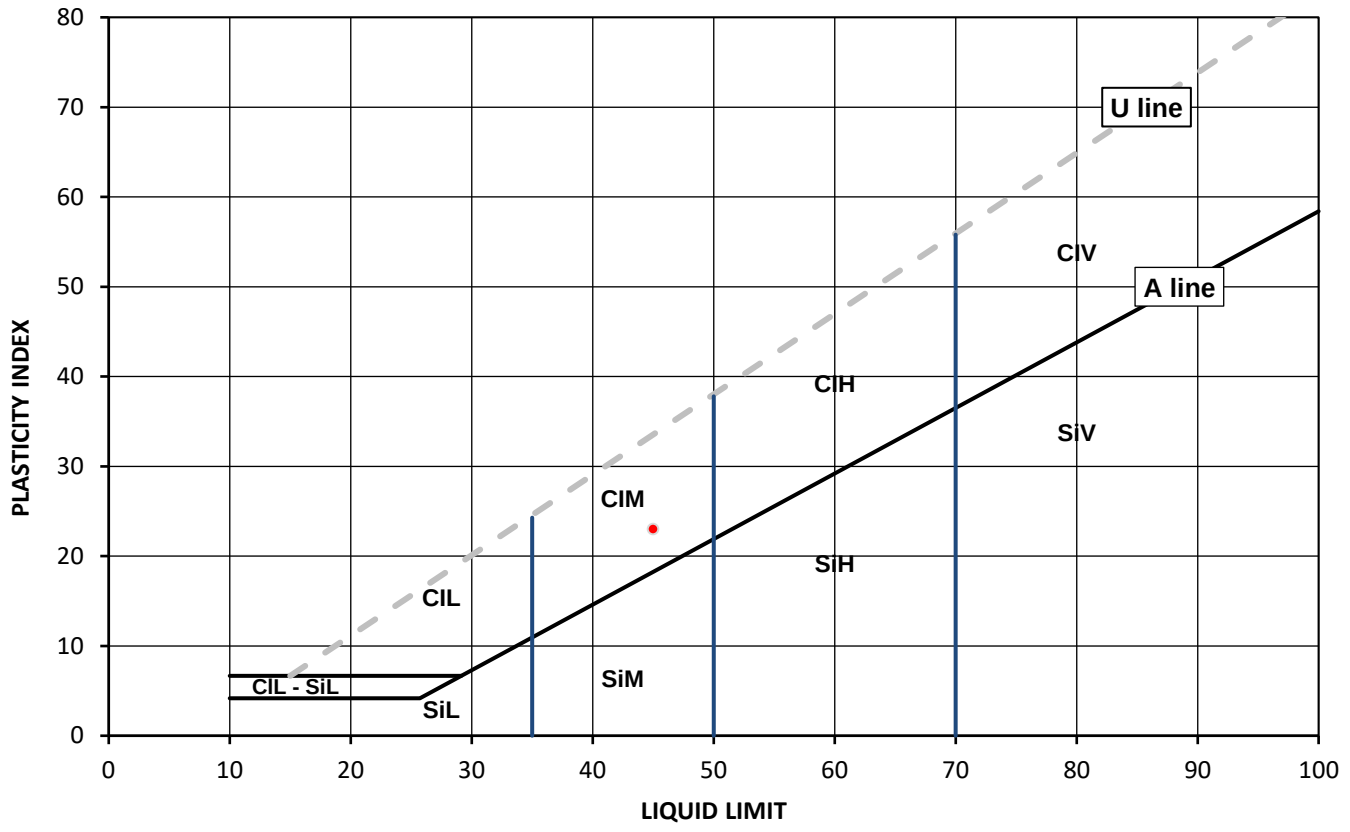
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434479	Depth Top [m]:	1.00
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	45	22	23	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Date Reported: 10/10/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

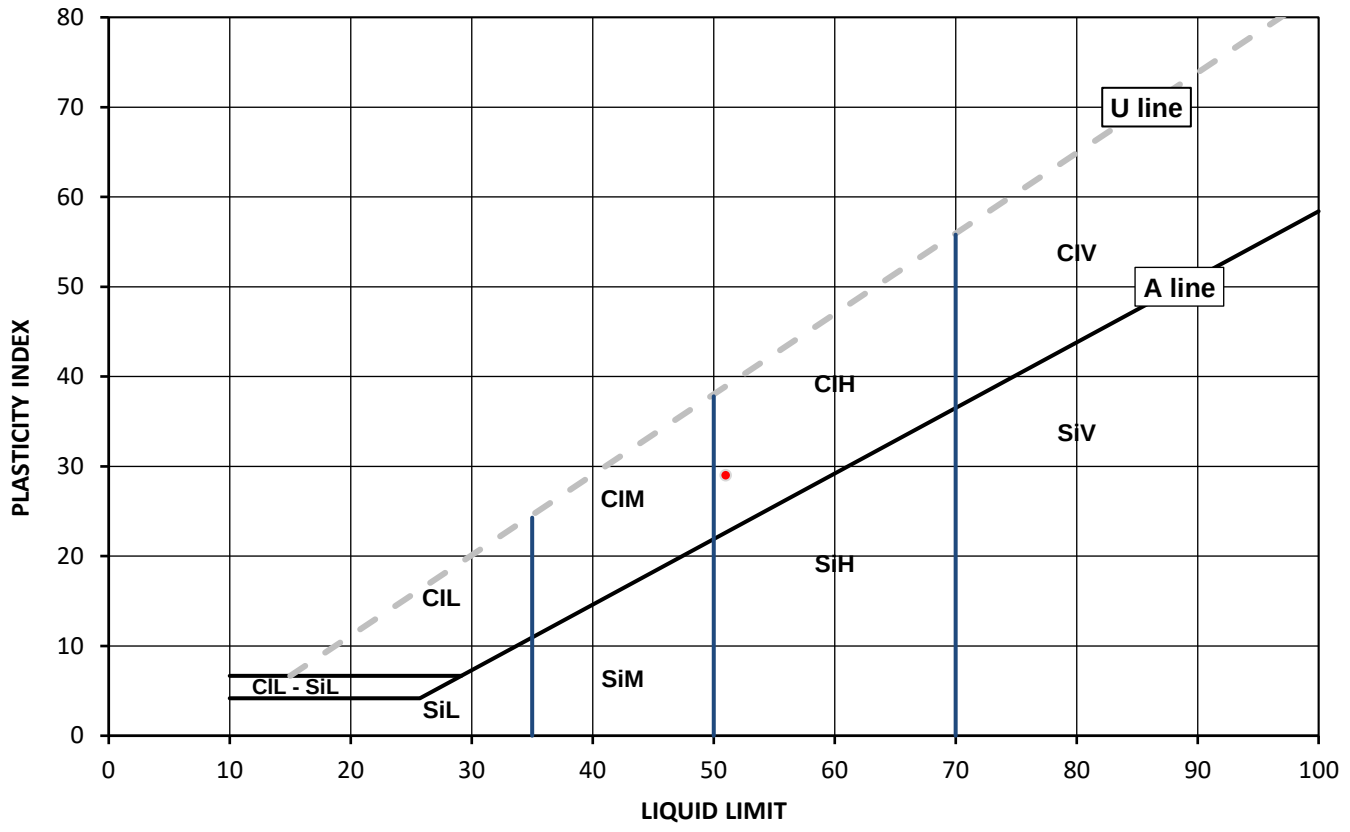
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434480	Depth Top [m]:	3.00
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	51	22	29	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Date Reported: 10/10/2022

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Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

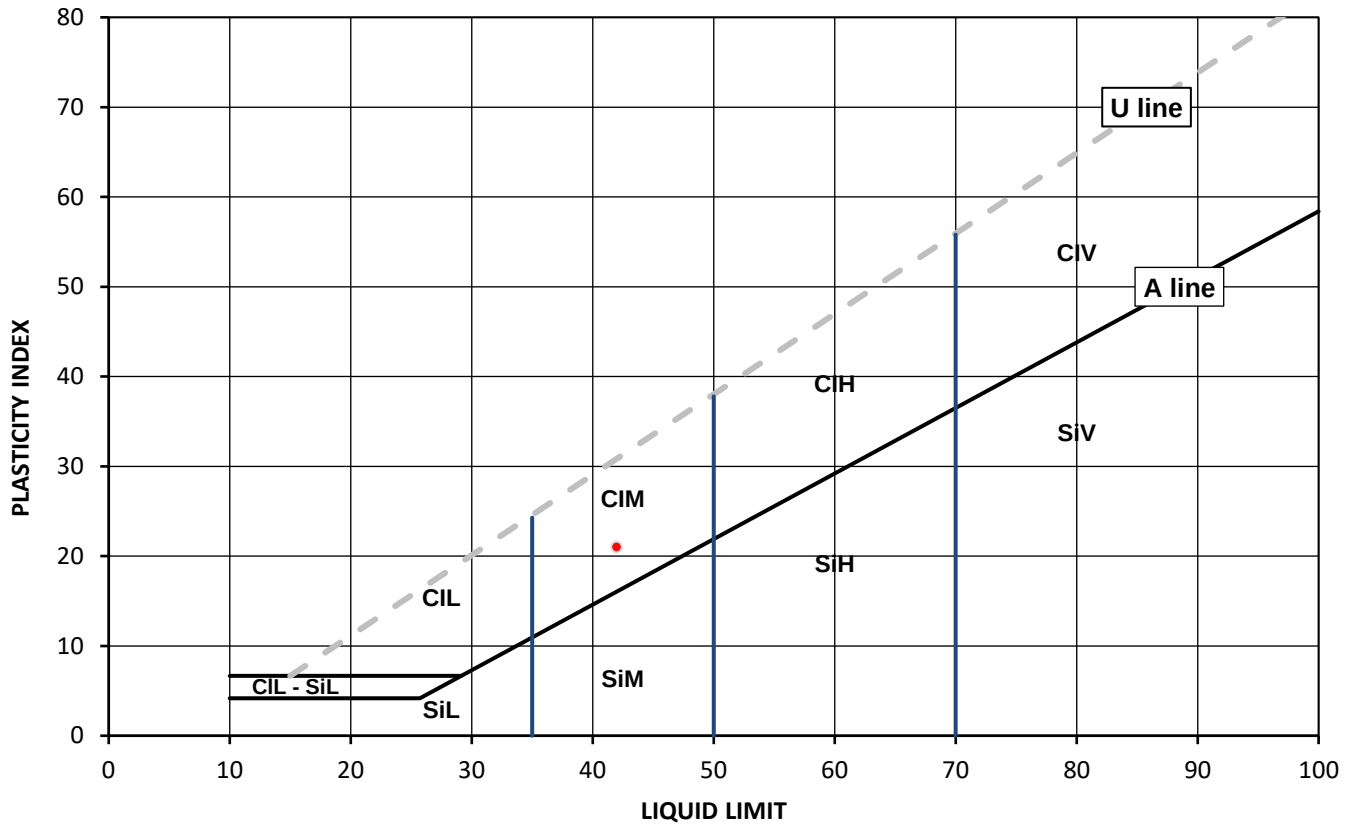
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434482	Depth Top [m]:	6.00
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	42	21	21	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Date Reported: 10/10/2022

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Brackmills Industrial Estate
Northampton NN4 7EB

4041

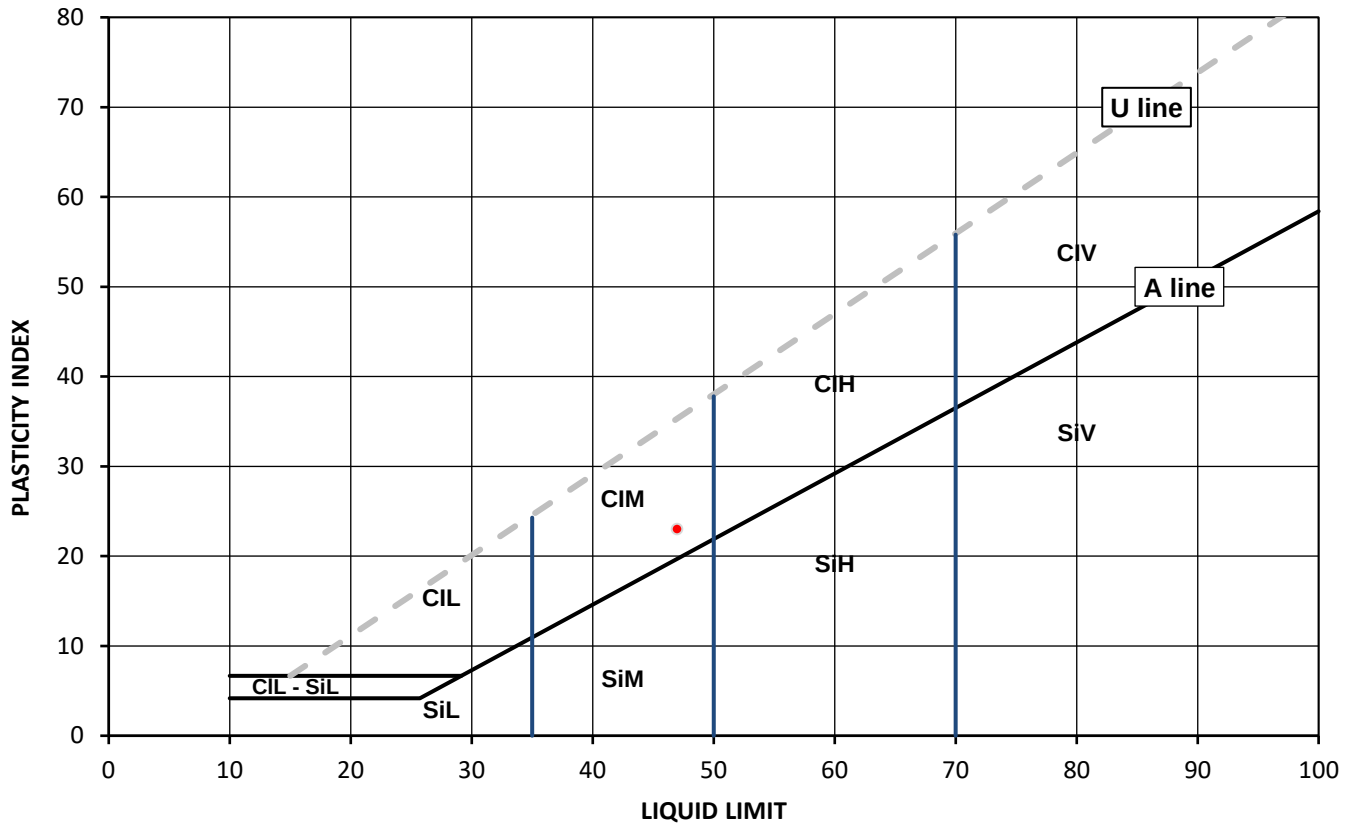
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434483	Depth Top [m]:	1.00
Hole No.:	BH5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	47	24	23	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
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i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

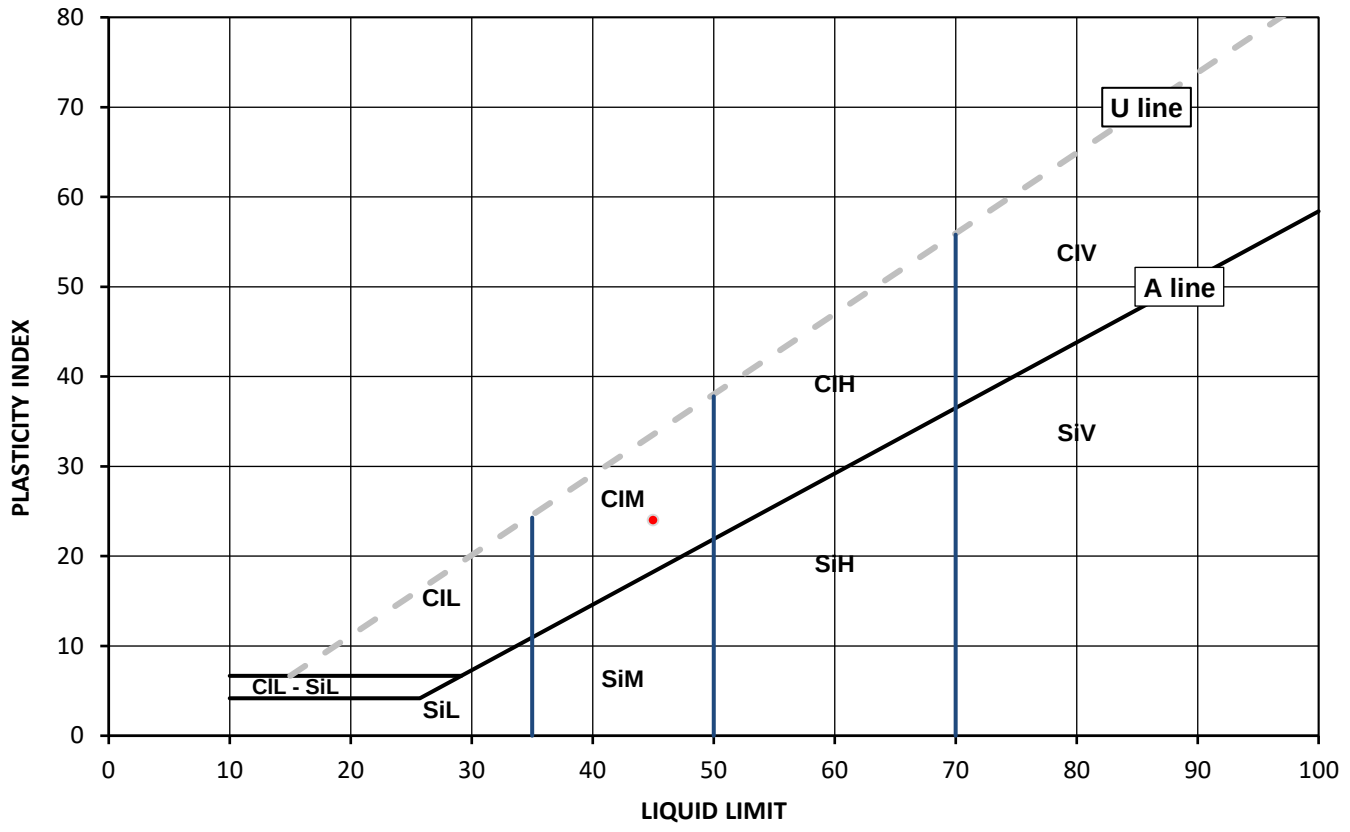
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434484	Depth Top [m]:	2.00
Hole No.:	BH5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	45	21	24	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
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Northampton NN4 7EB

4041

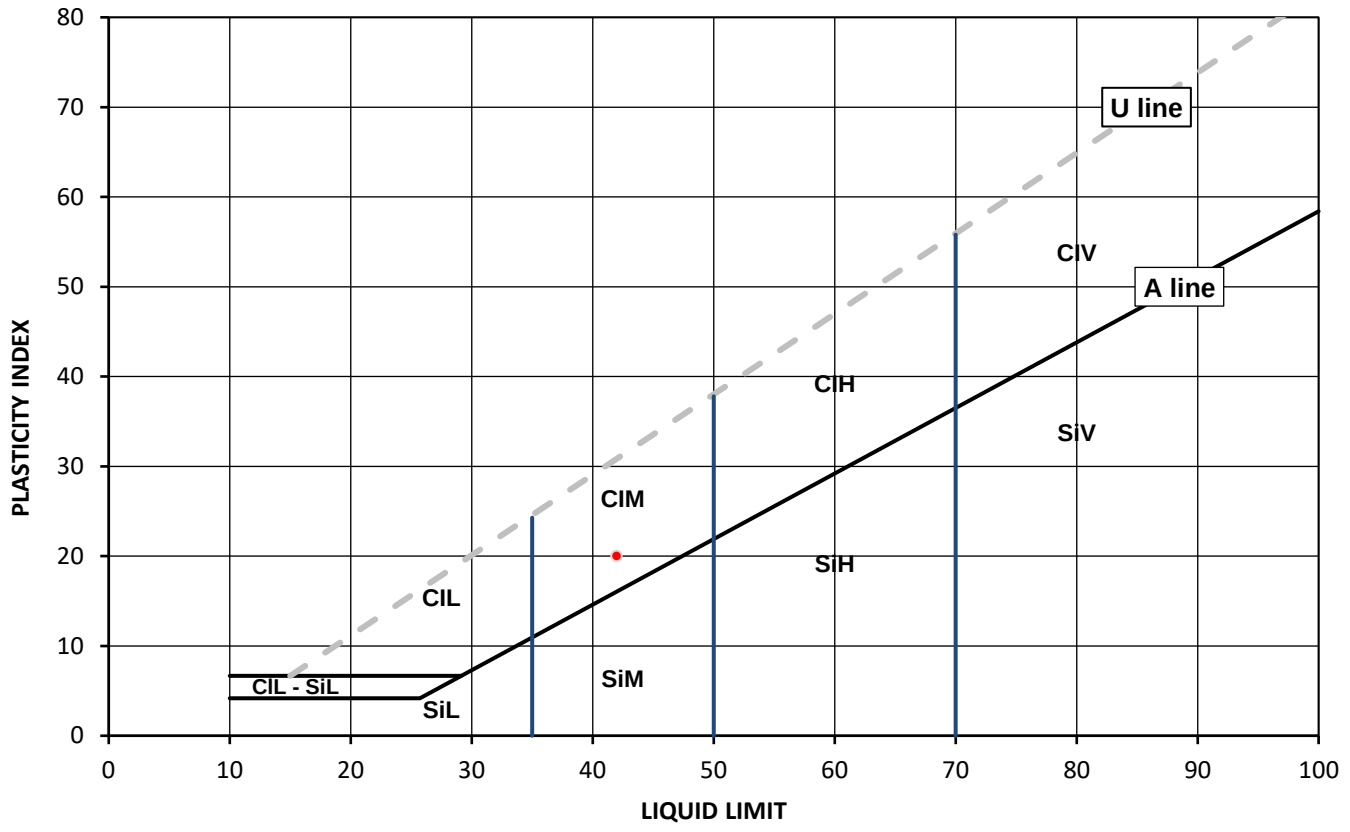
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434486	Depth Top [m]:	5.50
Hole No.:	BH5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	42	22	20	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
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Client:	Jomas Associates Ltd	Client Reference:	JJ2609
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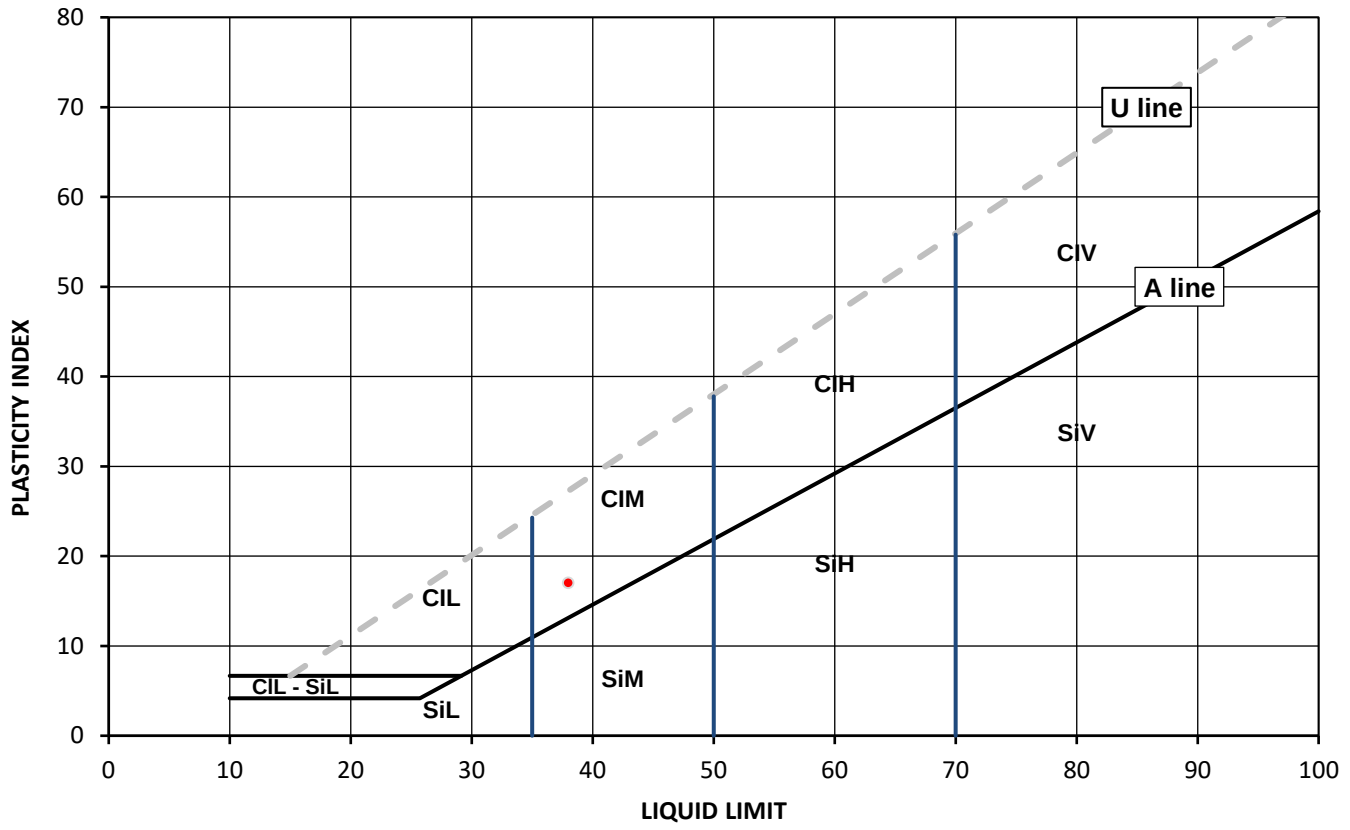
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434487	Depth Top [m]:	1.20
Hole No.:	TP1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	38	21	17	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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Date Reported: 10/10/2022

