PHASE 2 REPORT ON A SITE INVESTIGATION

Site

FRIARS GARTH,
THE PARADE, EPSOM,
SURREY KT18 5DH

Client

WELDIN BUILDERS LTD

Report Ref
22/12385/KJC REV 1

Issued
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ALBURY S.I. LTD

Geotechnical and Environmental Consultants
Miltons Yard, Petworth Road,
Witley, Surrey GU8 5LH

T: 01428 684 836
F: 01428 685 261
info@alburysi.co.uk
www.alburysi.co.uk

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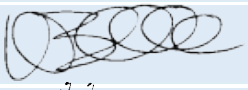
Prepared by	**K J Clark** BSc Hons Director		
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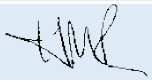
1	Final	12/09/2022	

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This Report is prepared for the specific purpose stated and in relation to the development proposals or usage indicated to Albury S.I. Limited at the time of preparation. The recommendations should not be used for adjacent schemes and may not be appropriate for alternative proposals.

The recommendations made and opinions expressed in this Report are based on the strata conditions revealed by the fieldworks as indicated on the exploratory records, together with an assessment of the data from in situ and laboratory tests. No liability can be accepted for conditions which have not been revealed by the fieldworks, for example, between exploratory positions. While this Report may offer opinions on the possible configuration of strata, both between the excavations and below the maximum depth achieved by the investigation, these comments are for guidance only and no liability can be accepted for their accuracy. The data obtained relate to the conditions which are relevant at the time of the investigation.

The groundwater observations entered on exploratory records are those noted at the time of the investigation. The normal rate of progress does not usually permit the recording of any equilibrium water level for any one water strike. It should be noted that groundwater levels are prone to seasonal variation and to changes in local drainage conditions. The word 'none' indicates that groundwater was sealed off by the borehole casing or that no water was observed in the exploratory hole upon completion.

REPORT REF: 22/12385/KJC REV 1
CONTRACT: THE PARADE, EPSOM

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1 INTRODUCTION

The Client proposes to construct a block of flats with associated car parking following the demolition of the existing structures at Friars Garth, The Parade, Epsom ("the site"). Albury SI Ltd completed a Phase 1 Desk Study for the site, report reference 20/11876/KJC, issued in July 2020. Consequently, in order to assist with the discharge of planning conditions an intrusive site investigation has been undertaken to ascertain the nature and engineering properties of the soils underlying the proposed development site and to obtain data which will assist in the formulation of a safe and economical foundation solution. In addition, a geo-environmental appraisal of the site has also been carried out. At the time of the site works, the site was occupied and the existing buildings were present.

In accordance with the Client's requirements the programme of this investigation comprised the construction of a single deep cable percussive borehole and six boreholes using hand-held window sampling techniques. During this work samples were recovered for further examination and laboratory testing. In addition, a number of in situ tests were also performed.

This report describes the work undertaken, presents the information obtained and discusses the ground conditions with respect to foundation design, construction and potential contamination.

2 FIELDWORKS

The boreholes were constructed on 6th and 7th June 2022, at locations as shown on the site plan, drawing no. 22/12385/1, which is presented as Figure 1. The exploratory positions were located in order to provide adequate site coverage taking into account the presence of the existing house and the proposed layout.

The depths and descriptions of the strata encountered in the boreholes are given on the records which comprise Appendix 1 to this report. These records note the depths at which samples were taken, the results of in situ tests and the groundwater observations noted at the time of the fieldworks.

Photographs which give a general impression of the site at the time of the fieldworks are included below.

3 GROUND CONDITIONS

3.1 Geology

Reference has been made to the published 1:50,000 scale British Geological Survey (BGS) digital mapping of the area and the Phase 1 Desk Study. The site is indicated as being underlain by River Terrace Deposits of geologically recent age. These superficial deposits are underlain by the Lambeth Group of Eocene age.

3.2 Stratigraphy

Consideration of the borehole records indicates that made ground varying in composition from dark brown silty sand with brick fragments to paving over concrete was present at the investigatory locations and was shown to extend to depths of between 0.40m and 1.70m.

Granular soils ranging from brown clayey sand with gravel to brown sandy gravel were encountered beneath the made ground and were proved to depths of between 2.30m and 2.80m. These soils are thought to represent the River Terrace Deposits.

Light brown sandy clay to green-grey very sandy clay was observed upon penetration of the River Terrace Deposits and was exposed to the concluding depth of boreholes 2 to 7 at 3.10m and to 6.90m in borehole 1. A thin band of grey-brown sand was observed interbedded within the sandy clay at 5.00m to 5.40m. Dark blue-grey/brown clayey sand was noted beneath the sandy clay, which extended to 8.70m. At this level, blue-grey/brown very sandy clay was exposed and proved to 11.00m. Blue-grey sand was encountered upon penetration of the very sandy clay. This fine grained soil continued to the full depth of borehole 1 at 15.00m. The above soils are collectively considered to represent the Lambeth Group.

3.3 Groundwater

During the construction of the exploratory positions tentative groundwater strikes were estimated at depths of the order of 2.50m within boreholes 2 to 7. In borehole 1 water strikes were noted at 4.70m, 6.90m and 11.00m. Short-term standing water levels upon completion of the boreholes of 3.80m and 2.08m were recorded in boreholes 1 and 5. On completion of the remaining boreholes the excavations were noted to have collapsed in to 2.50m.

3.4 In Situ Testing

During the construction of borehole 1 in situ Standard Penetration Tests [SPT] were performed. The test results are presented in terms of the number of blows to achieve a seating drive for 150mm of penetration, recorded as two 75mm increments and the test drive over 300mm recorded as four 75mm increments. The test drive is used to derive the penetration resistance for that soil layer and is recorded as the uncorrected SPT *N* value. A penetration resistance or *N* value of 18 blows/300mm was recorded in the made ground. *N* values ranging between 9 blows/300mm to 34 blows/300mm were recorded in the upper levels of the Lambeth Group, which, using established correlations, infers a firm to very stiff condition in situ for a cohesive soil or medium dense to dense condition for a granular soil. Three tests were conducted within the soils at the base of the borehole and *N* values of 85-97 blows/300mm were recorded, which infer that the soils are very dense in nature.

4 LABORATORY TESTING

A programme of laboratory testing has been undertaken and the results are presented as Appendix 2 to this report. The geotechnical soil testing was undertaken by Albury S.I. Ltd, whilst representative samples were submitted for geochemical testing at the UKAS accredited laboratories operated by i2 Analytical Ltd. Each type of test is summarised below and the results obtained have been used to assist in the formulation of the discussion.

4.1 Water Content

The water contents of samples of the soils encountered at this site have been determined. Water contents within the range 15.5% to 20.3% have been recorded.

4.2 Index Properties

The liquid and plastic limits of samples of the clay soils have been determined. The results of this work indicate that the samples tested can generally be described as inorganic clays of low to intermediate plasticity and of low shrinkage potential. In one instance the test sample proved to be non-plastic.

4.3 Particle Size Distribution

Samples of the soils encountered at this site have been subjected to sieve analysis in order to determine the soils' particle size distribution. The results of this work are presented in the form of grading curves.

4.4 Triaxial Compression

The undrained shear strength characteristics of samples of the cohesive soils encountered at this site have been determined by testing 100mm diameter specimens in the triaxial compression apparatus. Under the conditions of this work cohesions of 40kPa and 75kPa were obtained, which is indicative of a firm to stiff condition for a cohesive soil.

4.5 Chemical Testing – Soluble Sulphates & pH

Samples of the soils and groundwater encountered at this site have been subjected to chemical analyses in order to determine their soluble sulphate contents and pH values. Under the conditions of this work low concentrations of soluble sulphate have been recorded in association with near neutral pH values.

4.6 Geochemical Testing

Selected samples of the made ground have been submitted to the UKAS accredited laboratories operated by i2 Analytical Ltd. The testing comprises a suite of typical inorganic and organic priority contaminants including metals, PAH, TPH CWG and an asbestos screen.

5 GEOTECHNICAL DISCUSSION

5.1 Foundations

The Client proposes to construct a new block of flats, which will not incorporate a basement. The proposed layout is shown in Figure 2. At the time of the preparation of this report no information had been provided with respect to the anticipated structural loads.

It cannot be recommended that major structural foundations be located within the made ground revealed by this investigation. Soils of this origin are frequently present in a weak and variable condition such that unacceptable settlement could occur even under the action of light loading intensities. Therefore, it will be necessary to continue foundation excavations through these undesirable materials where they are of less than 1.00m in thickness to this minimum depth in order to avoid that zone of soil which is subject to normal seasonal

moisture variation or frost action. The above precautions need not necessarily be applied to light ancillary structures, which will be formed structurally discrete from the main development and in which a greater degree of settlement can be tolerated.