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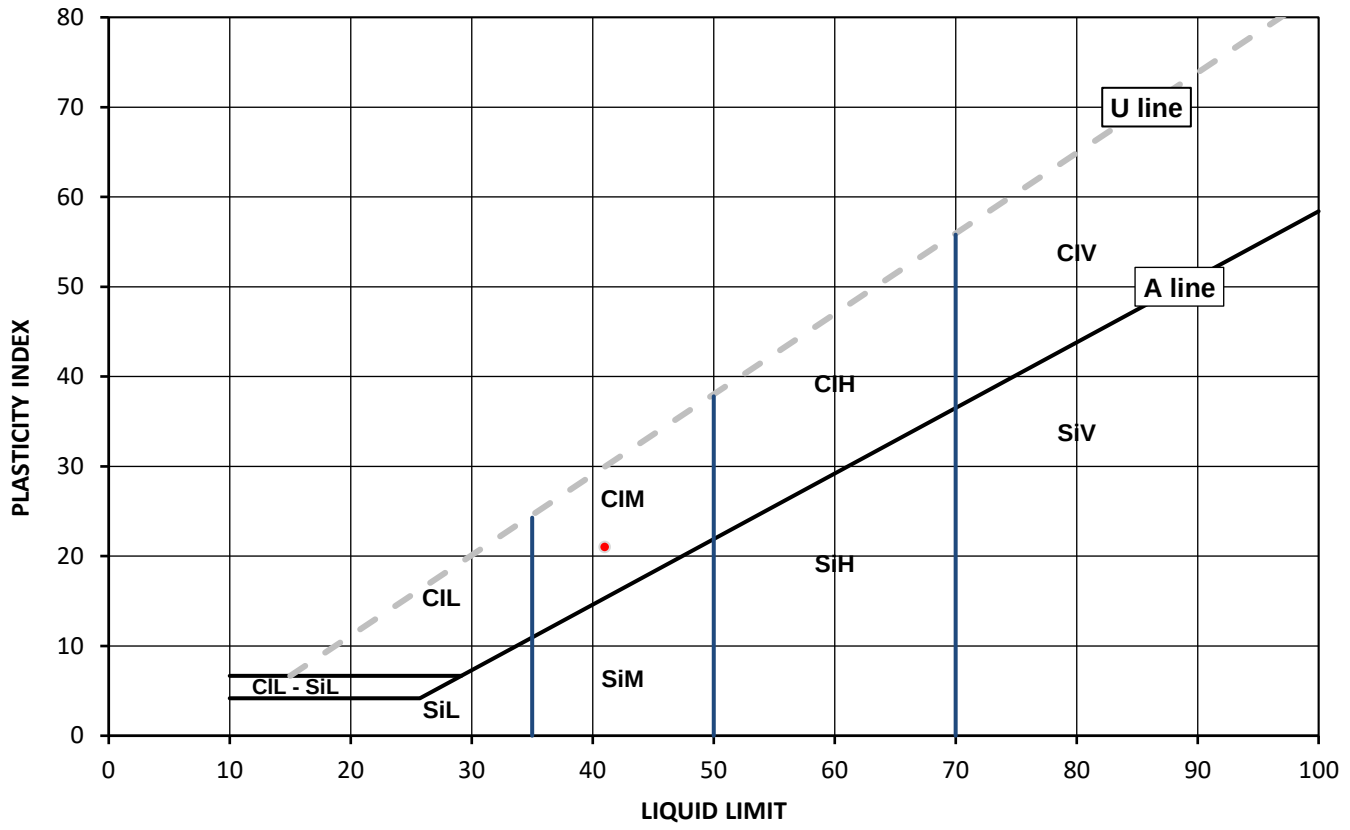
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434490	Depth Top [m]:	1.50
Hole No.:	TP4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	41	20	21	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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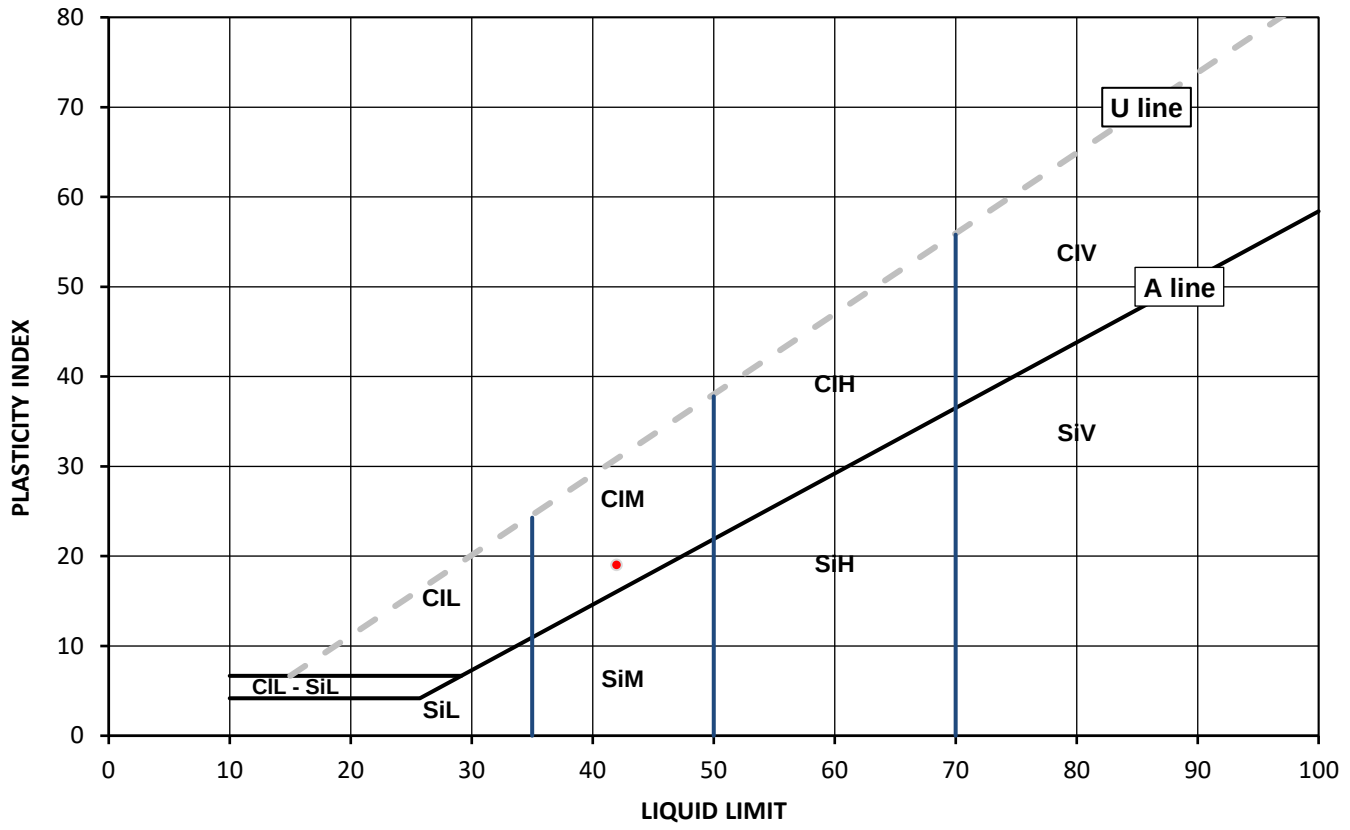
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434491	Depth Top [m]:	1.20
Hole No.:	TP5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	42	23	19	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING
4041

Environmental Science

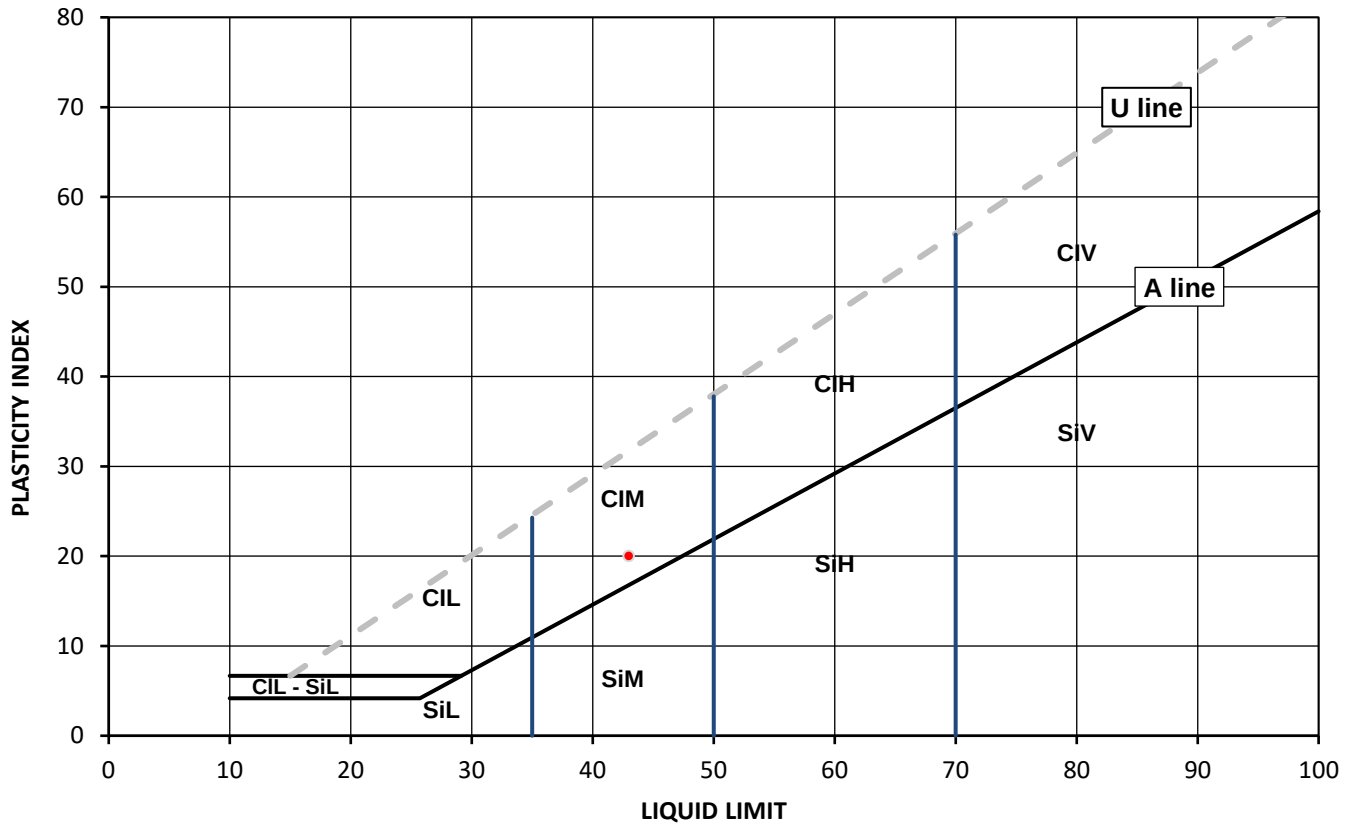
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434492	Depth Top [m]:	1.20
Hole No.:	TP6	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	43	23	20	89



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

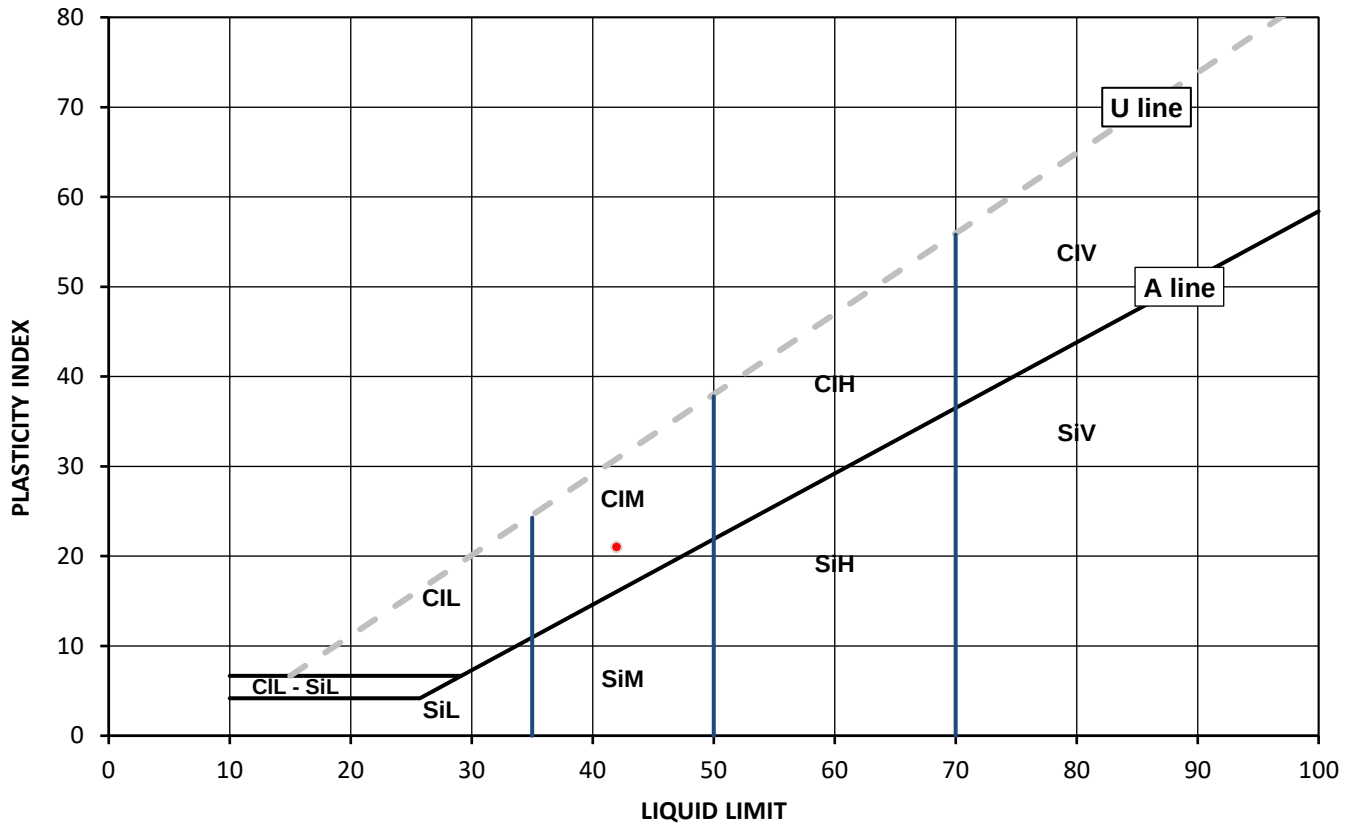
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434493	Depth Top [m]:	1.20
Hole No.:	TP7	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	42	21	21	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

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DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

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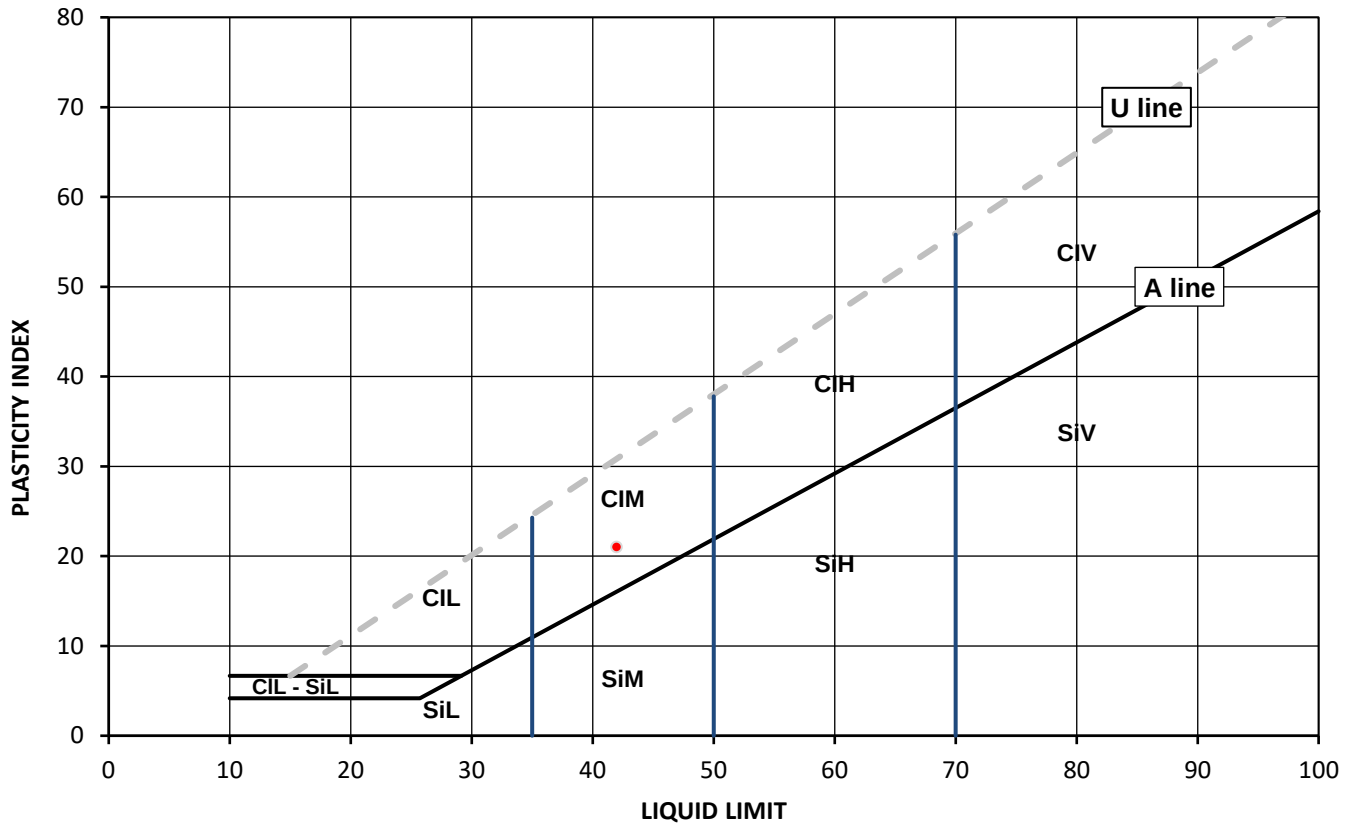
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434494	Depth Top [m]:	2.40
Hole No.:	TP8	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	42	21	21	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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Date Reported: 10/10/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
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Northampton NN4 7EB

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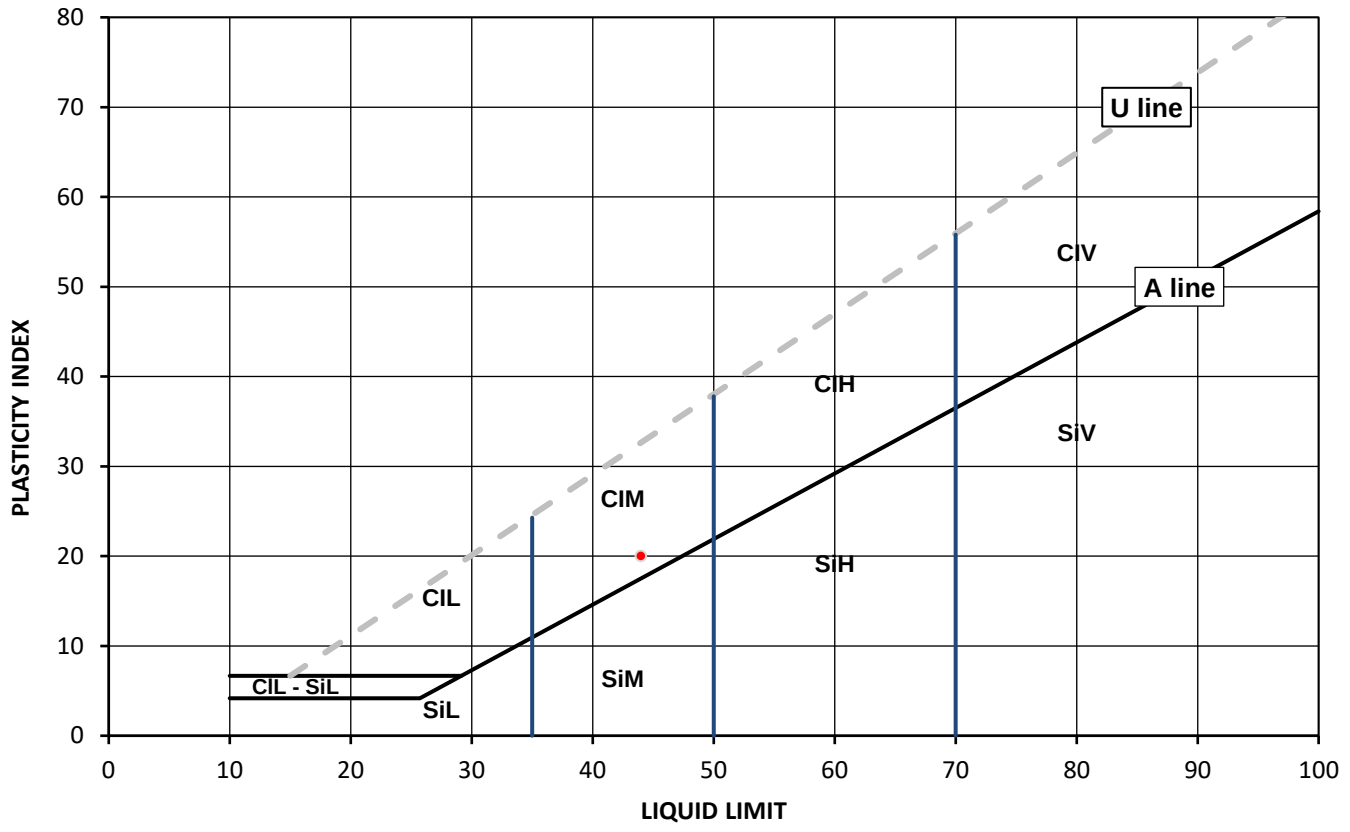
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434495	Depth Top [m]:	2.40
Hole No.:	TP9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	44	24	20	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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Northampton NN4 7EB

4041

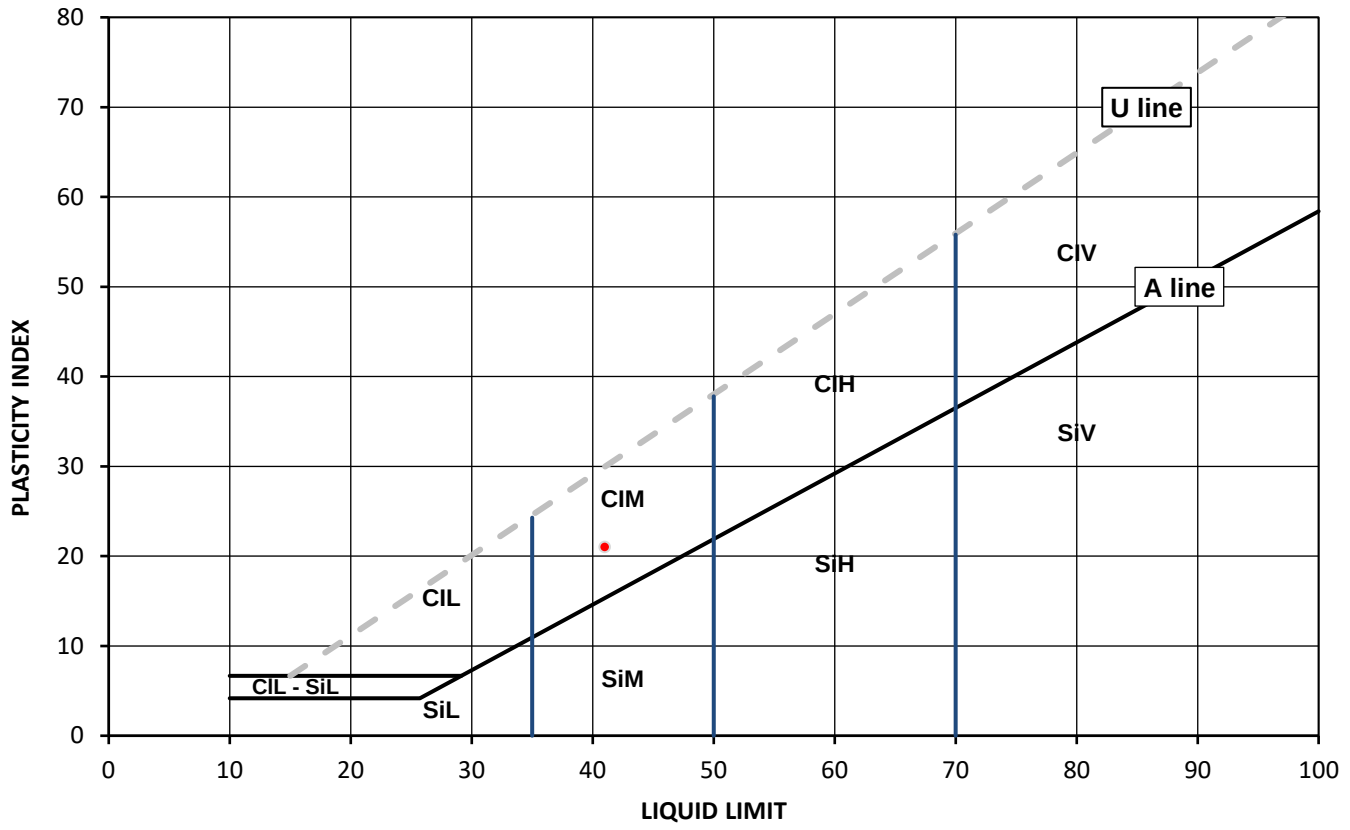
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434496	Depth Top [m]:	1.20
Hole No.:	TP10	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	41	20	21	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

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Northampton NN4 7EB

UKAS TESTING
4041

Environmental Science

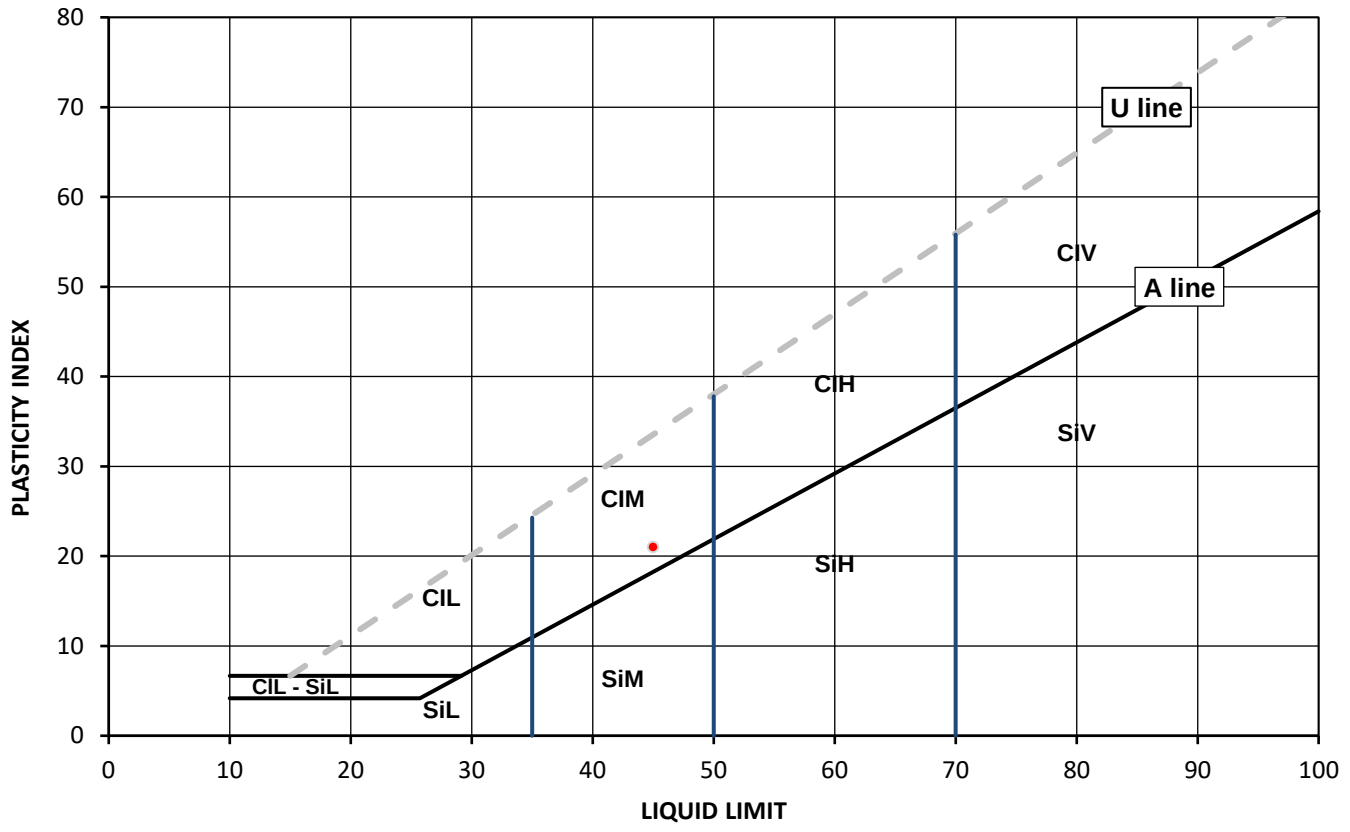
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434497	Depth Top [m]:	2.00
Hole No.:	TP11	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	45	24	21	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Brackmills Industrial Estate
Northampton NN4 7EB