It is known that a number of trees are present in the vicinity of the proposed structure. A discussion of the causes, effects and classification of desiccation in clay soils is included in Appendix 3 to this report. Consideration of the results of the laboratory testing indicates that moisture deficiency is not present within the cohesive soils encountered at this site. Nevertheless, it will be necessary to ensure that foundations comply with NHBC criteria on the basis that the cohesive soils are of low shrinkage potential.

Interpretation of the data derived from this investigation indicates that non-shrinkable granular soils will be present at a nominal depth of 1.25m beneath the made ground. Cohesive soils were noted to underlie the granular soils at depths of between 2.30m and 2.80m. It is possible that strip or spread foundations, constructed at a minimum depth of 1.00m, compliant with NHBC Criteria can be adopted. It is considered that the brown silty sand is competent to accept a maximum increase in load of 100kPa. At this loading intensity a factor of safety of 3 against general shear failure will be operative. Moreover, settlements should remain within tolerable limits for the type of structure proposed. These movements are likely to be sensibly complete during a normal construction period due to the free draining nature of the underlying soils.

An increased thickness of made ground was recorded to 1.70m depth at the location of borehole 1. Therefore, where required, local extension of foundation excavations should be undertaken to ensure that a consistent founding medium is achieved.

Should it be found that foundation depths do not comply with NHBC Criteria or a greater bearing is required then consideration should be given to use of piles. The design of piles lies outside the scope of this report as it is dependent upon the type of pile employed, its size and bearing capacity. Therefore, when the loadings are known it will be sensible to seek the advice of suitably experienced specialist piling contractors in order to provide a satisfactory solution to the problem. The information given in Appendices 1 and 2 of this report may be used in pile design.

5.2 Stability of Excavations

Excavations of less than 1.00m depth should not require temporary support to their sides. However, where foundation excavations are extended below this level, adequate temporary support or shoring should be provided in order to comply with current statutory safety regulations and to maintain the stability of the excavation sides.

5.3 Groundwater

The groundwater observations noted at the time of the fieldworks suggest that this phenomenon should not represent an engineering problem in respect of shallow depth excavation. Any seepages or surface water run-off accumulating in foundation excavations should be removed expeditiously by the construction of sumps from which the water can be pumped.

5.4 Drainage

The near surface drainage characteristics of the underlying granular soils have not been considered as part of this investigation. It is believed that these may act as a suitable drainage medium and this should be confirmed by carrying out full scale soakaway tests.

5.5 Ground Floor Slabs

The thickness of made ground revealed by this investigation, commonly in excess of 0.60m, infers that a system of fully suspended floor slabs should be incorporated within the proposed structure in accordance with NHBC criteria.

5.6 Buried Concrete

The information obtained from this investigation has been compared with the criteria proposed in BRE Special Digest 1, 2005 Edition, Concrete in Aggressive Ground. Using the information in Table C1 (natural ground) or C2 (brownfield locations) of this publication the Aggressive Chemical Environment for Concrete Classification (ACEC) is AC-1s, which coincides with a Design Sulphate Class DS-1. The ACEC Class above can be used to determine the Design Chemical Class for concrete for general cast-in-situ use as required Part D of the Digest.

6 GROUND CONTAMINATION

A Conceptual Site Model (CSM) was formulated for this site as part of the Phase 1 Desk Study. This report has been used to inform the current Phase 2 intrusive investigation. The CSM produced as part of the Desk Study noted a low risk of the presence of heavy metals and PAH's. The report also highlighted the need for the completion of an asbestos survey on the existing building.

6.1 Human Health

A generic assessment of the chronic or long-term risk to human health from soil contamination has been made using the available generic screening criteria. The screening

values include the Category 4 Screening Levels [C4SLs] (DEFRA, 2014) and Suitable for Use Levels [S4ULs] (LQM/CIEH, 2014) derived using the CLEA software. It should be appreciated that these do not consider the short-term or acute risks, such as to construction workers or SI personnel.

The results have been compared against the criteria for a Residential (with home-grown produce) end-use and appropriate SOM. A study of the data reveals elevated levels of PAH's, namely benzo(a)pyrene and dibenz(a,h)anthracene, which exceed the S4UL GAC in the test sample from borehole 5. Elevated levels of lead were also recorded at the locations of boreholes 1, 2, 3 and 5. Additional testing at these positions revealed elevated levels of lead at 0.50m depth in boreholes 1, 2 and 5. Acceptable PAH levels were recorded at 0.50m in borehole 5.