4041

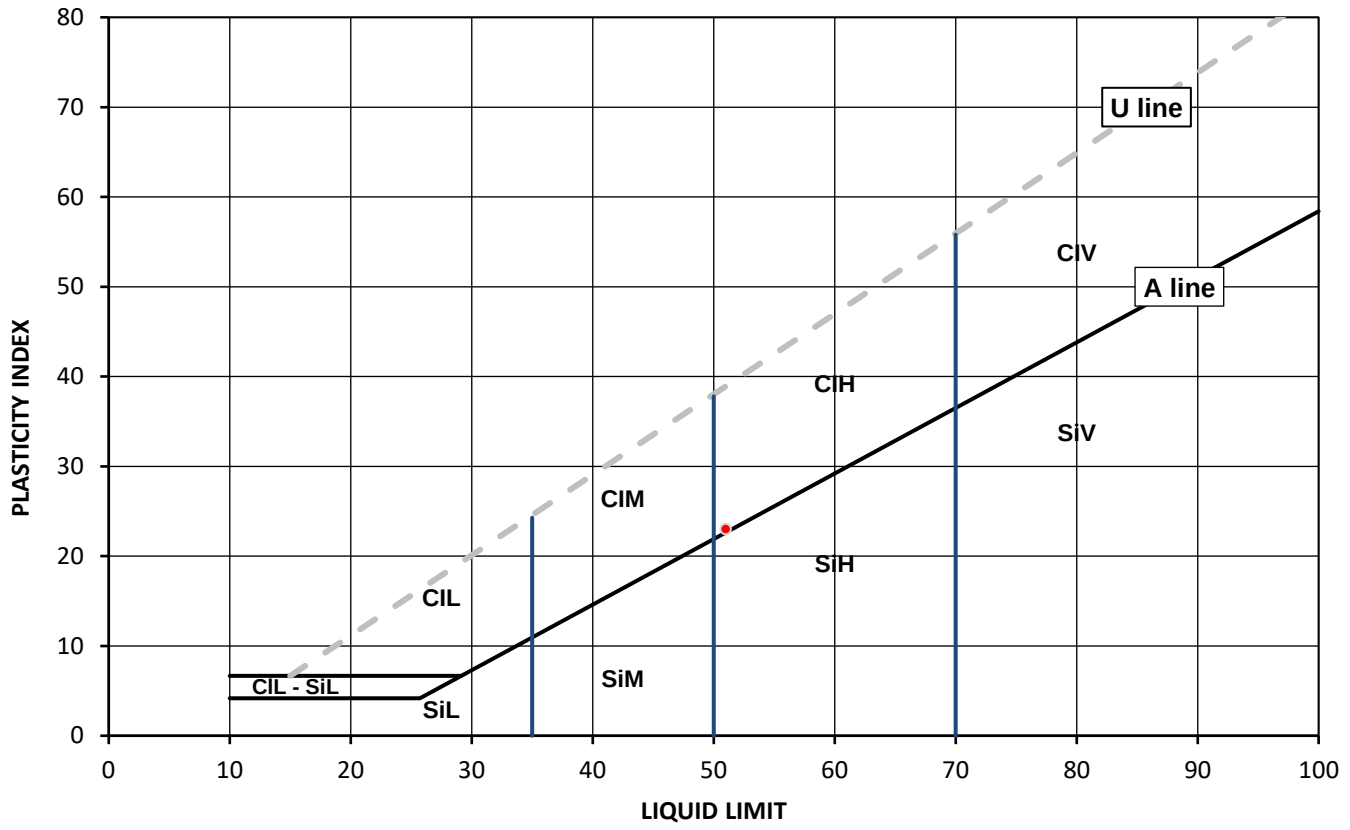
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434498	Depth Top [m]:	1.20
Hole No.:	TP12	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
10	51	28	23	50



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Date Reported: 10/10/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
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i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING
4041

Environmental Science

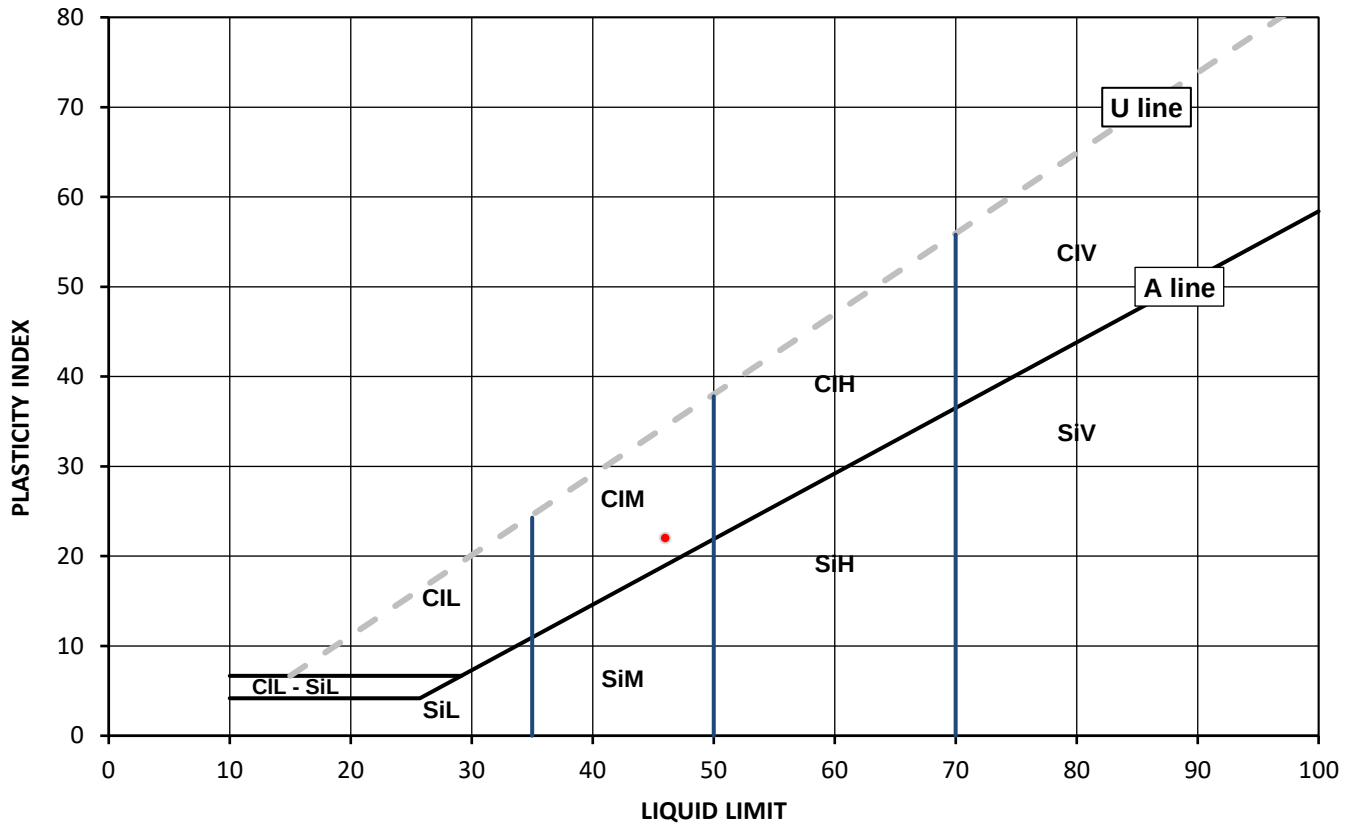
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434499	Depth Top [m]:	2.40
Hole No.:	TP13	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	46	24	22	89



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Brackmills Industrial Estate
Northampton NN4 7EB

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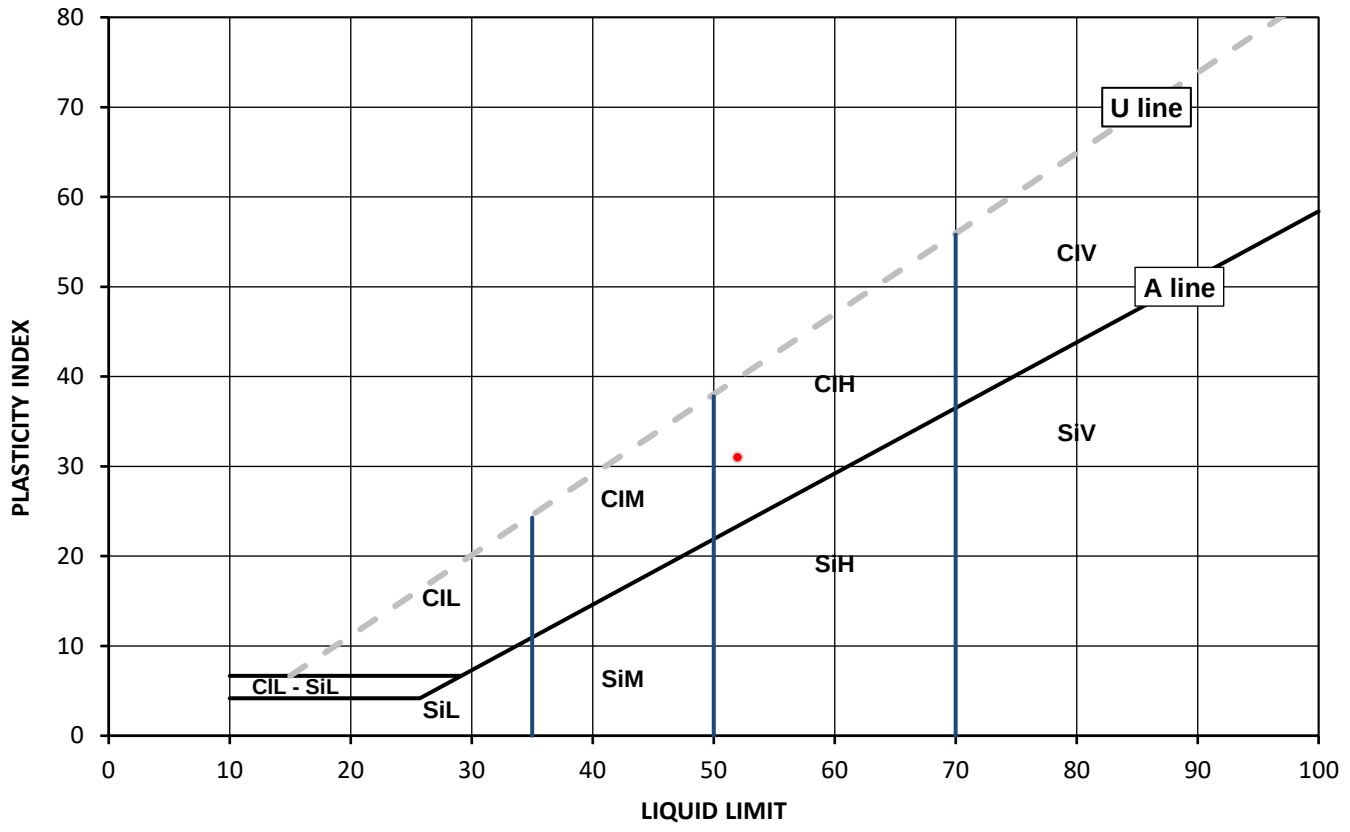
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434500	Depth Top [m]:	0.50
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
11	52	21	31	75



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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DETERMINATION OF LIQUID AND PLASTIC LIMITS
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Northampton NN4 7EB

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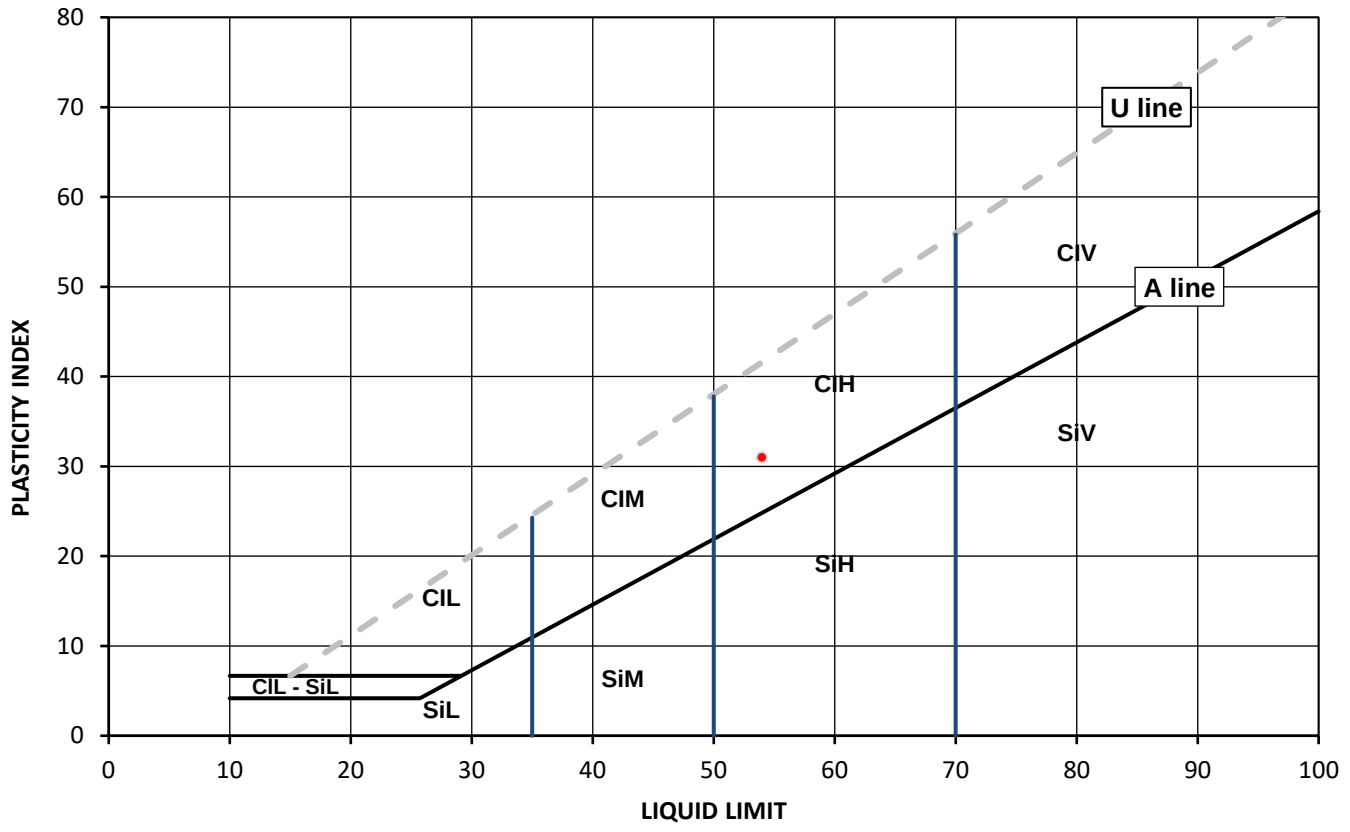
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434501	Depth Top [m]:	1.00
Hole No.:	WS3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	54	23	31	52



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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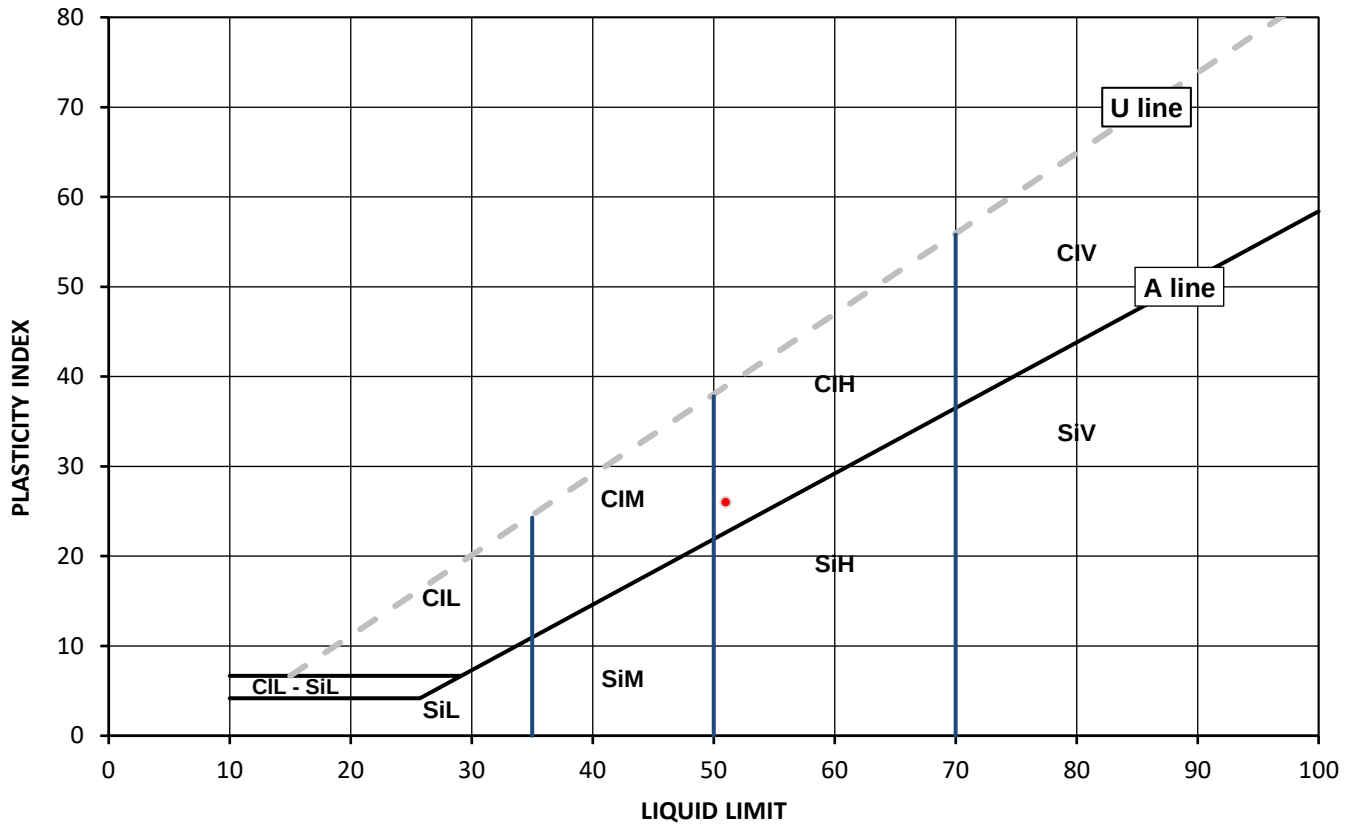
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434502	Depth Top [m]:	1.00
Hole No.:	WS4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	51	25	26	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

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DETERMINATION OF LIQUID AND PLASTIC LIMITS
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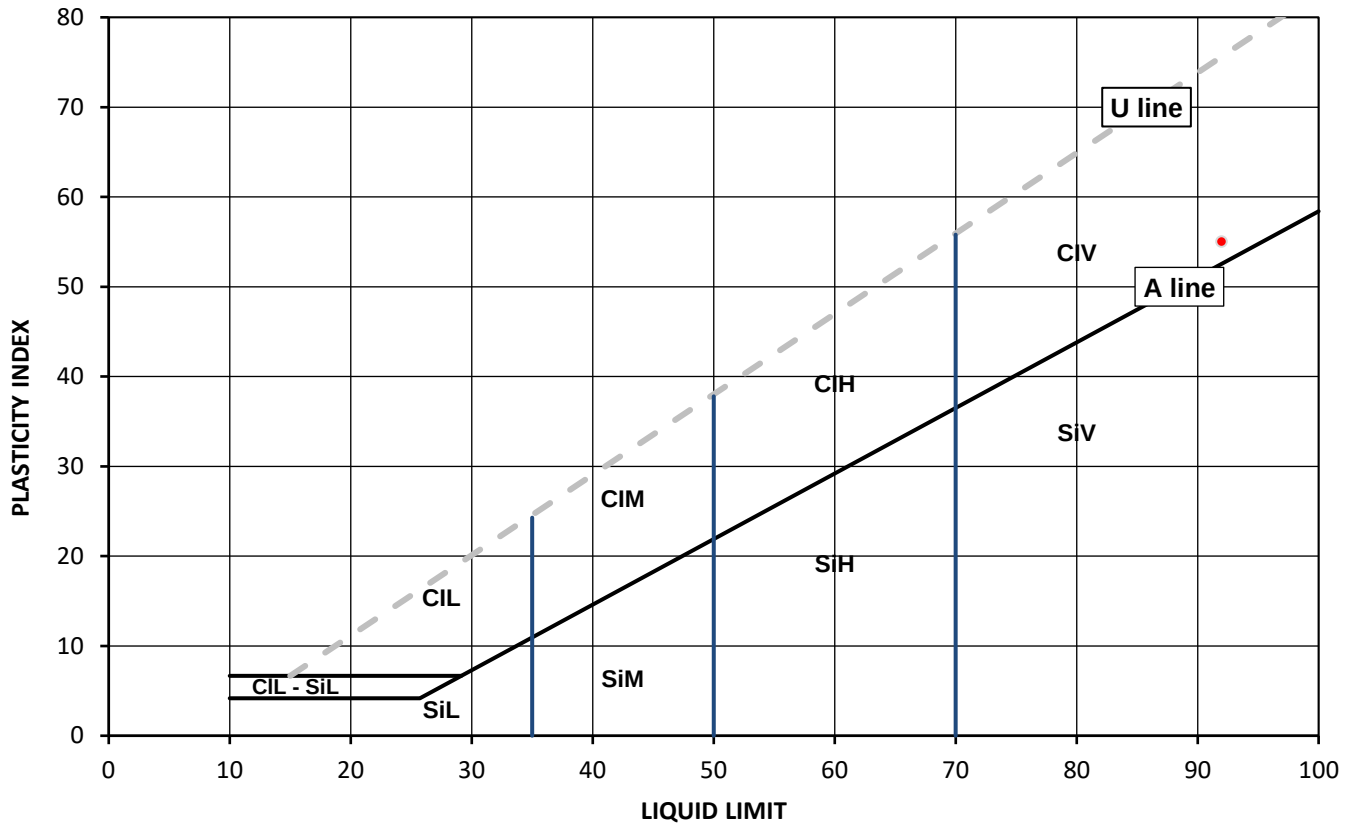
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434503	Depth Top [m]:	2.00
Hole No.:	WS5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	92	37	55	82



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

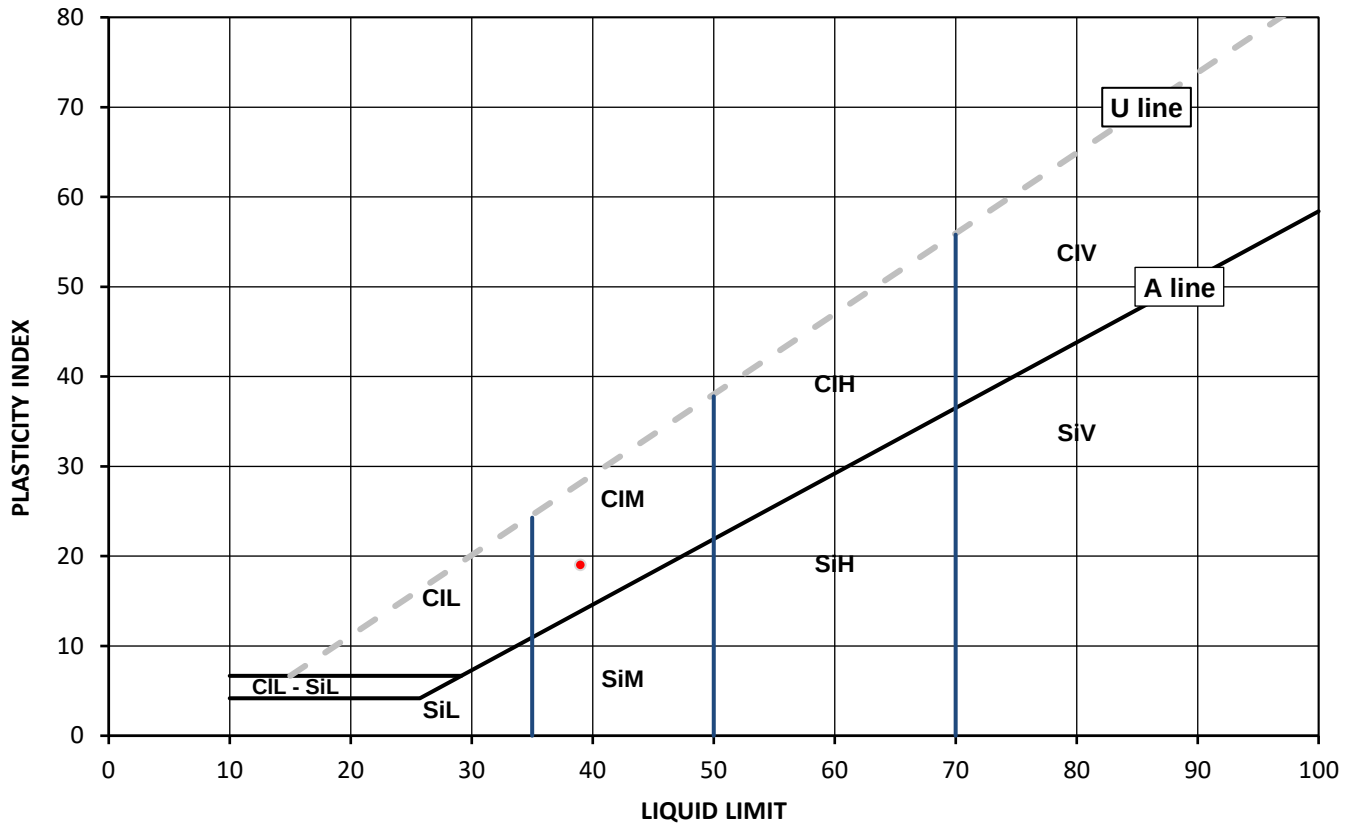
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434505	Depth Top [m]:	0.50
Hole No.:	WS7	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
11	39	20	19	70