Remedial measures will need to be implemented as part of the redevelopment. It is recommended that 600mm of material should be removed from all soft landscaped areas. Thereafter, clean material should be placed comprising 450mm of granular subsoil, overlain by a minimum thickness of 150mm of clean topsoil. A formal Remediation Method Statement is likely to be required to satisfy the Local Authority and warranty provider with supplementary validation to confirm the measures have been implemented.

In areas of hard cover, i.e. parking and the proposed block of flats, remedial measures will not be required as the PAH contaminated soils will be removed and replaced as part of road and floor slab construction. Moreover, no viable pathway will exist where hard cover is present.

6.2 Preliminary Waste Assessment

Where excavated soils cannot be re-used or retained on site, then these surplus materials will require off-site disposal. It may be possible to divert the unwanted material to a soil treatment hub where it can be recycled. Where material cannot be re-used or recycled then disposal at a licensed landfill site can be considered. It will then be necessary to classify the spoil as inert, non-hazardous or hazardous. A discussion of the current regime for the classification and treatment of waste soils is included in Appendix 4.

An initial assessment of the geochemical results obtained from this investigation has been carried out to provide a preliminary classification of the surplus materials. The Atkins CAT-WASTE tool determines whether waste soil should be classified as being non-hazardous or hazardous. The output from the CAT-WASTE assessment is located in Appendix 4. Based on the output waste soil arisings from this site have been tentatively identified as being non-hazardous waste. The underlying soils are considered to be inert for disposal purposes. No asbestos was detected in any of the test samples.

This assessment is preliminary and based upon the information obtained from the investigation. Where made ground is excavated then these materials should be stockpiled and segregated. Further sampling, testing and characterisation to accurately classify waste soil arisings may be required. It should be appreciated that it is the responsibility of the waste producer to sufficiently characterise their waste. Moreover, the agreement of the waste acceptor should be sought.

6.3 Ground Gas

The Desk Study, report reference 20/11876/KJC, did not note any features in the site area that would constitute a ground gas risk. Old gravel pits were present within 250m to the south of the site, however, these disappeared c1913. Given the age and distance to the site these are not credible sources of ground gases which would pose a risk to the receptors or end users of the site.

The site was previously part of formal gardens thought to be associated with a property to the west. The current property appears on the 1932 map along with a number of houses in the vicinity and the site has been in residential use for over 90 years. Therefore, it is considered that there is a very low risk and ground gas monitoring is not warranted.