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING
4041

Environmental Science

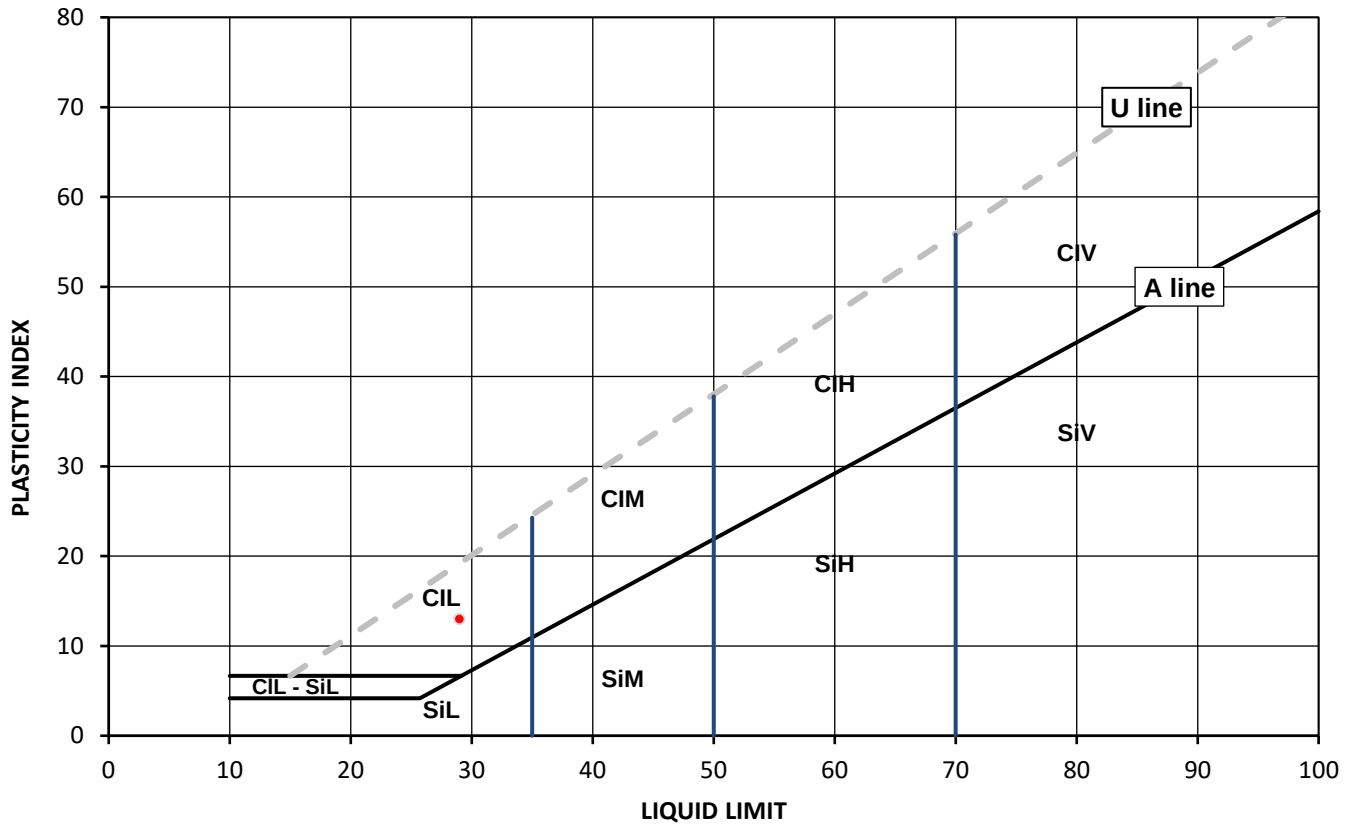
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434506	Depth Top [m]:	0.60
Hole No.:	BH5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	29	16	13	56



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 236.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2434473	BH1	Not Given	9.00	Not Given	D	Light grey slightly sandy CLAY	Atterberg 4 Point	23		100	45	24	21						
2434474	BH2	Not Given	0.60	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	27		74	58	29	29						
2434476	BH2	Not Given	4.00	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	32		100	43	19	24						
2434477	BH2	Not Given	6.00	Not Given	D	Light grey slightly gravelly sandy CLAY	Atterberg 4 Point	37		93	42	21	21						
2434479	BH3	Not Given	1.00	Not Given	D	Light grey slightly sandy CLAY	Atterberg 4 Point	22		100	45	22	23						
2434480	BH3	Not Given	3.00	Not Given	D	Light grey slightly sandy CLAY	Atterberg 4 Point	26		100	51	22	29						
2434482	BH3	Not Given	6.00	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	23		100	42	21	21						
2434506	BH5	Not Given	0.60	Not Given	D	Light grey gravelly very sandy CLAY	Atterberg 4 Point	14		56	29	16	13						
2434483	BH5	Not Given	1.00	Not Given	D	Light grey slightly sandy CLAY	Atterberg 4 Point	25		100	47	24	23						
2434484	BH5	Not Given	2.00	Not Given	D	Light grey slightly sandy CLAY	Atterberg 4 Point	23		100	45	21	24						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 238.14

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2434486	BH5	Not Given	5.50	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	27		100	42	22	20						
2434487	TP1	Not Given	1.20	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	20		100	38	21	17						
2434496	TP10	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY	Atterberg 4 Point	20		99	41	20	21						
2434497	TP11	Not Given	2.00	Not Given	D	Light grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	27		99	45	24	21						
2434498	TP12	Not Given	1.20	Not Given	D	Brownish grey gravelly slightly sandy CLAY	Atterberg 4 Point	10		50	51	28	23						
2434499	TP13	Not Given	2.40	Not Given	D	Light brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	18		89	46	24	22						
2434490	TP4	Not Given	1.50	Not Given	D	Light grey slightly gravelly sandy CLAY	Atterberg 4 Point	20		99	41	20	21						
2434491	TP5	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY	Atterberg 4 Point	21		99	42	23	19						
2434492	TP6	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY	Atterberg 4 Point	22		89	43	23	20						
2434493	TP7	Not Given	1.20	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	21		100	42	21	21						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 238.14

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2434494	TP8	Not Given	2.40	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	23		100	42	21	21						
2434495	TP9	Not Given	2.40	Not Given	D	Light grey sandy CLAY	Atterberg 4 Point	21		100	44	24	20						
2434500	WS2	Not Given	0.50	Not Given	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	11		75	52	21	31						
2434501	WS3	Not Given	1.00	Not Given	D	Light brown gravelly slightly sandy CLAY	Atterberg 4 Point	22		52	54	23	31						
2434502	WS4	Not Given	1.00	Not Given	D	Light brown slightly sandy CLAY	Atterberg 4 Point	25		100	51	25	26						
2434503	WS5	Not Given	2.00	Not Given	D	Brown slightly gravelly CLAY	Atterberg 4 Point	26		82	92	37	55						
2434505	WS7	Not Given	0.50	Not Given	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	11		70	39	20	19						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2434473	BH1	Not Given	9.00	Not Given	D	Light grey slightly sandy CLAY		23	Sample was quartered, oven dried at 108.2 °C			
2434474	BH2	Not Given	0.60	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY		27	Sample was quartered, oven dried at 108.2 °C			
2434476	BH2	Not Given	4.00	Not Given	D	Light grey sandy CLAY		32	Sample was quartered, oven dried at 108.2 °C			
2434477	BH2	Not Given	6.00	Not Given	D	Light grey slightly gravelly sandy CLAY		37	Sample was quartered, oven dried at 108.2 °C			
2434479	BH3	Not Given	1.00	Not Given	D	Light grey slightly sandy CLAY		22	Sample was quartered, oven dried at 108.2 °C			
2434480	BH3	Not Given	3.00	Not Given	D	Light grey slightly sandy CLAY		26	Sample was quartered, oven dried at 108.2 °C			
2434482	BH3	Not Given	6.00	Not Given	D	Light grey sandy CLAY		23	Sample was quartered, oven dried at 108.2 °C			
2434506	BH5	Not Given	0.60	Not Given	D	Light grey gravelly very sandy CLAY		14	Sample was quartered, oven dried at 108.2 °C			
2434483	BH5	Not Given	1.00	Not Given	D	Light grey slightly sandy CLAY		25	Sample was quartered, oven dried at 108.2 °C			
2434484	BH5	Not Given	2.00	Not Given	D	Light grey slightly sandy CLAY		23	Sample was quartered, oven dried at 108.2 °C			

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 099.16

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2434486	BH5	Not Given	5.50	Not Given	D	Light grey sandy CLAY		27	Sample was quartered, oven dried at 108.2 °C			
2434487	TP1	Not Given	1.20	Not Given	D	Light grey sandy CLAY		20	Sample was quartered, oven dried at 108.2 °C			
2434496	TP10	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY		20	Sample was quartered, oven dried at 108.2 °C			
2434497	TP11	Not Given	2.00	Not Given	D	Light grey slightly gravelly slightly sandy CLAY		27	Sample was quartered, oven dried at 106.1 °C			
2434498	TP12	Not Given	1.20	Not Given	D	Brownish grey gravelly slightly sandy CLAY		10	Sample was quartered, oven dried at 108.2 °C			
2434499	TP13	Not Given	2.40	Not Given	D	Light brown slightly gravelly slightly sandy CLAY		18	Sample was quartered, oven dried at 106.3 °C			
2434490	TP4	Not Given	1.50	Not Given	D	Light grey slightly gravelly sandy CLAY		20	Sample was quartered, oven dried at 108.2 °C			
2434491	TP5	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY		21	Sample was quartered, oven dried at 108.2 °C			
2434492	TP6	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY		22	Sample was quartered, oven dried at 108.2 °C			
2434493	TP7	Not Given	1.20	Not Given	D	Light grey sandy CLAY		21	Sample was quartered, oven dried at 108.2 °C			

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 099.16

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2434494	TP8	Not Given	2.40	Not Given	D	Light grey sandy CLAY		23	Sample was quartered, oven dried at 108.2 °C			
2434495	TP9	Not Given	2.40	Not Given	D	Light grey sandy CLAY		21	Sample was quartered, oven dried at 108.2 °C			
2434500	WS2	Not Given	0.50	Not Given	D	Brown slightly gravelly slightly sandy CLAY		11	Sample was quartered, oven dried at 107.2 °C			
2434501	WS3	Not Given	1.00	Not Given	D	Light brown gravelly slightly sandy CLAY		22	Sample was quartered, oven dried at 108.2 °C			
2434502	WS4	Not Given	1.00	Not Given	D	Light brown slightly sandy CLAY		25	Sample was quartered, oven dried at 108.2 °C			
2434503	WS5	Not Given	2.00	Not Given	D	Brown slightly gravelly CLAY		26	Sample was quartered, oven dried at 108.2 °C			
2434505	WS7	Not Given	0.50	Not Given	D	Brown slightly gravelly sandy CLAY		11	Sample was quartered, oven dried at 108.2 °C			

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

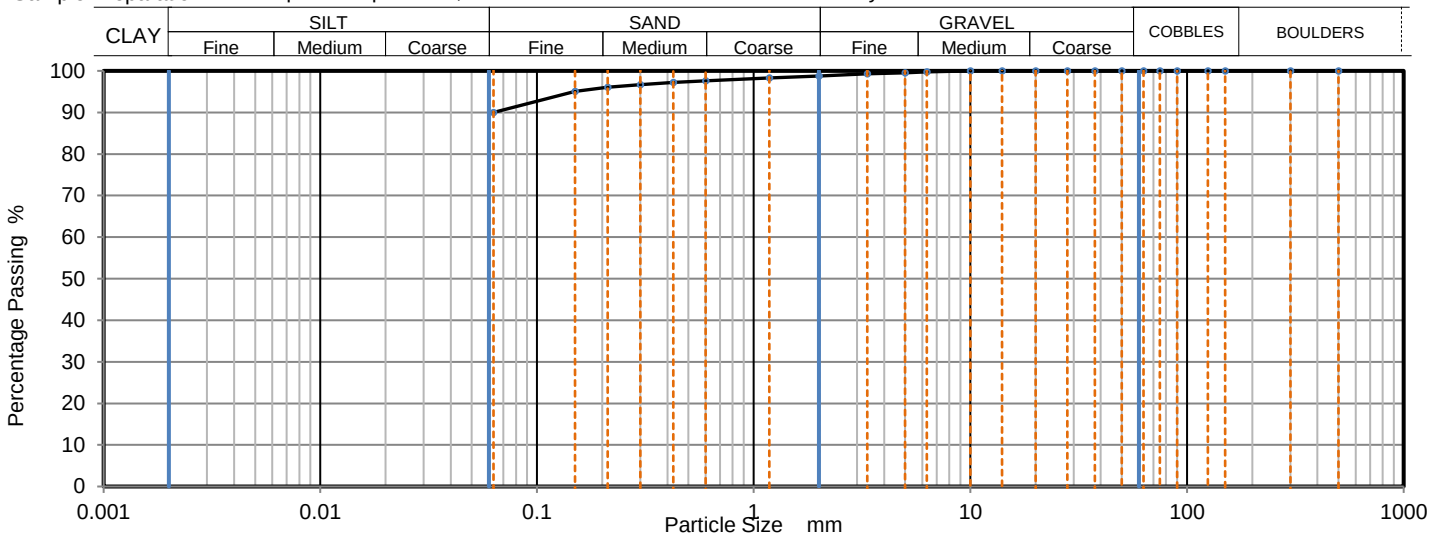
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434471	Depth Top [m]:	3.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	99		
1.18	98		
0.6	98		
0.425	97		
0.3	97		
0.212	96		
0.15	95		
0.063	90		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	9
Fines <0.063mm	90

Grading Analysis		
D100	mm	10
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

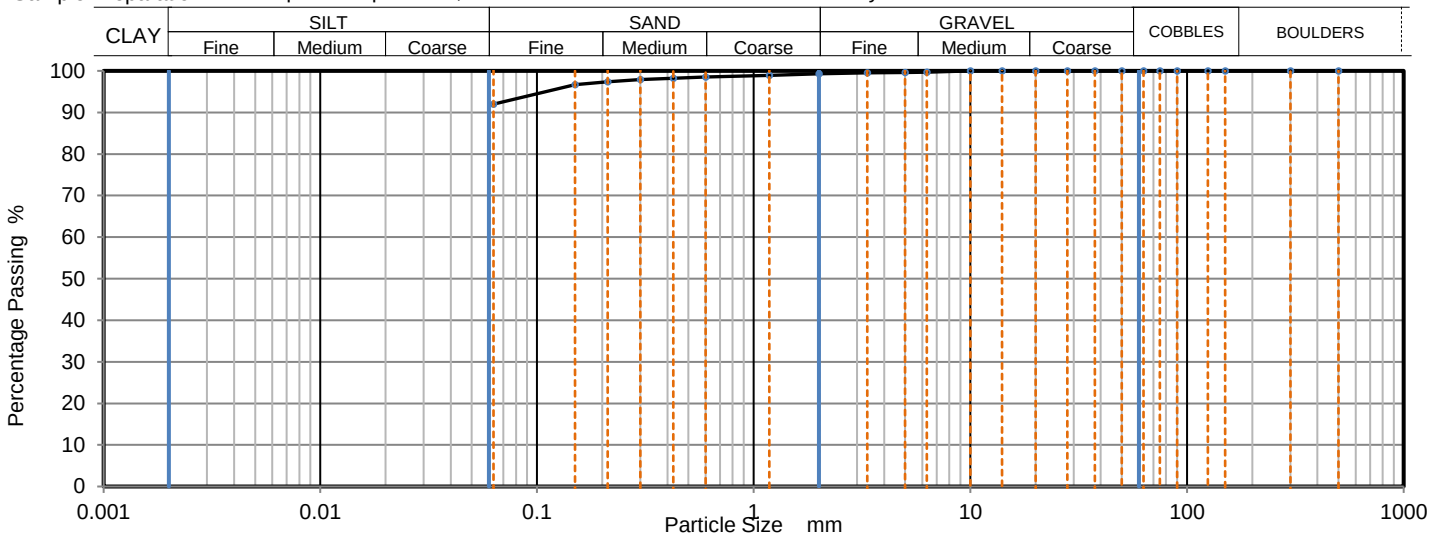
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434472	Depth Top [m]:	7.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	99		
0.425	98		
0.3	98		
0.212	97		
0.15	97		
0.063	92		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	7
Fines <0.063mm	92

Grading Analysis		
D100	mm	10
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

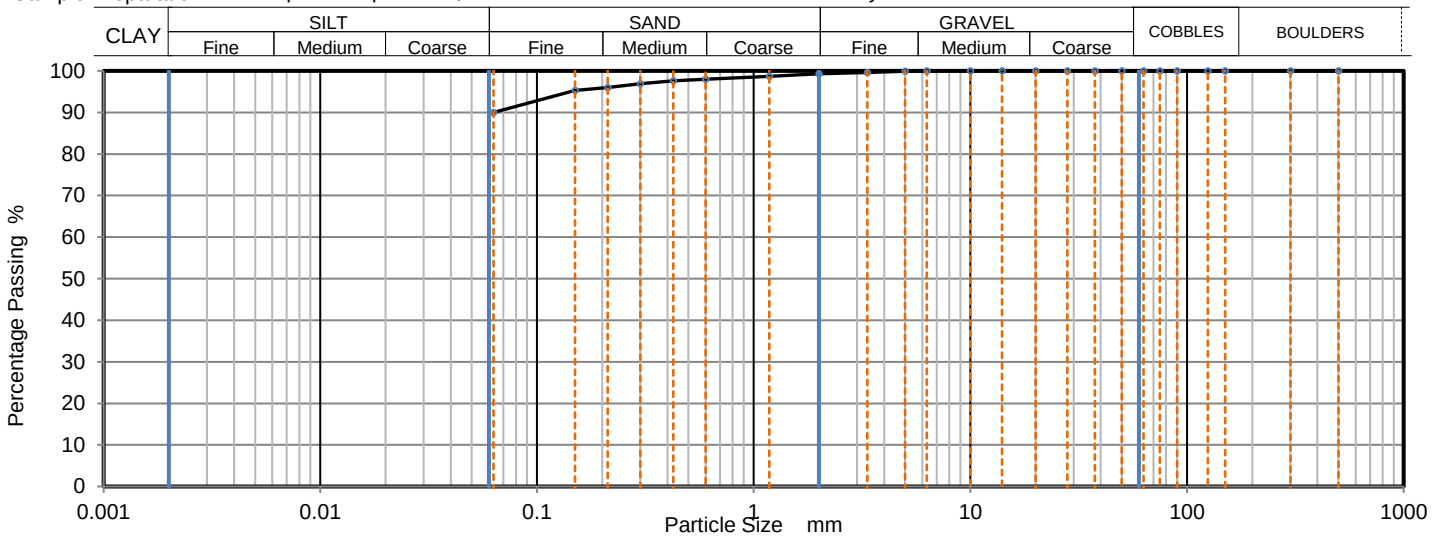
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434475	Depth Top [m]:	2.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98		
0.425	98		
0.3	97		
0.212	96		
0.15	95		
0.063	90		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	9
Fines <0.063mm	90

Grading Analysis		
D100	mm	6.3
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

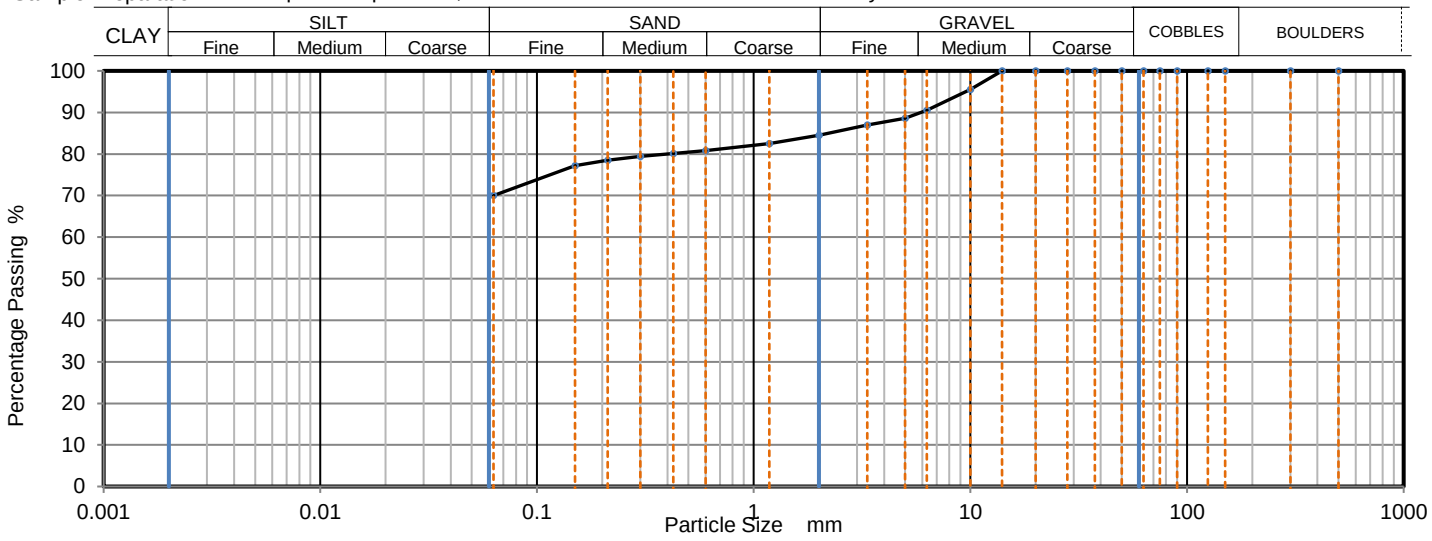
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434478	Depth Top [m]:	8.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey gravelly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	96		
6.3	91		
5	89		
3.35	87		
2	85		
1.18	83		
0.6	81		
0.425	80		
0.3	79		
0.212	79		
0.15	77		
0.063	70		

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	14
Fines <0.063mm	70

Grading Analysis		
D100	mm	14
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

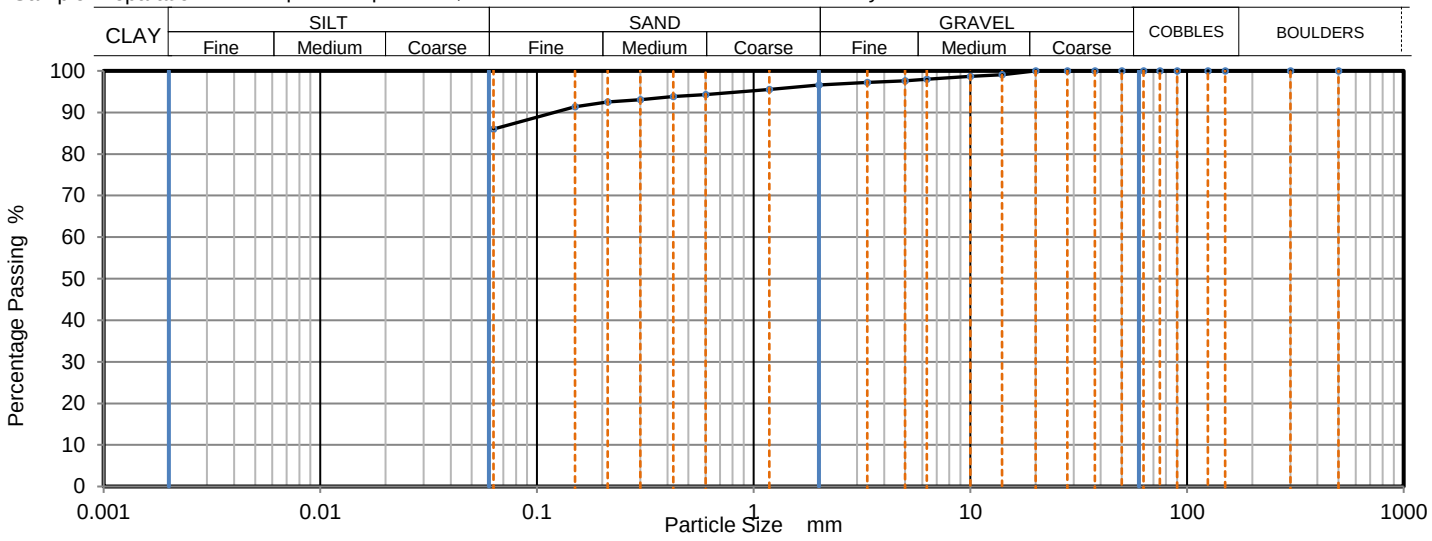
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434481	Depth Top [m]:	5.00
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly gravelly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	94		
0.425	94		
0.3	93		
0.212	93		
0.15	91		
0.063	87		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	10
Fines <0.063mm	86

Grading Analysis		
D100	mm	20
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

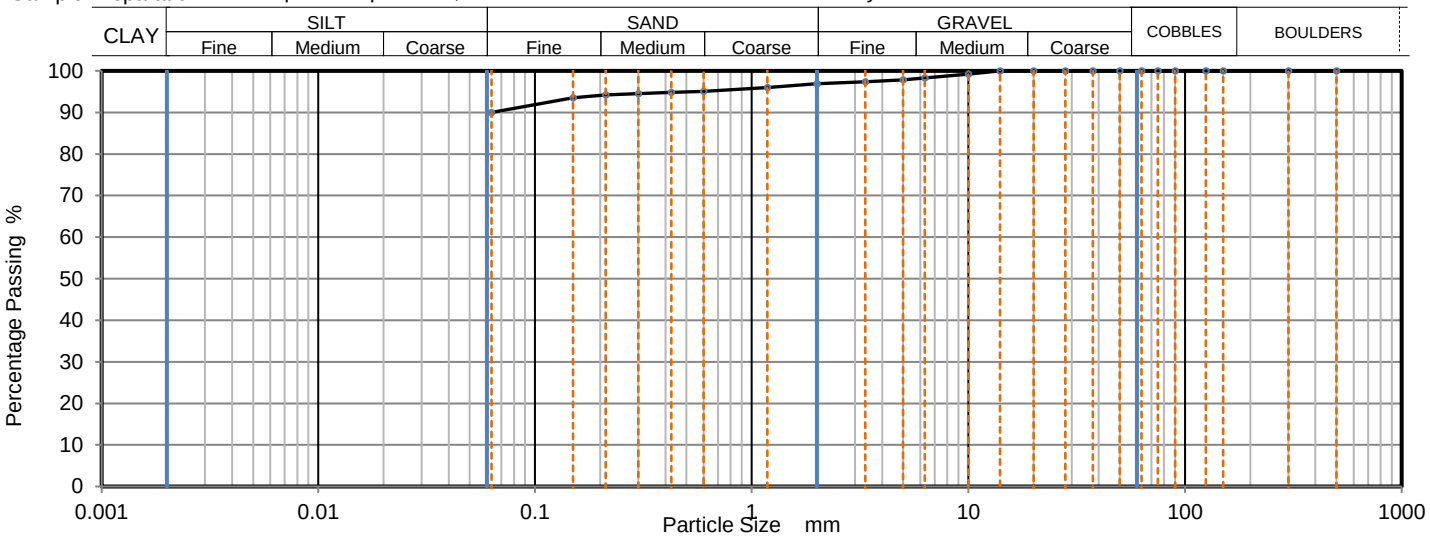
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434485	Depth Top [m]:	4.00
Hole No.:	BH5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slighty gravelly slightly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	95		
0.425	95		
0.3	95		
0.212	94		
0.15	94		
0.063	90		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	7
Fines <0.063mm	90

Grading Analysis		
D100	mm	14
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

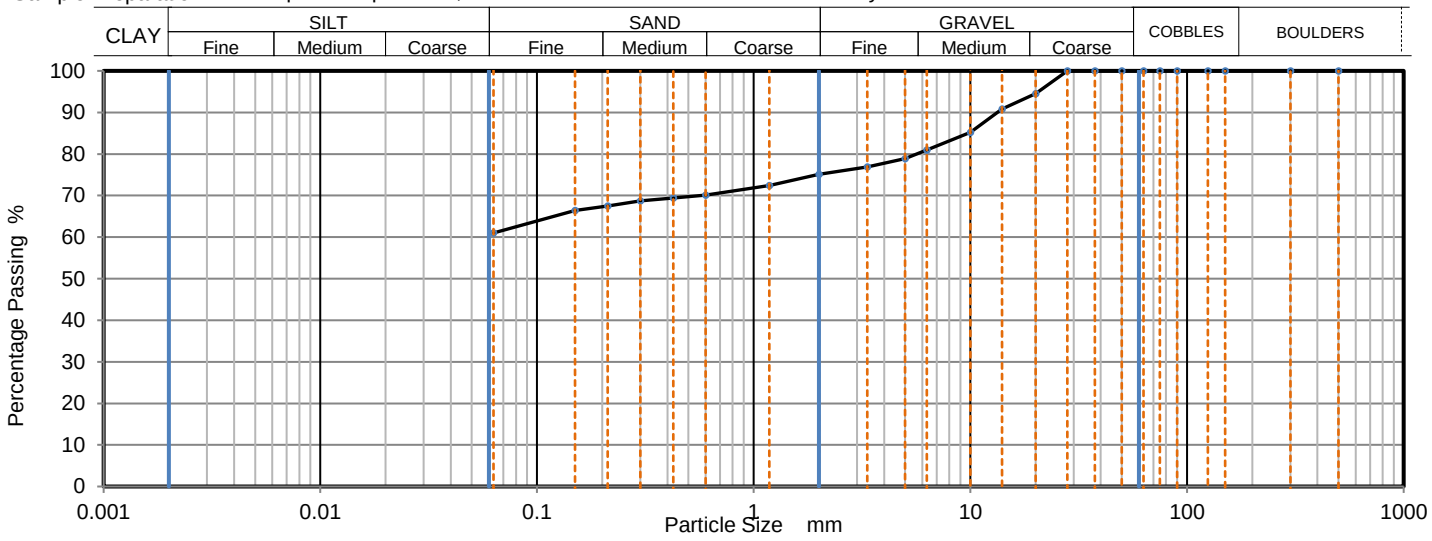
Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434488	Depth Top [m]:	1.50
Hole No.:	TP2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey gravelly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	95		
14	91		
10	85		
6.3	81		
5	79		
3.35	77		
2	75		
1.18	72		
0.6	70		
0.425	69		
0.3	69		
0.212	68		
0.15	66		
0.063	61		

Sample Proportions	% dry mass
Very coarse	0
Gravel	25
Sand	14
Fines <0.063mm	61

Grading Analysis		
D100	mm	28
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

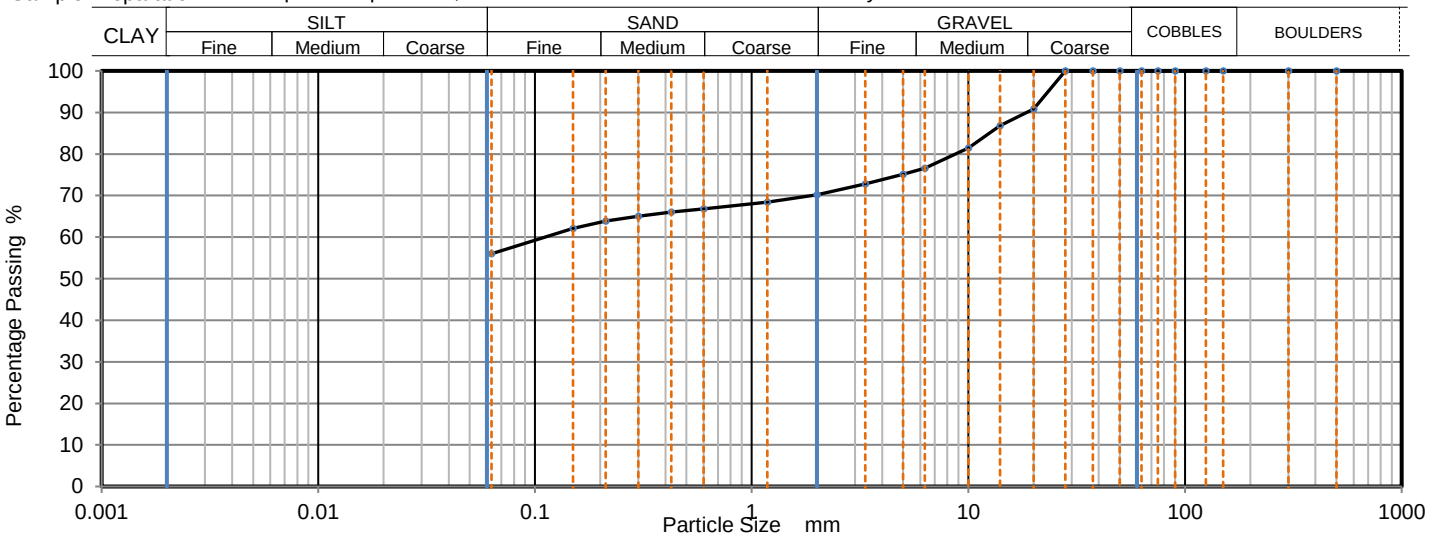
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434489	Depth Top [m]:	1.20
Hole No.:	TP3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown sandy very gravelly CLAY		
Sample Preparation:	Sample was quartered, oven dried at 107.9 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	91		
14	87		
10	81		
6.3	77		
5	75		
3.35	73		
2	70		
1.18	68		
0.6	67		
0.425	66		
0.3	65		
0.212	64		
0.15	62		
0.063	56		

Sample Proportions	% dry mass
Very coarse	0
Gravel	30
Sand	14
Fines <0.063mm	56

Grading Analysis		
D100	mm	28
D60	mm	0.11
D30	mm	
D10	mm	
Uniformity Coefficient		> 1.8
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

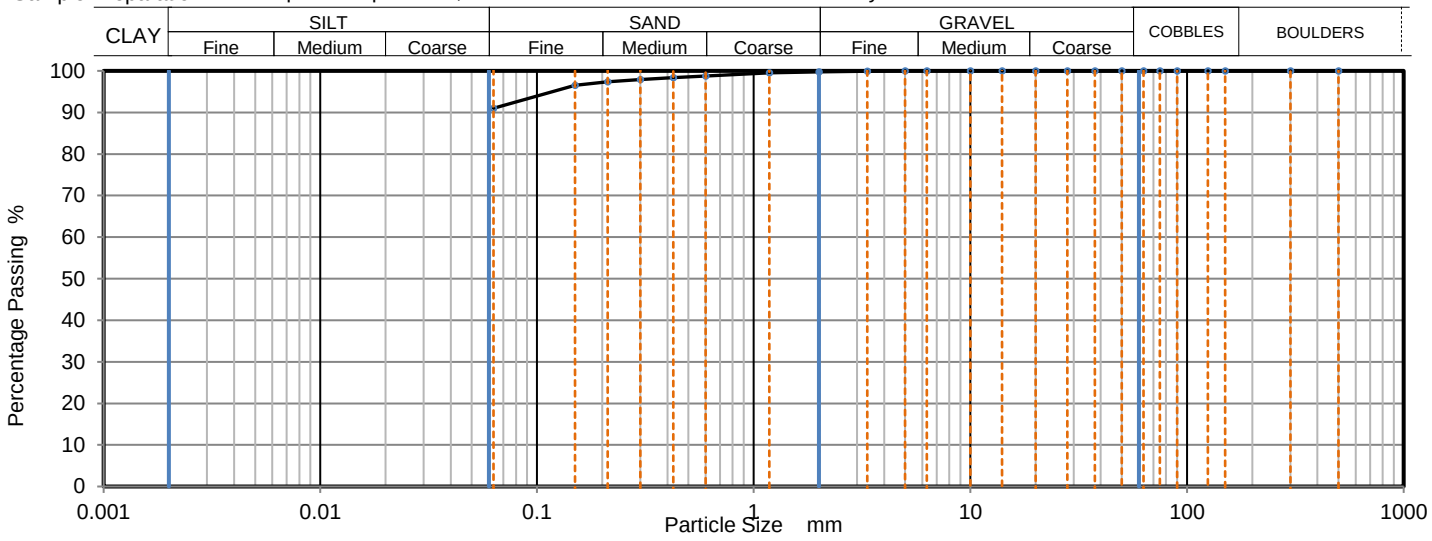
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-85862
		Date Sampled:	Not Given
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	27/09/2022
Site Address:	Zone 5 & ESA Harwell Campus Didcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2434504	Depth Top [m]:	2.00
Hole No.:	WS6	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	98		
0.3	98		
0.212	97		
0.15	97		
0.063	92		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	8
Fines <0.063mm	91

Grading Analysis		
D100	mm	5
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 100.21

SUMMARY REPORT

METHOD FOR SATURATION MOISTURE CONTENT OF CHALK

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus Didcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-85862
Date Sampled: Not Given
Date Received: 20/09/2022
Date Tested: 27/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC	Preparation
		Reference	Depth Top m	Depth Base m	Type			%	Mg/m3	Mg/m3	%	
2434480	BH3	Not Given	3.00	Not Given	D	Light grey slightly sandy CLAY	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.87	1.49	25	
2434483	BH5	Not Given	1.00	Not Given	D	Light grey slightly sandy CLAY	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.87	1.50	25	
2434491	TP5	Not Given	1.20	Not Given	D	Light grey slightly gravelly sandy CLAY	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	26	1.90	1.59	20	
2434494	TP8	Not Given	2.40	Not Given	D	Light grey sandy CLAY	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	25	1.99	1.62	22	

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/10/2022

GF 132.14

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

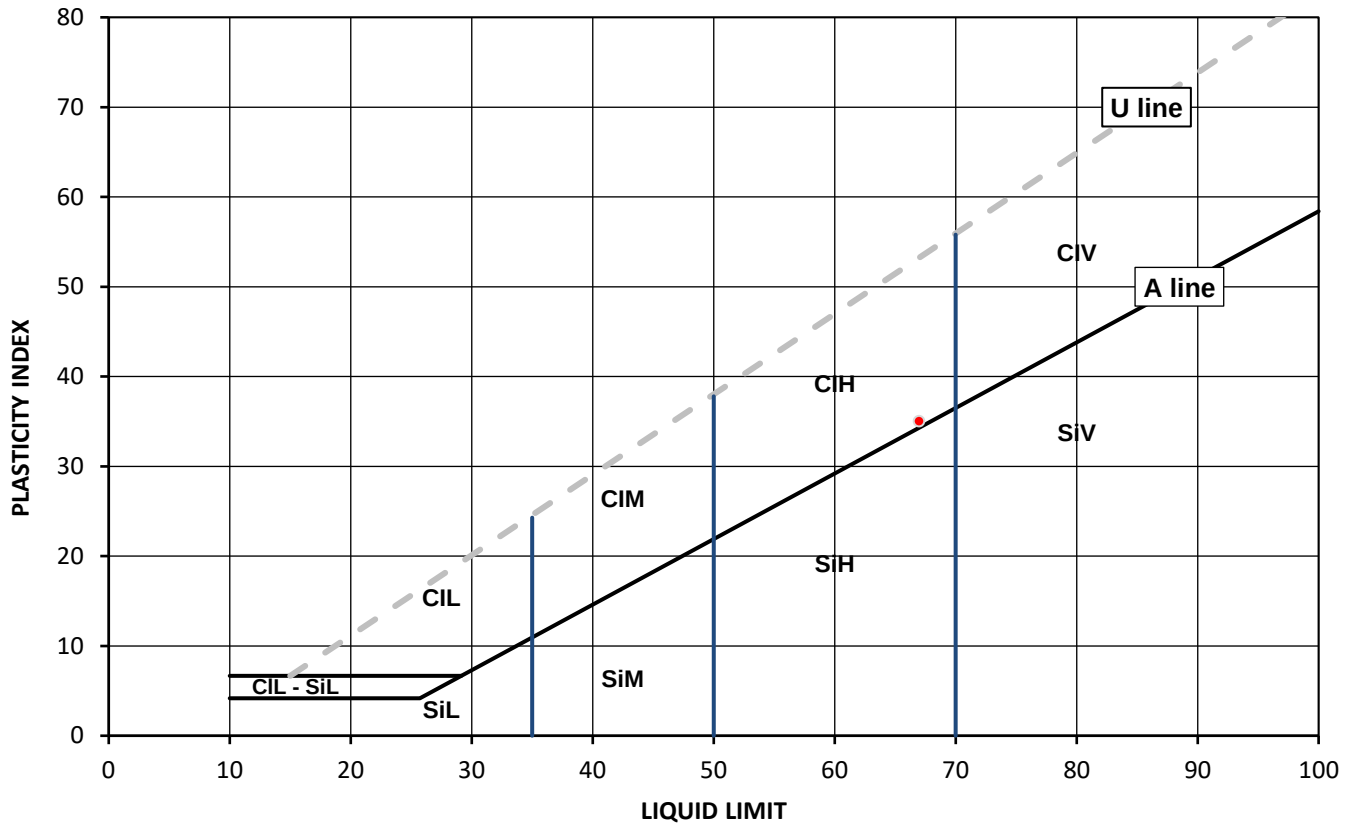
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-86251
		Date Sampled:	15/09/2022
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	03/10/2022
Site Address:	Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2436932	Depth Top [m]:	1.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly CLAY with fragments of roots		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	67	32	35	79



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Dudzińska Anna

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

 Date Reported: 12/10/2022 **GF 236.12**

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

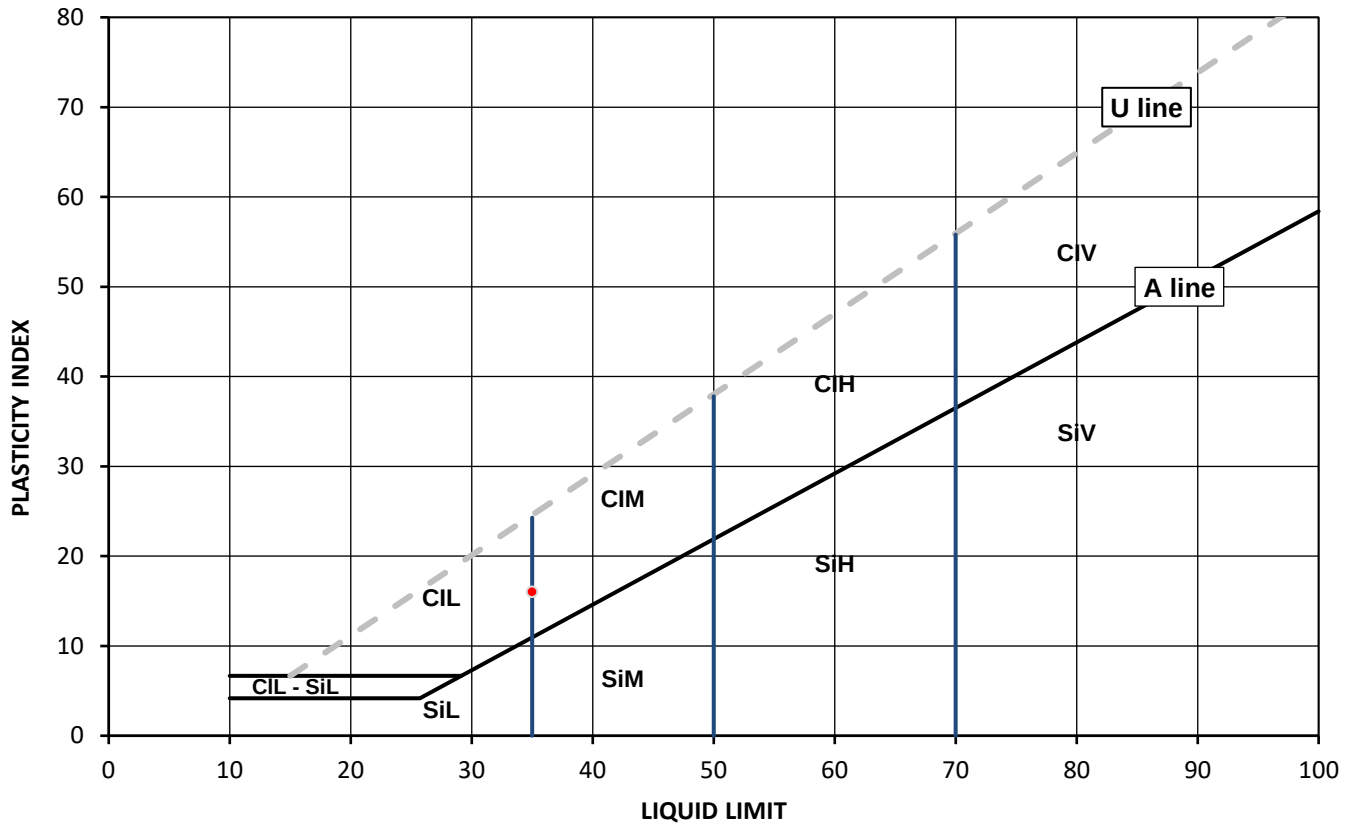
Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-86251
		Date Sampled:	15/09/2022
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	03/10/2022
Site Address:	Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2436933	Depth Top [m]:	4.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	White CHALK		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	35	19	16	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Dudzińska Anna

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

 Date Reported: 12/10/2022 **GF 236.12**

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2609
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-86251
		Date Sampled:	15/09/2022
		Date Received:	20/09/2022
Contact:	Tom Elbourne	Date Tested:	03/10/2022
Site Address:	Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD	Sampled By:	Not Given

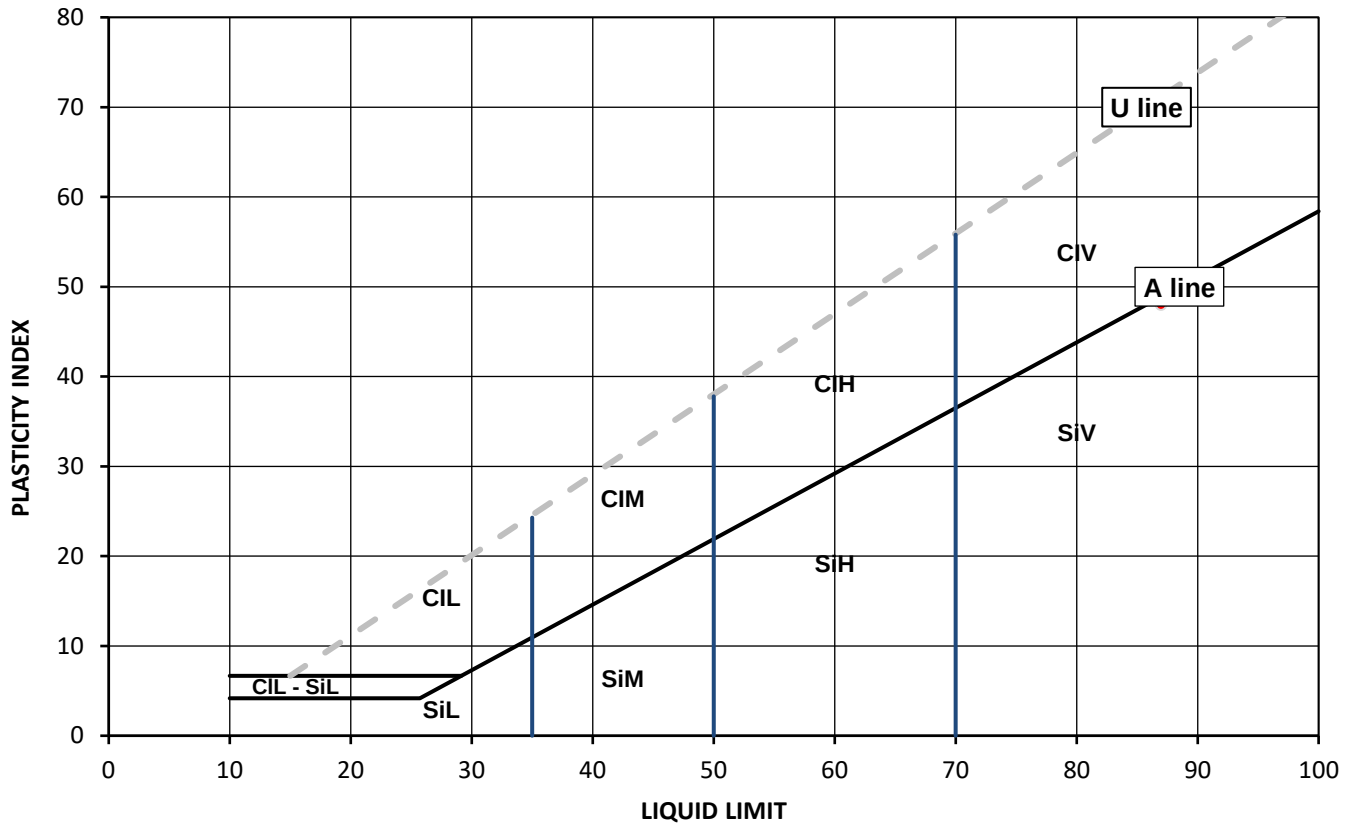
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2436935	Depth Top [m]:	1.00
Hole No.:	TP13	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown gravelly CLAY		

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	87	39	48	42



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Dudzińska Anna

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

 Date Reported: 12/10/2022 **GF 236.12**

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: JJ2609
Job Number: 22-86251
Date Sampled: 15/09/2022
Date Received: 20/09/2022
Date Tested: 03/10/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2436932	BH1	Not Given	1.00	Not Given	D	Brown slightly gravelly CLAY with fragments of roots	Atterberg 4 Point	24		79	67	32	35						
2436933	BH1	Not Given	4.00	Not Given	D	White CHALK	Atterberg 4 Point	24		100	35	19	16						
2436935	TP13	Not Given	1.00	Not Given	D	Brown gravelly CLAY	Atterberg 4 Point	23		42	87	39	48						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 12/10/2022

GF 238.14

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD

Client Reference: JJ2609
Job Number: 22-86251
Date Sampled: 15/09/2022
Date Received: 20/09/2022
Date Tested: 03/10/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2436932	BH1	Not Given	1.00	Not Given	D	Brown slightly gravelly CLAY with fragments of roots		24	Sample was quartered, oven dried at 107.7 °C			
2436933	BH1	Not Given	4.00	Not Given	D	White CHALK		24	Sample was quartered, oven dried at 107.7 °C			
2436935	TP13	Not Given	1.00	Not Given	D	Brown gravelly CLAY		23	Sample was quartered, oven dried at 107.7 °C			

Comments:

Signed:

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 12/10/2022

GF 099.16

SUMMARY REPORT

METHOD FOR SATURATION MOISTURE CONTENT OF CHALK

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Tom Elbourne

Site Address: Zone 5 & ESA Harwell Campus, Ditcot OX11 0FD

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: JJ2609
Job Number: 22-86251
Date Sampled: 15/09/2022
Date Received: 20/09/2022
Date Tested: 11/10/2022
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC	Preparation
		Reference	Depth Top m	Depth Base m	Type			%	Mg/m3	Mg/m3	%	
2436933	BH1	Not Given	4.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	27	1.94	1.57	24	

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Signed:

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 12/10/2022

GF 132.14

APPENDIX 5 – SOIL GAS MONITORING RESULTS

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** RAY	**Date:** 21/09/2022	**Time:** 12:15	**Round:** 1	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Overcast	**Ground Conditions: Dry**	**Temperature**: 19°C
Barometric Pressure (mbar): 1012	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.3 %CH_4, 0.1 %CO_2, 21.0%O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
BH1	+0.3	+0.3	1012	0.2	-	0.8	20.2	0.0	0.0	0	1	-	DRY	7.90
BH2	+0.2	+0.2	1013	0.1	-	0.3	20.1	0.0	0.0	0	1	-	DRY	6.70
BH3	+0.2	+0.2	1012	0.1	-	0.8	20.2	0.0	0.0	0	1	-	DRY	5.88
BH4	+0.2	+0.2	1012	0.1	-	0.3	20.2	0.0	0.0	0	9	-	DRY	5.32
BH5	+0.2	+0.2	1011	0.0	-	0.9	20.4	0.0	0.0	0	1	-	DRY	4.41
BH6	+0.1	+0.1	1012	0.0	-	0.0	20.1	0.0	0.0	0	0	-	DRY	4.40
BH7	+0.2	+0.2	1012	0.0	-	0.6	20.2	0.0	0.0	0	2	-	DRY	4.43

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** RAY	**Date:** 21/09/2022	**Time:** 12:15	**Round:** 1	**Page:** 2

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Overcast	**Ground Conditions: Dry**	**Temperature**: 19°C
Barometric Pressure (mbar): 1012	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.3 %CH_4, 0.1 %CO_2, 21.0%O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
WS2	+0.2	+0.2	1013	0.2	-	0.9	20.2	0.0	0.0	0	1	-	DRY	1.76
WS5	+0.2	+0.2	1012	0.1	-	2.3	19.5	0.0	0.0	0	1	-	DRY	1.91
WS7	+0.3	+0.3	1012	0.0	-	0.9	20.5	0.0	0.0	0	1	-	DRY	1.75
WS8	+0.2	+0.2	1012	0.0	-	0.0	20.7	0.0	0.0	0	1	-	DRY	0.73

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** EEG	**Date:** 21/09/2022	**Time:** 12:15	**Round:** 2	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny with intermittent heavy showers	**Ground Conditions:** Wet	**Temperature**: 14°C
Barometric Pressure (mbar): 987	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.0 %CH_4, 0.2 %CO_2, 21.0 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
BH1	+0.0	+0.0	987	0.0	-	1.1	20.0	0.0	0.0	0	0	-	DRY	7.84
BH2	+0.1	+0.1	988	0.0	-	0.3	21.3	0.0	0.0	0	0	-	DRY	6.63
BH3	+0.0	+0.0	988	0.0	-	0.8	20.7	1.0	0.0	0	0	-	DRY	4.84
BH4	+0.0	+0.0	998	0.0	-	0.4	20.5	0.0	0.0	0	2	-	DRY	5.30
BH5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	+0.1	+0.1	987	0.0	-	0.0	19.9	0.0	0.0	1	1	-	DRY	4.37
BH7	+0.2	+0.2	987	0.0	-	1.3	19.8	0.0	0.0	0	0	-	DRY	4.42

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** EEG	**Date:** 27/09/2022	**Time:** 12:15pm	**Round:** 2	**Page:** 2

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny with intermittent heavy showers	**Ground Conditions:** Wet	**Temperature**: 14°C
Barometric Pressure (mbar): 987	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.1 %CH_4, 1.3 %CO_2, 19.9 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
WS2	+0.1	+0.1	988	0.0	-	0.6	21.8	0.0	0.0	0	0	-	DRY	1.71
WS5	+0.0	+0.0	987	0.0	-	1.7	19.2	0.0	0.0	0	0	-	DRY	1.90
WS7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS8	+0.2	+0.1	988	0.0	-	0.1	20.8	0.0	0.0	0	1	-	DRY	0.70

*Monitoring wells BH5 and WS7 removed on 21/09/2022.

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** JAR	**Date:** 05/10/2022	**Time:** 9:30	**Round: 3**	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny with intermittent showers	**Ground Conditions:** Wet	**Temperature**: 15°C
Barometric Pressure (mbar): 993	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.2 %CH_4, 0.1 %CO_2, 20.6 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
BH1	0.1	0.1	993	0.1	-	1.6	19.2	0.1	0.1	0	0	-	DRY	7.85
BH2	0.2	0.2	993	0.1	-	0.1	20.5	0.2	0	0	0	-	DRY	6.65
BH3	0	0	993	0.1	-	0.8	20.2	0.1	0.1	0	0	-	DRY	5.8
BH4	0	0	993	0.2	-	0.1	20.9	0	0	0	0	-	DRY	5.30
BH5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	0.1	0.1	993	0.1	-	0	20.7	0.3	0.1	0	0	-	DRY	4.4
BH7	0.1	0.1	993	0.1	-	1.3	19.90	0.2	0	0	0	-	DRY	4.3

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s): JAR**	**Date:** 05/10/2022	**Time:** 9:30	**Round: 3**	**Page:** 2

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny with intermittent showers	**Ground Conditions:** Wet	**Temperature**: 15°C
Barometric Pressure (mbar): 993	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.2 %CH_4, 0.1 %CO_2, 20.6 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
WS2	0.1	0.1	993	0.2	-	0.9	20.5	0.4	0.2	0	0	-	DRY	1.75
WS5	0.2	0.2	993	0.1	-	1.4	20.0	0.2	0.1	0	0	-	DRY	1.90
WS7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS8	0.1	0.1	993	0.2	-	0.1	20.9	0	0	0	0	-	DRY	0.70

*Monitoring wells BH5 and WS7 removed on 21/09/2022.

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** EEG	**Date:** 12/10/2022	**Time:** 9:50	**Round: 4**	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions:** Damp	**Temperature**: 10°C
Barometric Pressure (mbar): 1008	**Barometric Pressure Trend (24hr):** Rising	**Ambient Concentration:** 0.2 %CH_4, 0.1 %CO_2, 20.8 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
BH1	-0.5	-0.3	1007	0.1	-	1.3	19.9	0.3	0.2	0	0	-	DRY	7.88
BH2	-0.1	-0.1	1008	0.1	-	0.2	20.4	0.3	0.3	0	0	-	DRY	6.67
BH3	-0.0	-0.0	1008	0.1	-	0.7	20.7	0.2	0.1	0	0	-	DRY	5.88
BH4	+0.1	+0.1	1008	0.1	-	0.3	20.6	0.3	0.2	0	0	-	DRY	5.32
BH5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	+0.0	+0.0	1008	0.1	-	0.0	20.4	0.1	0.0	0	4	-	DRY	4.41
BH7	+0.0	+0.0	1008	0.1	-	0.8	20.5	13.5	10.1	0	0	-	DRY	4.43

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Zone 5 & ESA Harwell Campus	**Operative(s):** EEG	**Date:** 12/10/2022	**Time:** 9:50	**Round: 4**	**Page:** 2

MONITORING EQUIPMENT

Instrument Type	**Instrument Make**	**Serial No.**	**Date Last Calibrated**
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions:** Damp	**Temperature**: 10°C
Barometric Pressure (mbar): 1008	**Barometric Pressure Trend (24hr):** Rising	**Ambient Concentration:** 0.2 %CH_4, 0.1 %CO_2, 20.8 %O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)
	Peak	Steady						Peak	Steady					
WS2	+0.0	+0.0	1009	0.1	-	0.8	20.3	0.3	0.3	0	0	-	DRY	1.77
WS5	-0.1	-0.1	1007	0.1	-	0.7	20.8	0.2	0.2	0	0	-	DRY	1.93
WS7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS8	+0.0	+0.0	1008	0.1	-	0.1	20.8	0.4	0.2	0	0	-	DRY	0.74

*Monitoring wells BH5 and WS7 removed on 21/09/2022.

APPENDIX 6 – SOIL INFILTRATION TEST RECORDS

BRE 365 INFILTRATION TESTS

JOMAS JOB NAME: Harwell Campus, Didcot, OX11 0FD

CALCULATING ENGINEER: JAR **DATE:** 21 September 2022

APPROVED BY: SC **DATE:** 23 September 2022

JOMAS JOB NO.: P4397J2609

TEST LOCATION: TP4

DATE OF TEST: 14 September 2022

Pit Details

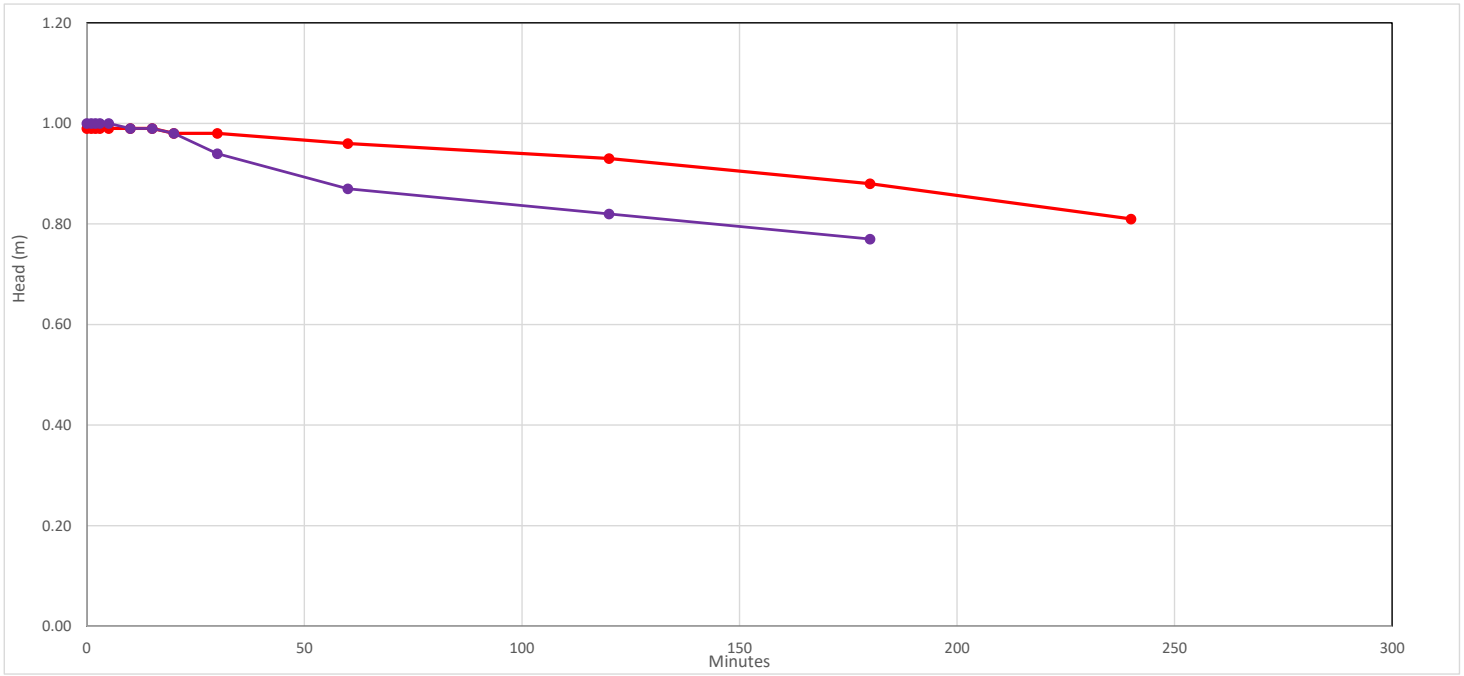
Length	2.2 m
Breadth	0.6 m
Depth	3.3 m
Groundwater?	N
Filled With Gravel?	N

	TP4 - Test 1	TP4 - Test 2	TP4 - Test 3
Dg 75% (m)	0.74	0.75	
Tp 75%			
Dg 25%	0.25	0.25	
Tp 25%			
Vp75% - Vp25% (m^3)	0.65	0.66	
ap50% (m^2)	4.09	4.12	
Tp75-Tp25 (min)			
Soil infiltration rate (m/sec)	Insuff. Drain	Insuff. Drain	
Permeability Description			
Drainage Condtions			

Notes:

Dw = depth to water

Dg = head of water in the pit



TP4 - Test 1			TP4 - Test 2			TP4 - Test 3		
Min	Dw	Dg	Min	Dw	Dg	Min	Dw	Dg
0	2.31	0.99	0	2.30	1.00			
1	2.31	0.99	1	2.30	1.00			
2	2.31	0.99	2	2.30	1.00			
3	2.31	0.99	3	2.30	1.00			
5	2.31	0.99	5	2.30	1.00			
10	2.31	0.99	10	2.31	0.99			
15	2.31	0.99	15	2.31	0.99			
20	2.32	0.98	20	2.32	0.98			
30	2.32	0.98	30	2.36	0.94			
60	2.34	0.96	60	2.43	0.87			
120	2.37	0.93	120	2.48	0.82			
180	2.42	0.88	180	2.53	0.77			
240	2.49	0.81						

	Min	Dg		Min	Dg		Min	Dg
	Insuff. Drain			Insuff. Drain				
75%		0.743	75%		0.75	75%		
	Insuff. Drain			Insuff. Drain				
25%		0.248	25%		0.25	25%		

BRE 365 INFILTRATION TESTS

JOMAS JOB NAME: Harwell Campus, Didcot, OX11 0FD

JOMAS JOB NO.: P4397J2609
TEST LOCATION: TP6
DATE OF TEST: 14 September 2022

Pit Details

Length	1.8 m
Breadth	0.6 m
Depth	3.1 m
Groundwater?	N
Filled With Gravel?	N

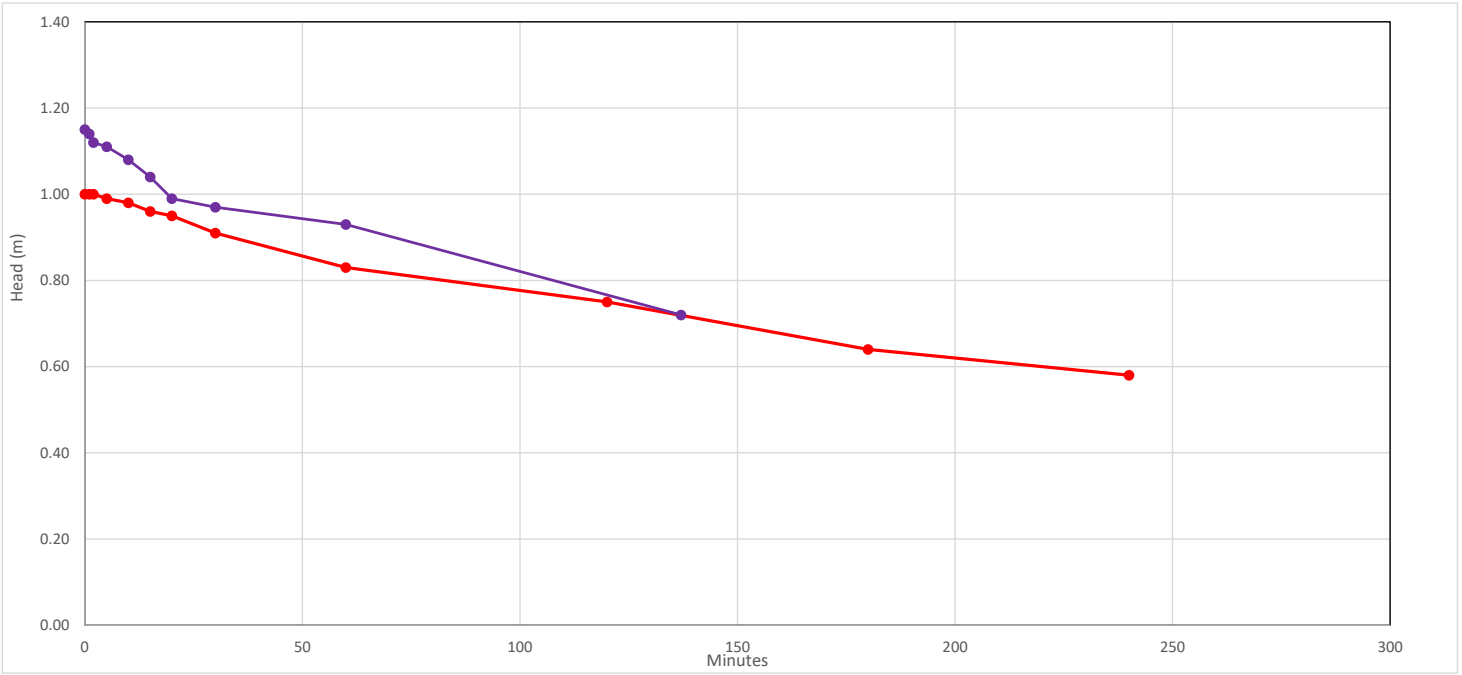
CALCULATING ENGINEER: JAR **DATE:** 21 September 2022
APPROVED BY: SC **DATE:** 23 September 2022

	TP6 - Test 1	TP6 - Test 2	TP6 - Test 3
Dg 75% (m)	0.75	0.86	
Tp 75%	120.00	84.75	
Dg 25%	0.25	0.29	
Tp 25%	459.01	314.55	
Vp75% - Vp25% (m^3)	0.54	0.62	
ap50% (m^2)	3.48	3.84	
Tp75-Tp25 (min)	339.01	229.80	
Soil infiltration rate (m/sec)	7.63E-06	1.17E-05	
Permeability Description	Low	Medium	
Drainage Condtions	Poor	Good	

Notes:

Dw = depth to water
Dg = head of water in the pit

2nd test undertaken on 15/09/2022



TP6 - Test 1			TP6 - Test 2			TP6 - Test 3		
Min	Dw	Dg	Min	Dw	Dg	Min	Dw	Dg
0	2.10	1.00	0	1.95	1.15			
1	2.10	1.00	1	1.96	1.14			
2	2.10	1.00	2	1.98	1.12			
5	2.11	0.99	5	1.99	1.11			
10	2.12	0.98	10	2.02	1.08			
15	2.14	0.96	15	2.06	1.04			
20	2.15	0.95	20	2.11	0.99			
30	2.19	0.91	30	2.13	0.97			
60	2.27	0.83	60	2.17	0.93			
120	2.35	0.75	137	2.38	0.72			
180	2.46	0.64						
240	2.52	0.58						

	Min	Dg		Min	Dg		Min	Dg
	Interpolated			Interpolated				
75%	120	0.75	75%	84.75	0.863	75%		
	Extrapolated			Extrapolated				
25%	459	0.25	25%	315	0.288	25%		

BRE 365 INFILTRATION TESTS

JOMAS JOB NAME: Harwell Campus, Didcot, OX11 0FD

CALCULATING ENGINEER: JAR **DATE:** 21 September 2022

APPROVED BY: SC **DATE:** 23 September 2022

JOMAS JOB NO.: P4397J2609

TEST LOCATION: TP11

DATE OF TEST: 15 September 2022

Pit Details

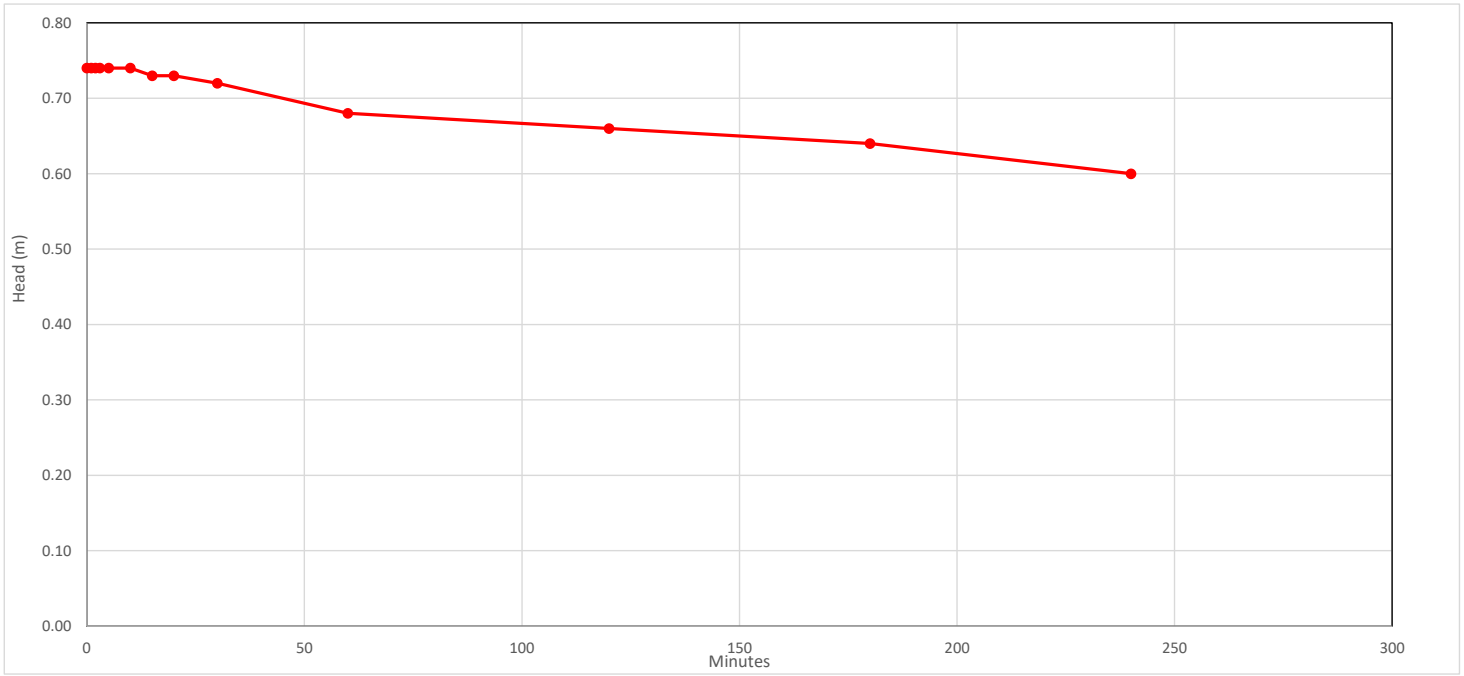
Length	1.0 m
Breadth	0.6 m
Depth	3.1 m
Groundwater?	N
Filled With Gravel?	N

	TP11 - Test 1	TP11 - Test 2	TP11 - Test 3
Dg 75% (m)	0.56		
Tp 75%			
Dg 25%	0.19		
Tp 25%			
Vp75% - Vp25% (m^3)	0.22		
ap50% (m^2)	1.78		
Tp75-Tp25 (min)			
Soil infiltration rate (m/sec)	Insuff. Drain		
Permeability Description			
Drainage Condtions			

Notes:

Dw = depth to water

Dg = head of water in the pit



TP11 - Test 1			TP11 - Test 2			TP11 - Test 3		
Min	Dw	Dg	Min	Dw	Dg	Min	Dw	Dg
0	2.36	0.74						
1	2.36	0.74						
2	2.36	0.74						
3	2.36	0.74						
5	2.36	0.74						
10	2.36	0.74						
15	2.37	0.73						
20	2.37	0.73						
30	2.38	0.72						
60	2.42	0.68						
120	2.44	0.66						
180	2.46	0.64						
240	2.50	0.60						

	Min	Dg		Min	Dg		Min	Dg
	Insuff. Drain							
75%		0.555	75%			75%		
	Insuff. Drain							
25%		0.185	25%			25%		

BRE 365 INFILTRATION TESTS

JOMAS JOB NAME: Harwell Campus, Didcot, OX11 0FD

CALCULATING ENGINEER: JAR **DATE:** 21 September 2022

APPROVED BY: SC **DATE:** 23 September 2022

JOMAS JOB NO.: P4397J2609

TEST LOCATION: TP13

DATE OF TEST: 14 September 2022

Pit Details

Length	2.4 m
Breadth	0.6 m
Depth	1.5 m
Groundwater?	N
Filled With Gravel?	N

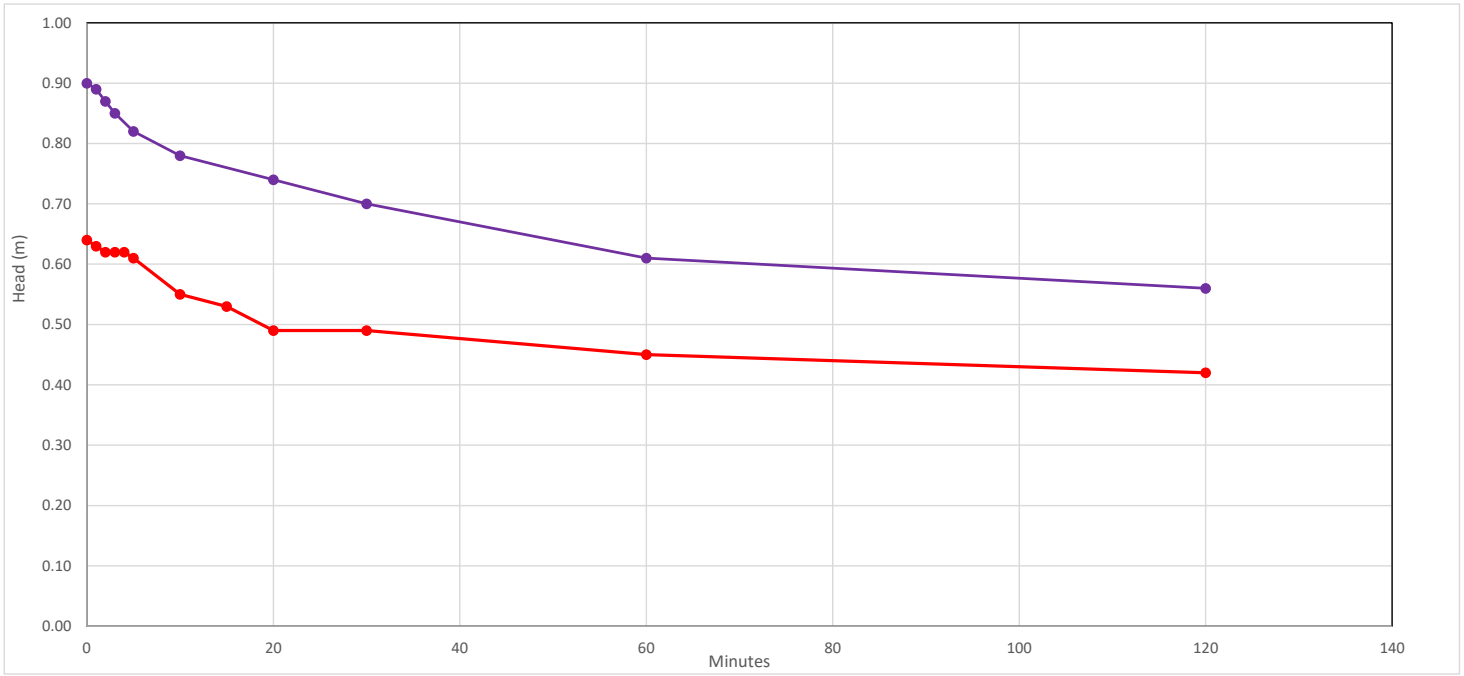
	TP13 - Test 1	TP13 - Test 2	TP13 - Test 3
Dg 75% (m)	0.48	0.68	
Tp 75%	37.50	38.33	
Dg 25%	0.16	0.23	
Tp 25%	438.65		
Vp75% - Vp25% (m^3)	0.46	0.65	
ap50% (m^2)	3.36	4.14	
Tp75-Tp25 (min)	401.15	38.33	
Soil infiltration rate (m/sec)	5.70E-06	6.81E-05	
Permeability Description	Low	Medium	
Drainage Condtions	Poor	Good	

Notes:

Dw = depth to water

Dg = head of water in the pit

2nd test undertaken on 15/09/2022



TP13 - Test 1			TP13 - Test 2			TP13 - Test 3		
Min	Dw	Dg	Min	Dw	Dg	Min	Dw	Dg
0	0.86	0.64	0	0.60	0.90			
1	0.87	0.63	1	0.61	0.89			
2	0.88	0.62	2	0.63	0.87			
3	0.88	0.62	3	0.65	0.85			
4	0.88	0.62	5	0.68	0.82			
5	0.89	0.61	10	0.72	0.78			
10	0.95	0.55	20	0.76	0.74			
15	0.97	0.53	30	0.80	0.70			
20	1.01	0.49	60	0.89	0.61			
30	1.01	0.49	120	0.94	0.56			
60	1.05	0.45						
120	1.08	0.42						

	Min	Dg		Min	Dg		Min	Dg
	Interpolated			Interpolated				
75%	37.5	0.48	75%	38.33	0.675	75%		
	Extrapolated			Extrapolated				
25%	438.6	0.16	25%	311	0.225	25%		

BRE 365 INFILTRATION TESTS

JOMAS JOB NAME: Harwell Campus, Didcot, OX11 0FD

CALCULATING ENGINEER: JAR **DATE:** 21 September 2022

APPROVED BY: SC **DATE:** 23 September 2022

JOMAS JOB NO.: P4397J2609

TEST LOCATION: TP16

DATE OF TEST: 16 September 2022

Pit Details

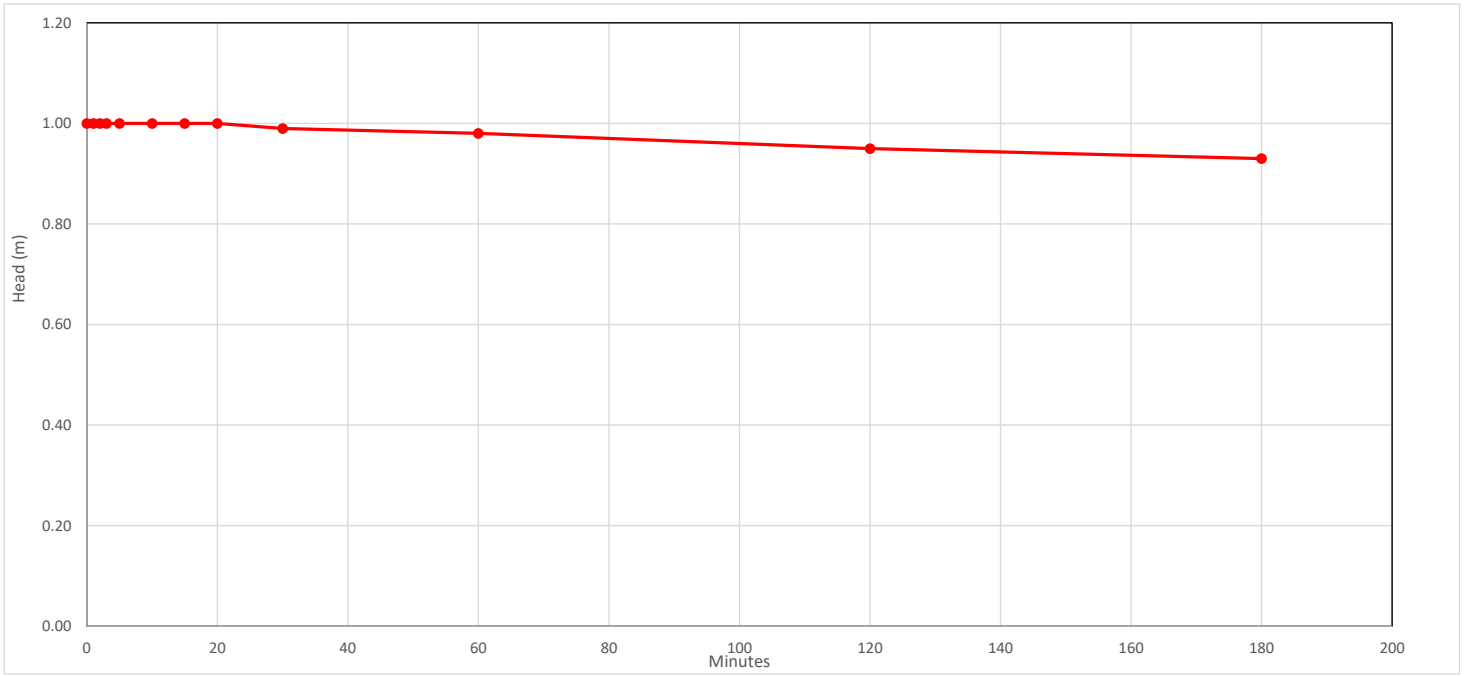
Length	1.9 m
Breadth	0.7 m
Depth	3.7 m
Groundwater?	N
Filled With Gravel?	N

	TP16 - Test 1	TP16 - Test 2	TP16 - Test 3
Dg 75% (m)	0.75		
Tp 75%			
Dg 25%	0.25		
Tp 25%			
Vp75% - Vp25% (m^3)	0.67		
ap50% (m^2)	3.93		
Tp75-Tp25 (min)			
Soil infiltration rate (m/sec)	Insuff. Drain		
Permeability Description			
Drainage Condtions			

Notes:

Dw = depth to water

Dg = head of water in the pit



TP16 - Test 1			TP16 - Test 2			TP16 - Test 3		
Min	Dw	Dg	Min	Dw	Dg	Min	Dw	Dg
0	2.70	1.00						
1	2.70	1.00						
2	2.70	1.00						
3	2.70	1.00						
5	2.70	1.00						
10	2.70	1.00						
15	2.70	1.00						
20	2.70	1.00						
30	2.71	0.99						
60	2.72	0.98						
120	2.75	0.95						
180	2.77	0.93						

	Min	Dg		Min	Dg		Min	Dg
	Insuff. Drain							
75%		0.75	75%			75%		
	Insuff. Drain							
25%		0.25	25%			25%		

APPENDIX 7 – CBR TEST RESULTS

CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR1
Date of Test: 13/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	0	0
100	0	0
150	0	0
200	0	0
250	10	10
300	8	18
350	3	21
400	2	23
450	2	25
500	2	27
550	1	28
600	1	29
650	1	30
700	1	31
750	1	32
800	1	33
850	1	34
900	1	35
950	1	36
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR1-Test 1	200	300	5.6	49.3	46.0	213.27
CBR1-Test 2	300	500	22.2	11.4	11.8	83.55
CBR1-Test 3	500	950	50.0	4.8	5.3	48.03

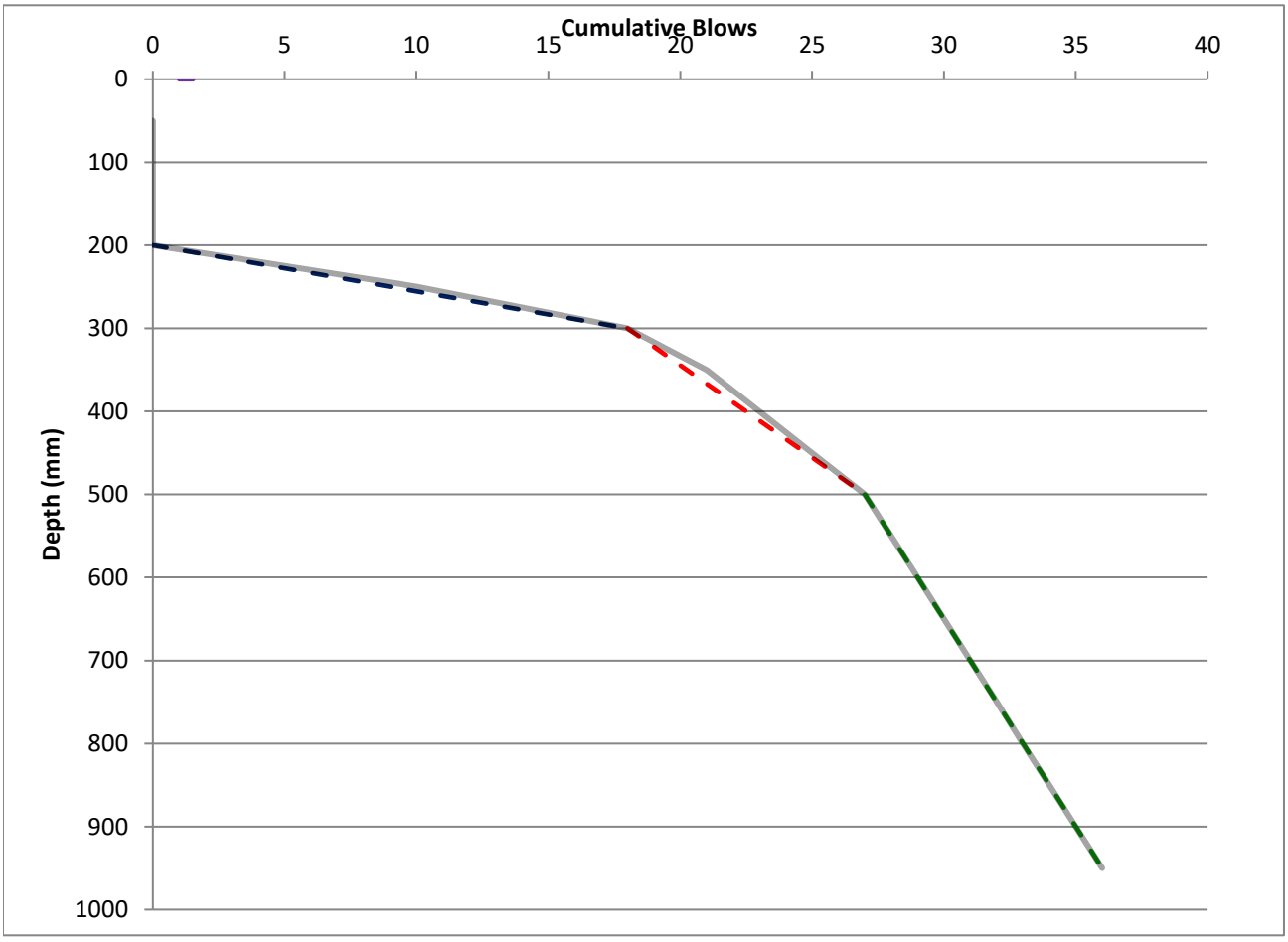
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR2
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	0	0
100	0	0
150	2	2
200	4	6
250	3	9
300	2	11
350	5	16
400	6	22
450	6	28
500	7	35
550	4	39
600	5	44
650	5	49
700	10	59
750	18	77
800	16	93
850	18	111
900	50	161
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR2-Test 1	50	300	22.7	11.1	11.6	82.13
CBR2-Test 2	300	650	9.2	28.9	28.0	151.53
CBR2-Test 3	650	850	3.2	87.6	78.4	308.12
CBR2-Test 4	850	900	1.0	302	247	680.33

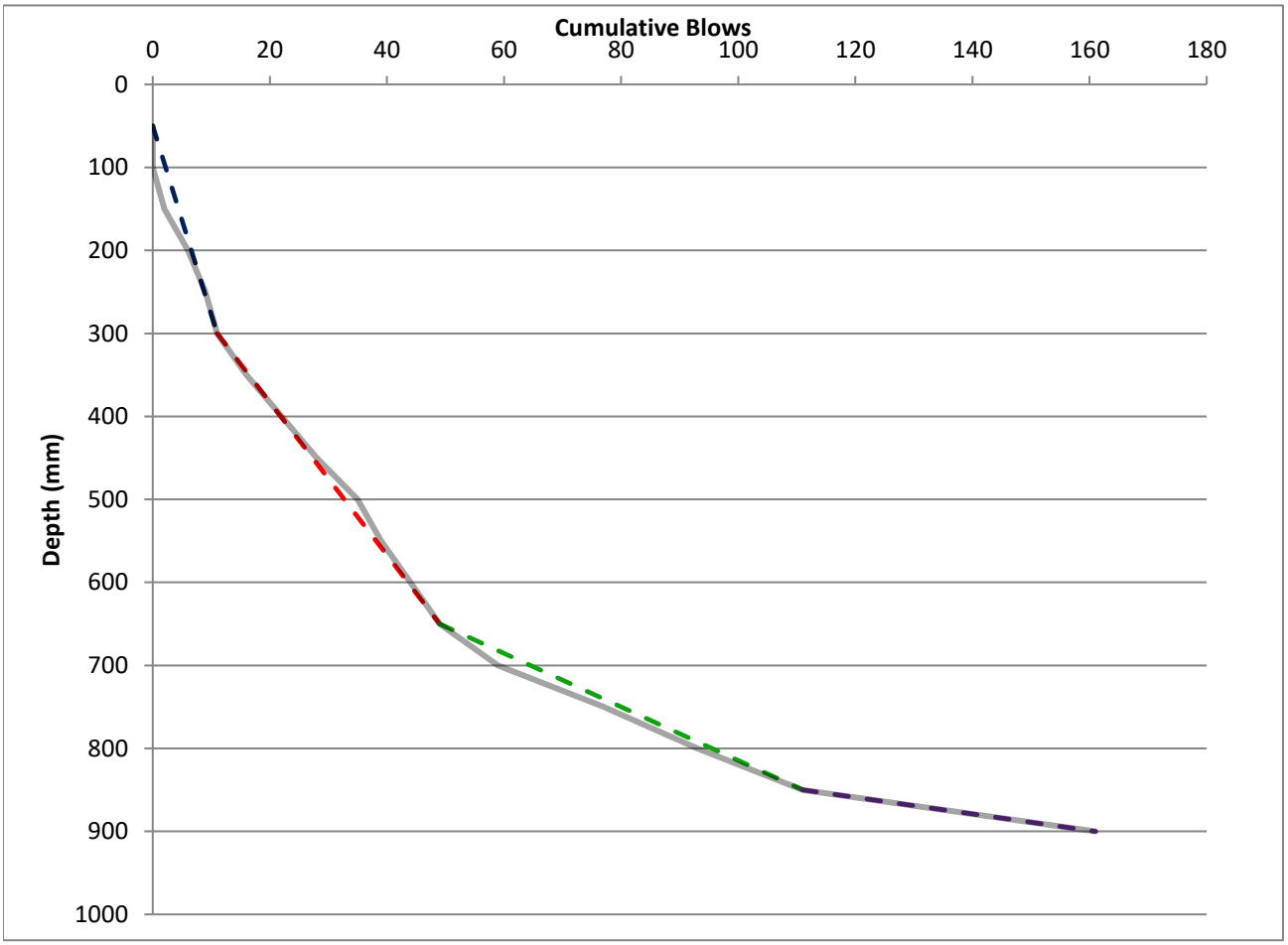
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR3
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	1	2
150	2	4
200	3	7
250	3	10
300	3	13
350	3	16
400	6	22
450	3	25
500	3	28
550	3	31
600	3	34
650	4	38
700	10	48
750	10	58
800	9	67
850	7	74
900	5	79
950	5	84
1000	6	90

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR3-Test 1	50	300	20.8	12.2	12.6	87.25
CBR3-Test 2	350	600	13.9	18.7	18.7	114.68
CBR3-Test 3	600	750	6.3	43.5	41.0	196.85
CBR3-Test 4	750	950	7.7	34.9	33.4	170.97

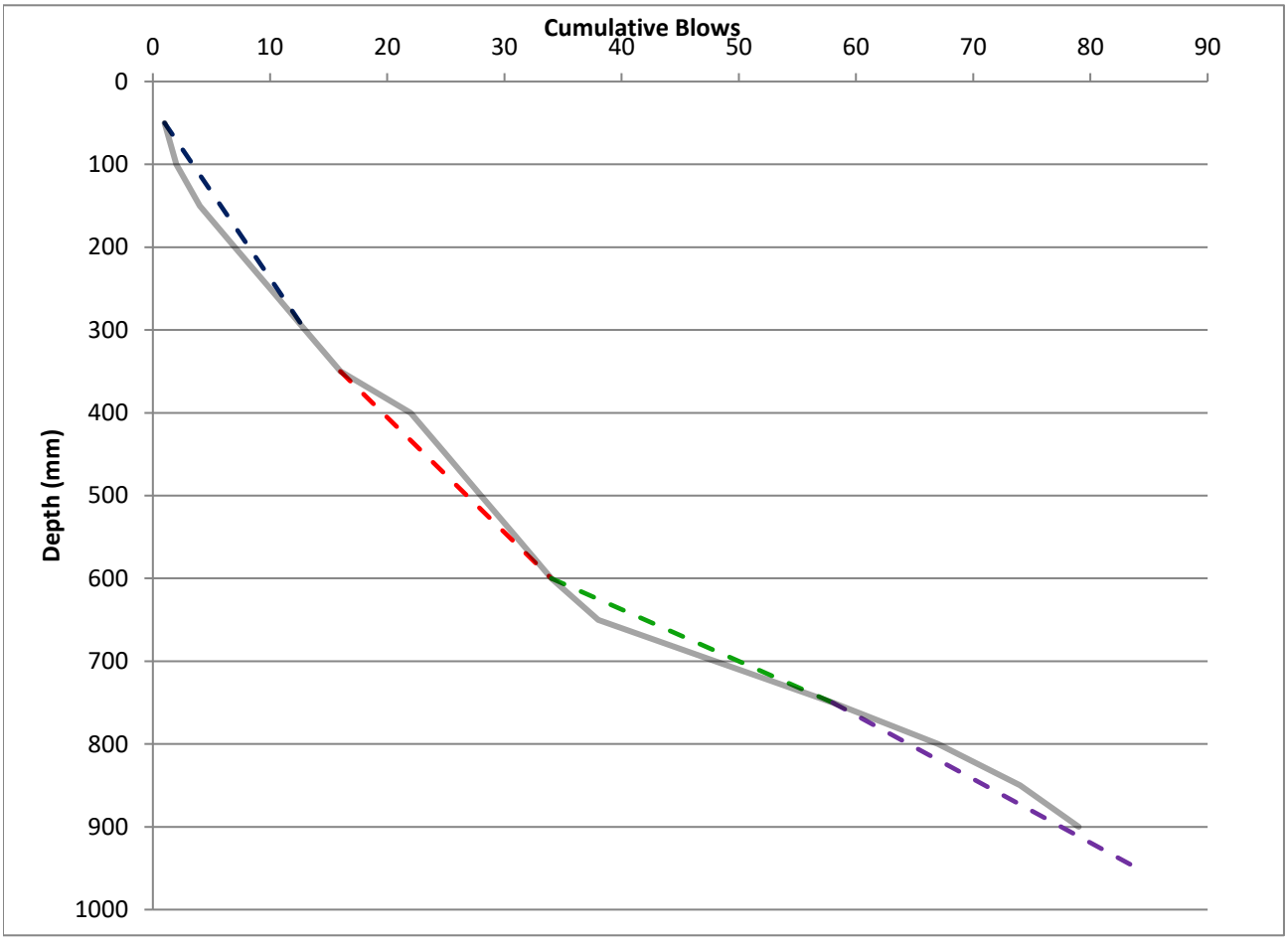
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR4
Date of Test: 12/09/2022

Calculating Engineer: EEG **Date:** 21/09/2022
Approved by: SC **Date:** 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	3	4
150	4	8
200	2	10
250	3	13
300	2	15
350	2	17
400	2	19
450	4	23
500	10	33
550	8	41
600	7	48
650	6	54
700	6	60
750	5	65
800	3	68
850	6	74
900	6	80
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR4-Test 1	50	150	14.3	18.2	18.2	112.71
CBR4-Test 2	150	400	22.7	11.1	11.6	82.13
CBR4-Test 3	450	750	7.1	37.8	36.0	179.93
CBR4-Test 4	800	900	8.3	32.1	30.9	162.06

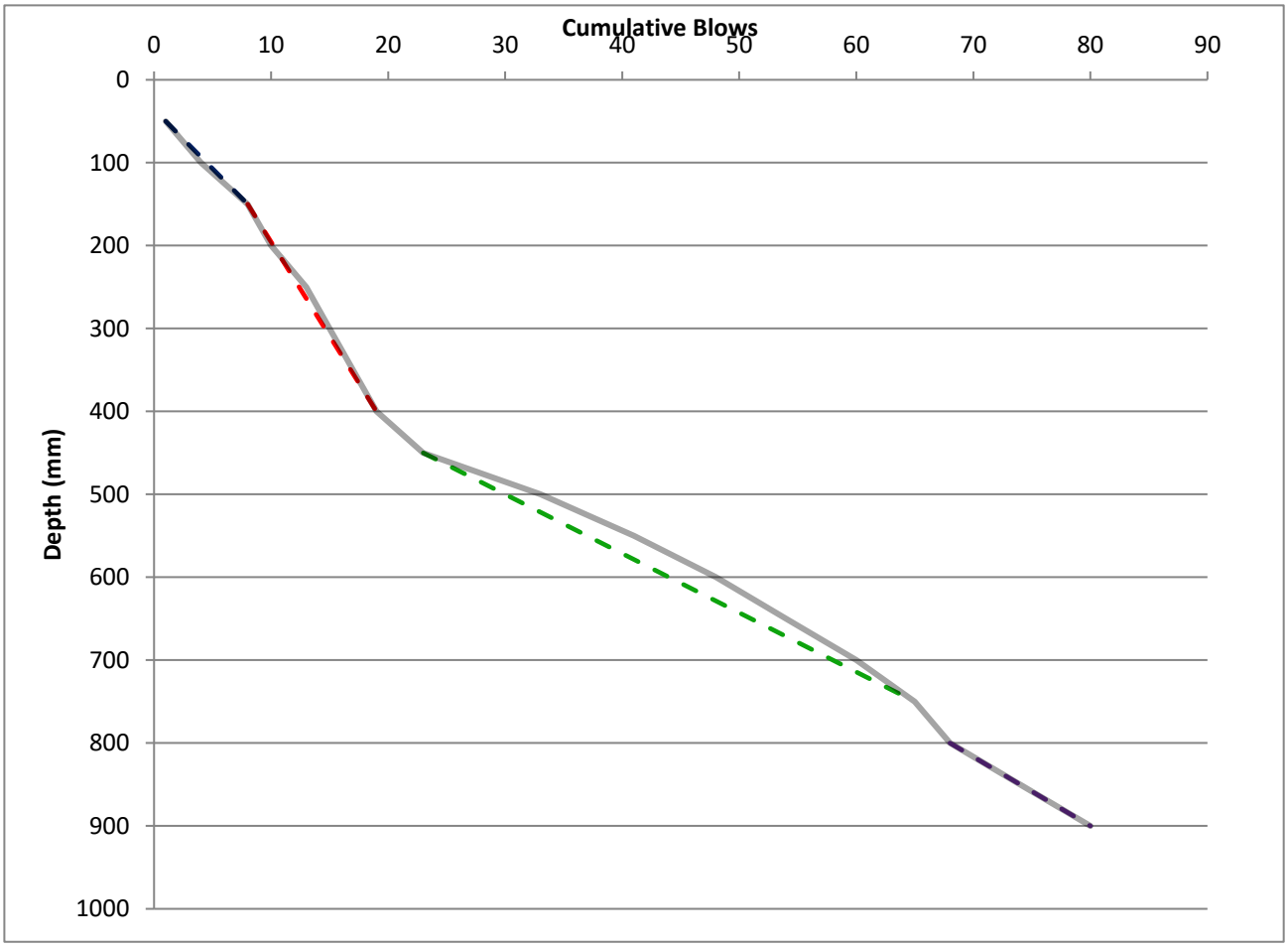
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR5
Date of Test: 13/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	2	3
150	2	5
200	3	8
250	2	10
300	4	14
350	4	18
400	3	21
450	4	25
500	3	28
550	4	32
600	6	38
650	8	46
700	10	56
750	10	66
800	10	76
850	10	86
900	11	97
950	8	105
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR5-Test 1	50	250	22.2	11.4	11.8	83.55
CBR5-Test 2	250	400	13.6	19.1	19.1	116.24
CBR5-Test 3	400	600	11.8	22.3	22.1	128.36
CBR5-Test 4	600	950	5.2	52.6	48.9	222.3

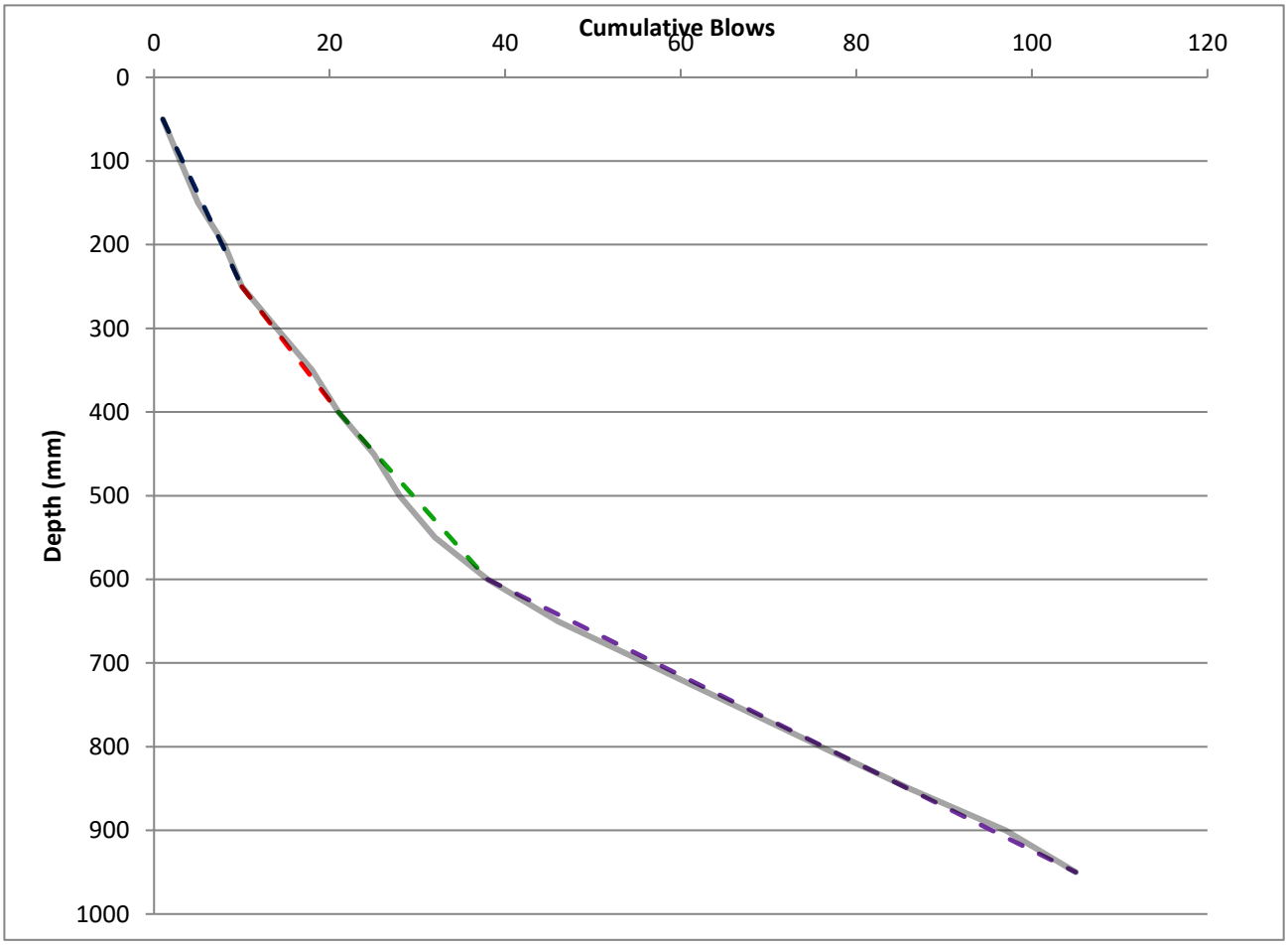
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR6
Date of Test: 13/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	1	2
150	1	3
200	2	5
250	4	9
300	3	12
350	3	15
400	3	18
450	4	22
500	3	25
550	4	29
600	3	32
650	4	36
700	3	39
750	5	44
800	4	48
850	3	51
900	3	54
950	3	57
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR6-Test 1	50	200	37.5	6.6	7.1	58.89
CBR6-Test 2	200	950	14.4	18	18.1	111.91

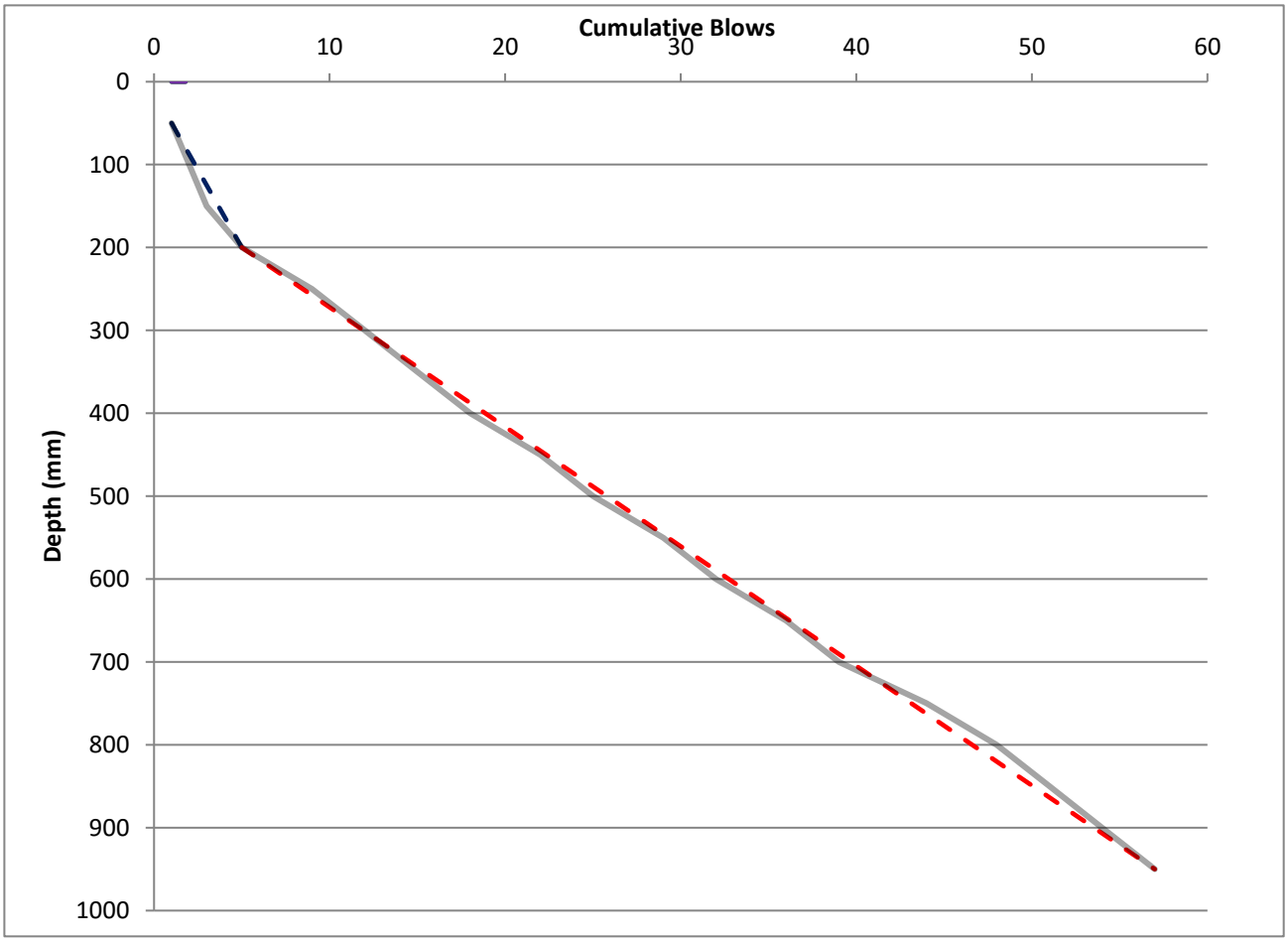
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR7
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	2	2
100	2	4
150	2	6
200	2	8
250	2	10
300	2	12
350	2	14
400	2	16
450	4	20
500	6	26
550	6	32
600	6	38
650	7	45
700	5	50
750	6	56
800	7	63
850	8	71
900	8	79
950	10	89
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR7-Test 1	50	400	25.0	10.1	10.5	77.32
CBR7-Test 2	400	750	8.8	30.5	29.5	156.84
CBR7-Test 3	750	950	6.1	45	42.3	201.17
CBR7-Test 4	400	950	7.5	35.7	34.1	173.47

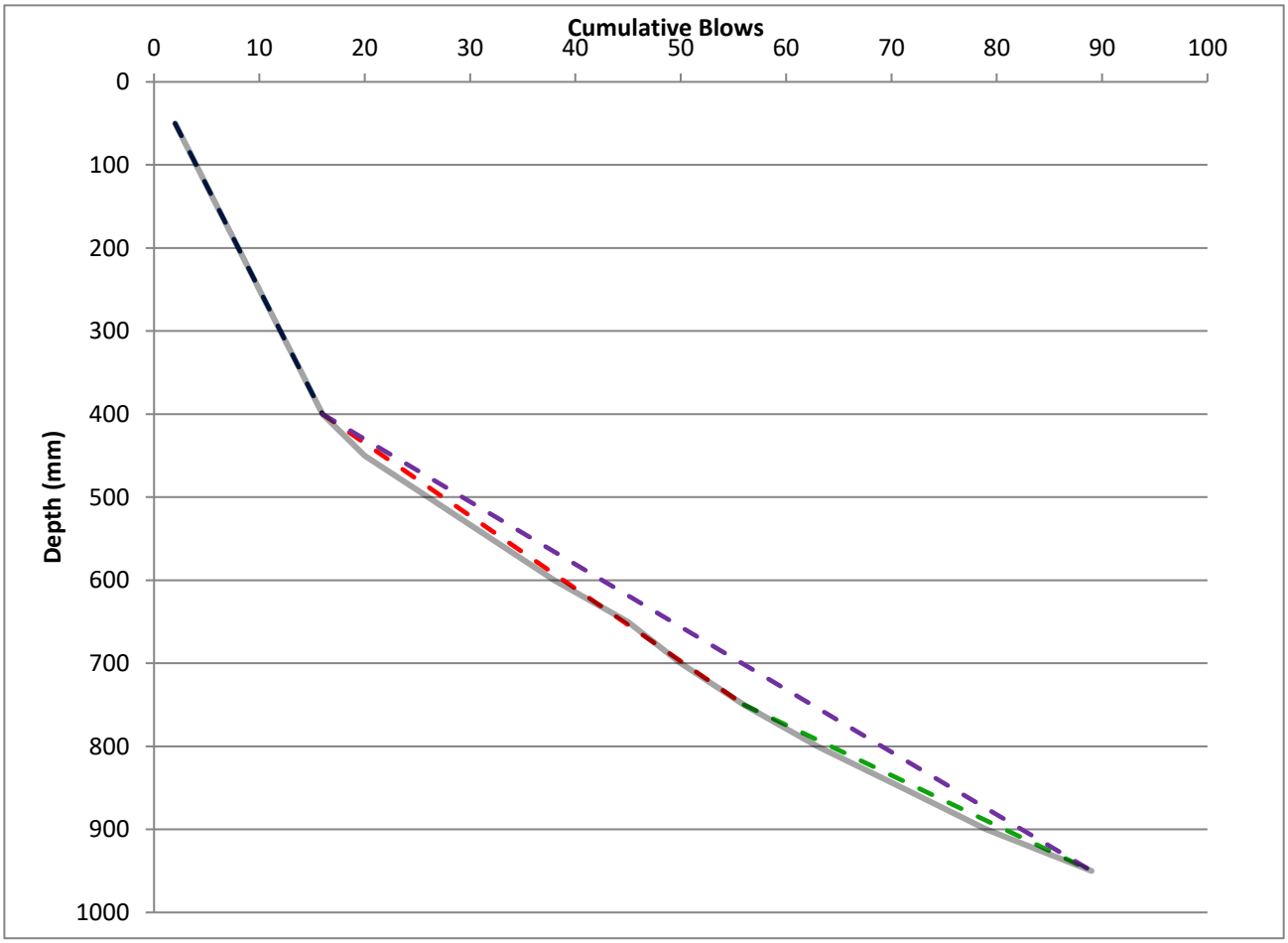
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR8
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	1	2
150	2	4
200	2	6
250	3	9
300	2	11
350	2	13
400	4	17
450	4	21
500	2	23
550	1	24
600	2	26
650	2	28
700	2	30
750	1	31
800	2	33
850	2	35
900	3	38
950	4	42
1000	4	46

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR8-Test 1	100	350	22.7	11.1	11.6	82.13
CBR8-Test 2	350	450	12.5	20.9	20.8	123.14
CBR8-Test 3	450	850	28.6	8.7	9.2	70.28
CBR8-Test 4	850	1000	13.6	19.1	19.1	116.24

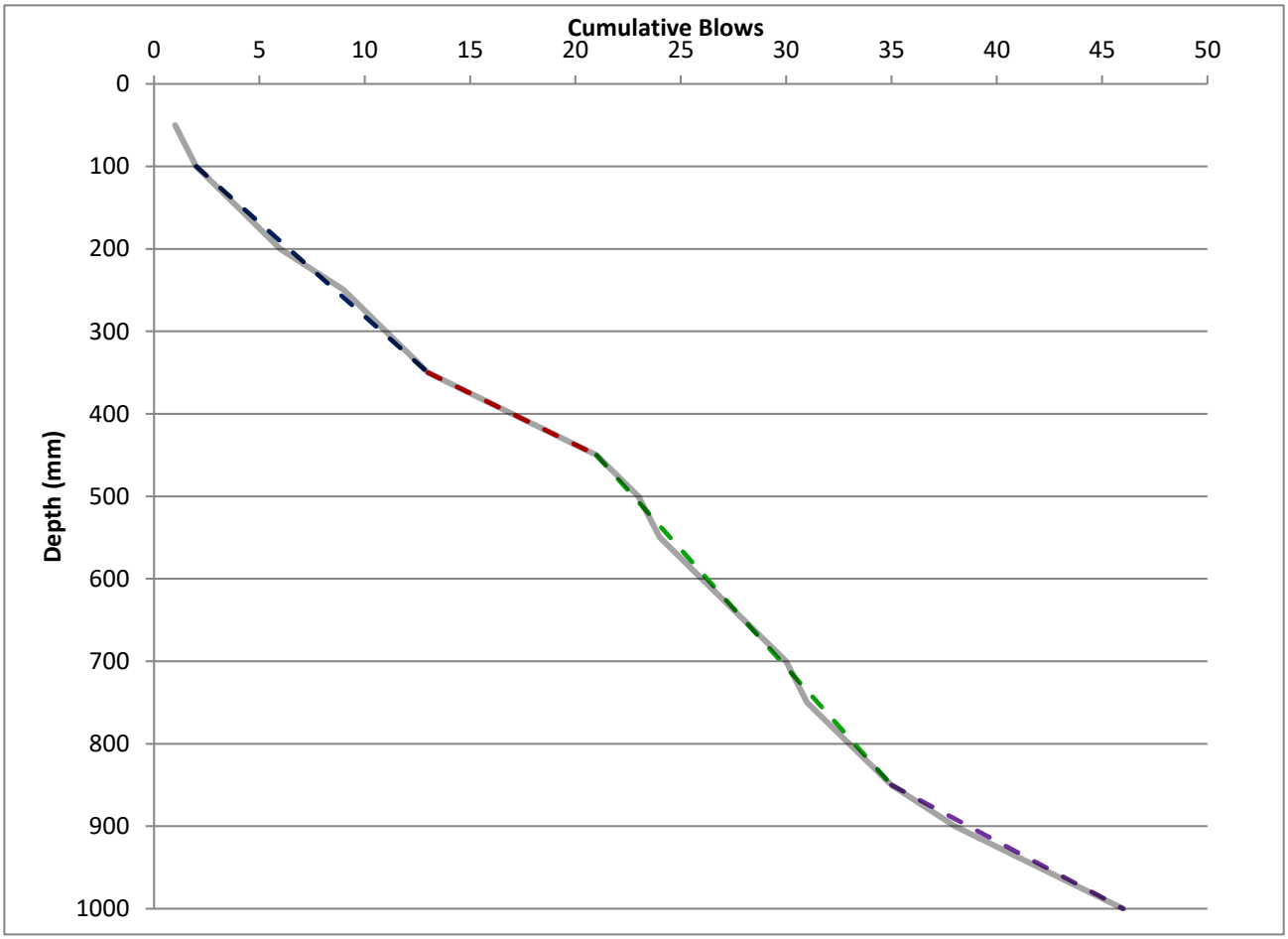
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



JOMAS ENGINEERING ENVIRONMENTAL

CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR9
Date of Test: 13/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	2	3
150	3	6
200	3	9
250	5	14
300	7	21
350	6	27
400	6	33
450	50	83
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR9-Test 1	50	200	18.8	13.6	14.0	93.54
CBR9-Test 2	200	400	8.3	32.1	30.9	162.06
CBR9-Test 3	400	450	1.0	302	247.0	680.33

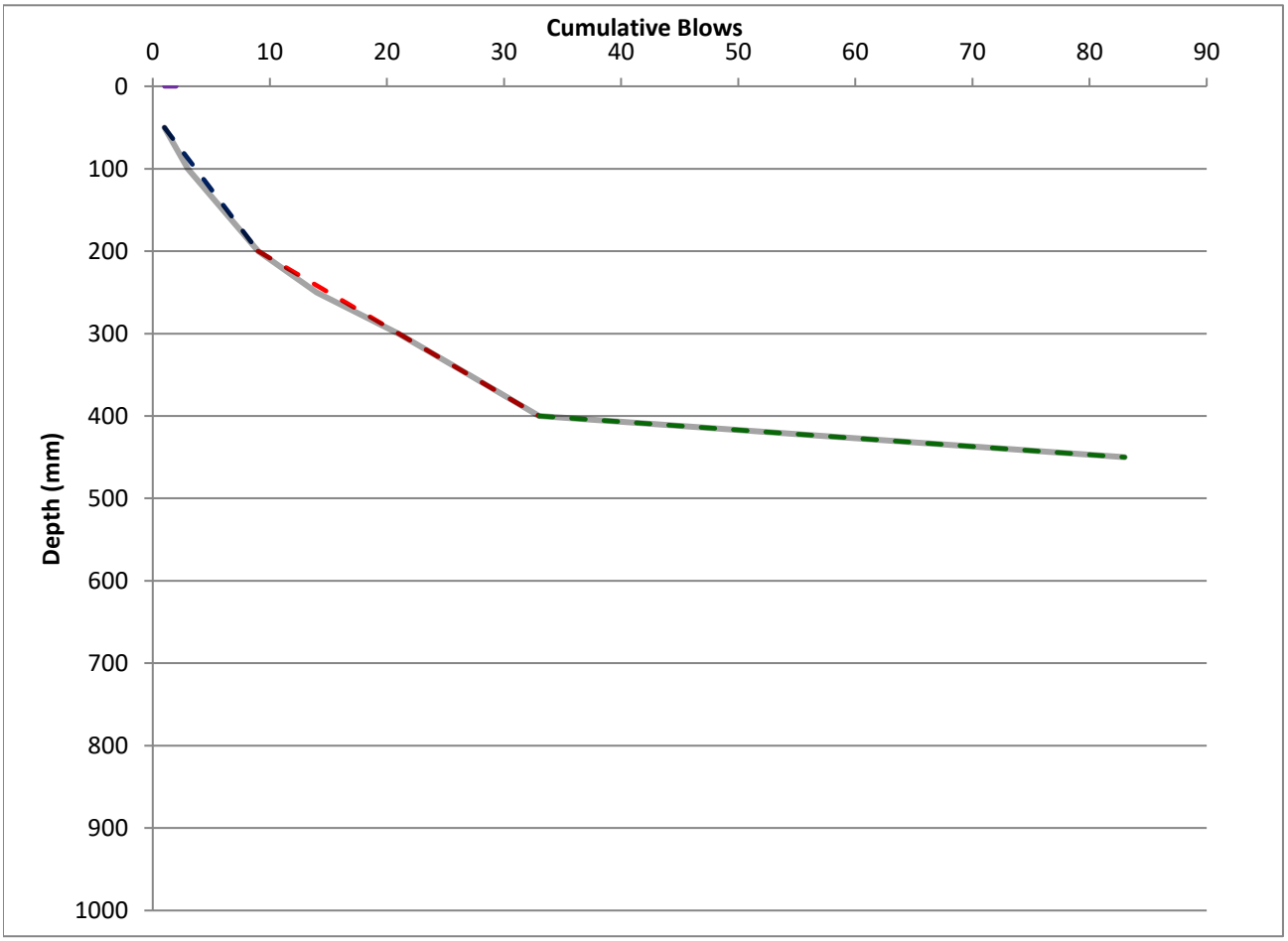
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR10
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	1	2
150	4	6
200	3	9
250	4	13
300	7	20
350	6	26
400	7	33
450	8	41
500	6	47
550	5	52
600	6	58
650	6	64
700	6	70
750	5	75
800	5	80
850	5	85
900	5	90
950	4	94
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR10-Test 1	100	250	13.6	19.1	19.1	116.24
CBR10-Test 2	250	450	7.1	37.8	36.0	179.93
CBR10-Test 3	450	950	9.4	28.2	27.4	149.17

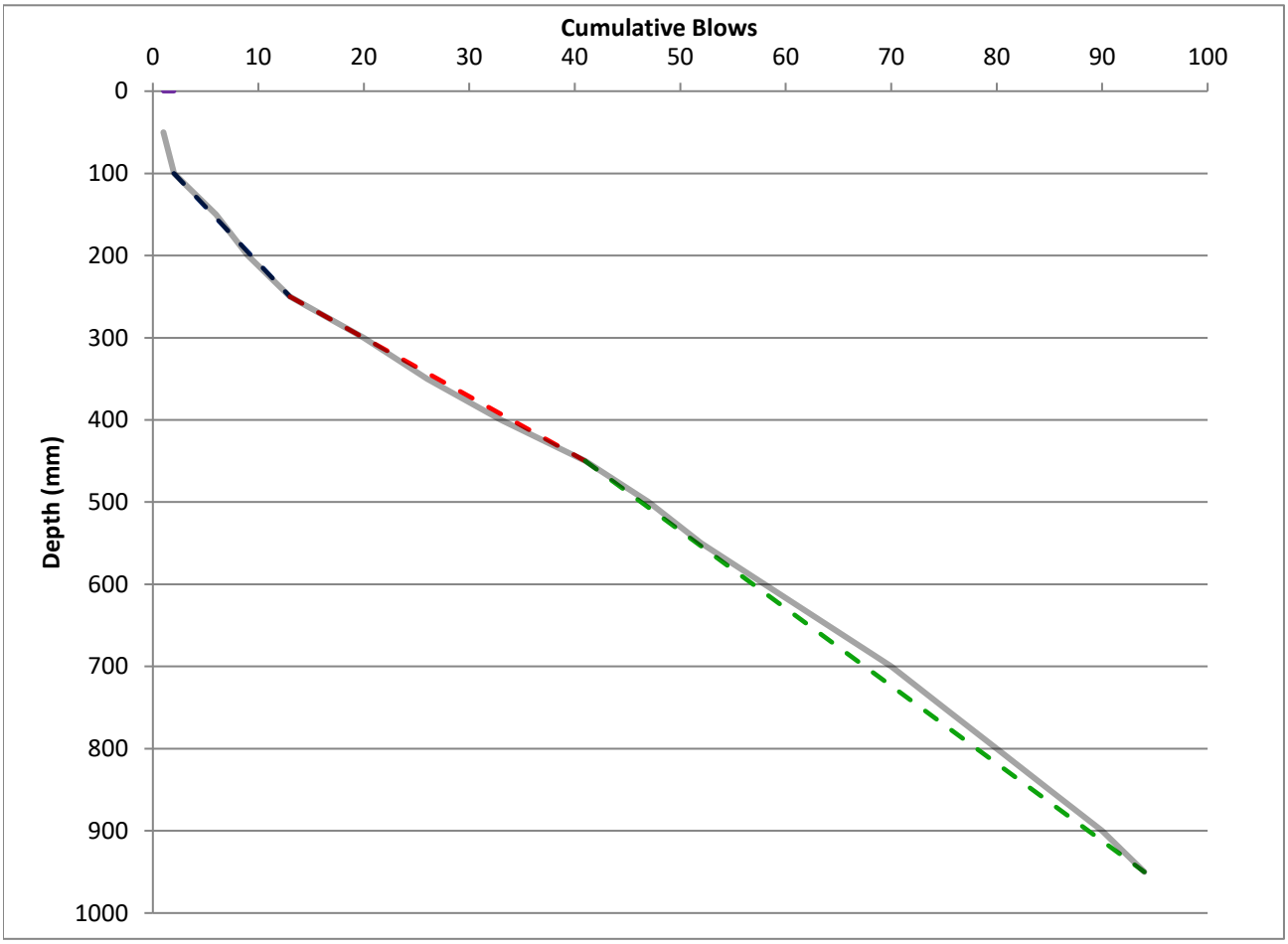
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR11
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	1	1
100	1	2
150	3	5
200	5	10
250	7	17
300	5	22
350	13	35
400	50	85
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR11-Test 1	50	150	25.0	10.1	10.5	77.32
CBR11-Test 2	150	300	8.8	30.2	29.2	155.85
CBR11-Test 3	300	350	3.8	72.7	66.0	273.46
CBR11-Test 4	350	400	1.0	302	247	680.33

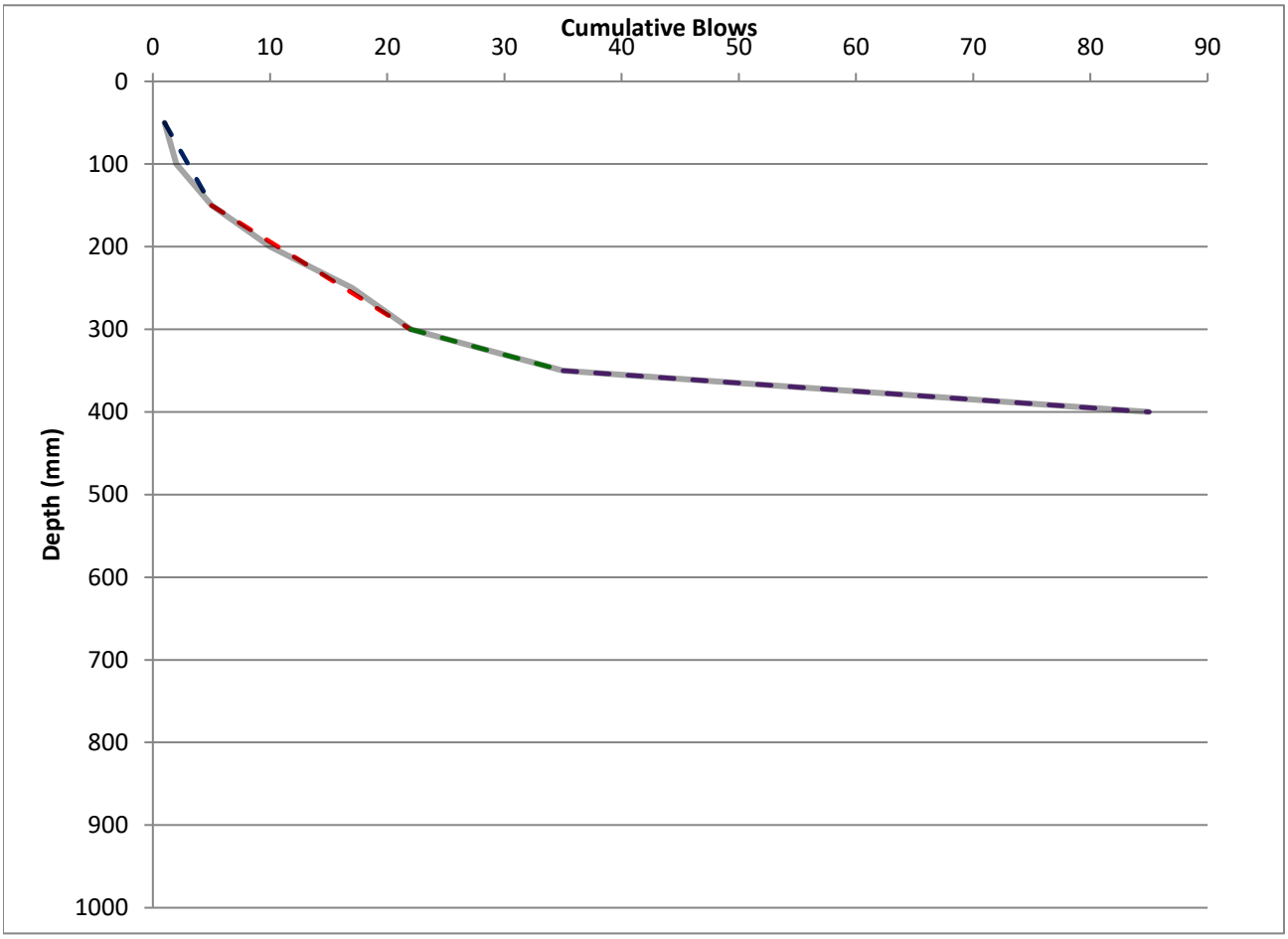
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Zone 5 & ESA Harwell Campus
Jomas Job No.: P4397J2609

Test Location: CBR12
Date of Test: 12/09/2022

Calculating Engineer: EEG
Approved by: SC

Date: 21/09/2022
Date: 23/09/2022

Depth (mm)	Nr Blow	Cumulative blows
50	0	0
100	1	1
150	1	2
200	2	4
250	3	7
300	4	11
350	3	14
400	3	17
450	5	22
500	3	25
550	2	27
600	2	29
650	2	31
700	2	33
750	3	36
800	4	40
850	5	45
900	3	48
950	4	52
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
CBR12-Test 1	50	150	50.0	4.8	5.3	48.03
CBR12-Test 2	150	400	16.7	15.4	15.7	101.28
CBR12-Test 3	450	700	22.7	11.1	11.6	82.13
CBR12-Test 4	700	950	13.2	19.8	19.8	118.95

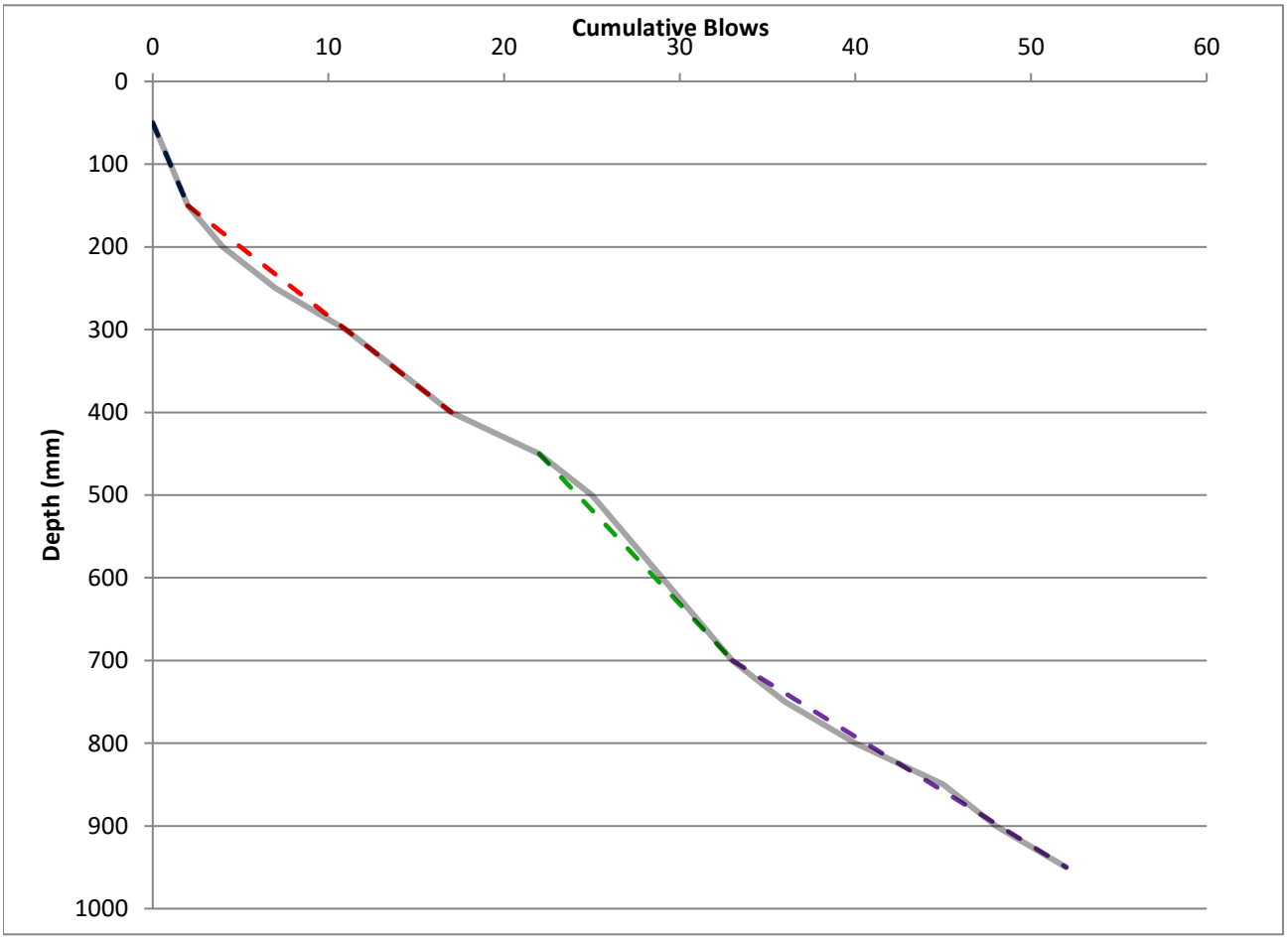
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



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