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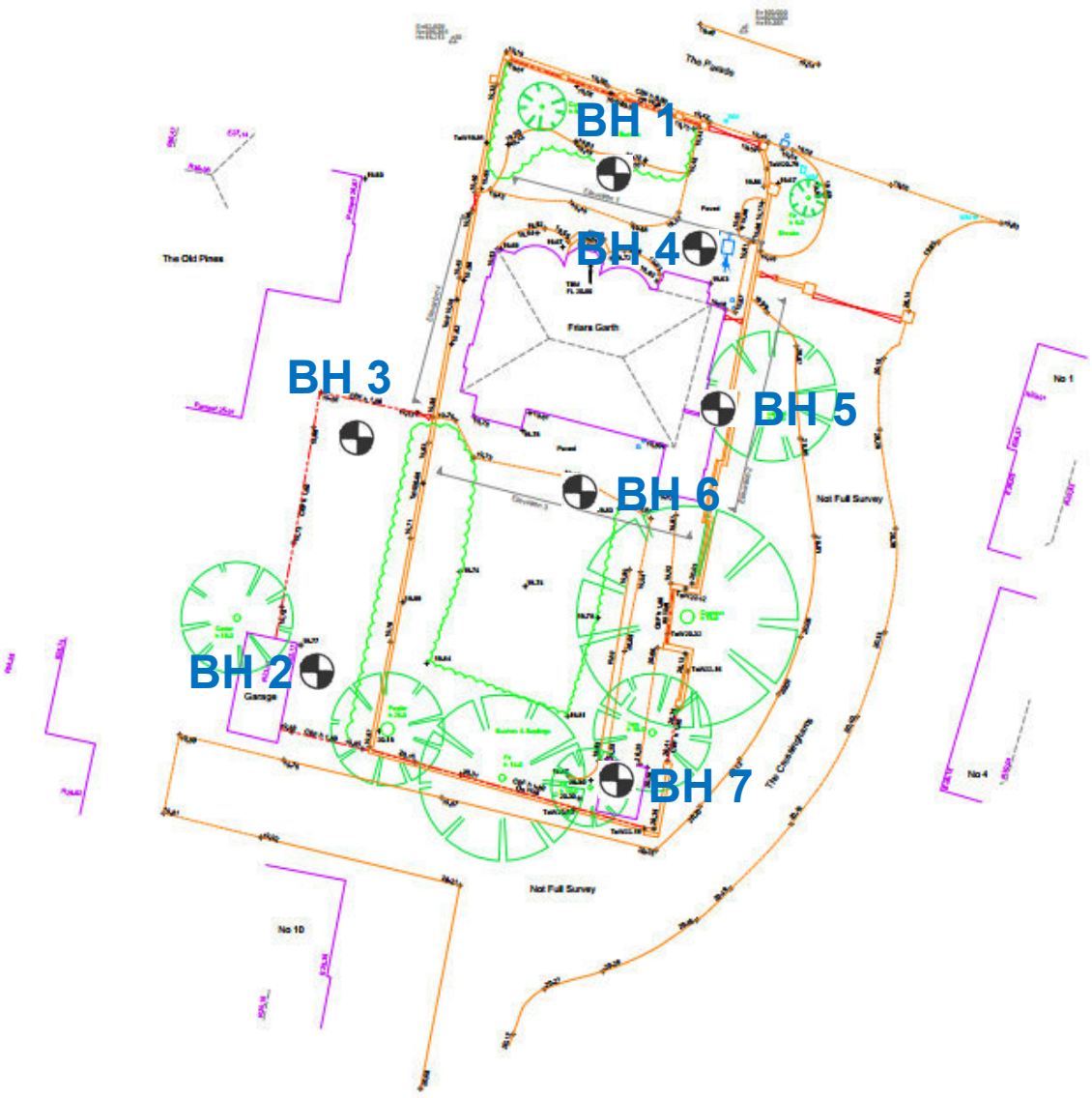
LIST OF ABBREVIATIONS

AOD	-	Above Ordnance Datum
ACM	-	Asbestos-containing Material
AST	-	Above-ground Storage Tank
BGS	-	British Geological Survey
BH	-	Borehole
BRE	-	Building Research Establishment
BSI	-	British Standards Institution
BS	-	British Standard
C4SL	-	Category Four Screening Level
CIRIA	-	Construction Industry Research and Information Association
CP	-	Cable Percussive
DPH	-	Dynamic Probing Heavy
DPSH	-	Dynamic Probing Super Heavy
EA	-	Environment Agency
GAC	-	Generic Assessment Criteria
LL	-	Liquid Limit
mAOD	-	Metres Above Ordnance Datum
mBGL	-	Metres Below Ground Level
mOD	-	Metres Ordnance Datum
OS	-	Ordnance Survey
PAH	-	Polycyclic Aromatic Hydrocarbons
PCB	-	Polychlorinated Biphenyl
PID	-	Photo Ionisation Detector
PL	-	Plastic Limit
PSD	-	Particle Size Distribution
SGV	-	Soil Guideline Value
SOM	-	Soil Organic Matter
SPT	-	Standard Penetration Test
SPZ	-	Source Protection Zone
SVOC	-	Semi-volatile Organic Compounds
TPH	-	Total Petroleum Hydrocarbon
UST	-	Underground Storage Tank
UXB	-	Unexploded Bombs
UXO	-	Unexploded Ordnance
VOC	-	Volatile Organic Compound

FIGURE 1

SITE LAYOUT PLAN



Legend:

Borehole Location

Title:	Site Layout Plan
Dwg No:	22/12385/1
Drawn by:	KJC
Client:	Weldin Builders Ltd
Contract:	The Parade, Epsom
Job Ref:	22/12385/KJC
Scale:	NTS
Revision:	0
Issue Date:	27/06/2022

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Witley, Surrey GU8 5LH
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FIGURE 2

PROPOSED LAYOUT

Title:	Proposed Layout
Dwg No:	22/12385/2
Drawn by:	KJC
Client:	Weldin Builders Ltd
Contract:	The Parade, Epsom
Job Ref:	22/12385/KJC
Scale:	NTS
Revision:	0
Issue Date:	27/06/2022

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APPENDIX 1

EXPLORATORY RECORDS

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		BOREHOLE	1
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Ground Level**	mAOD
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Date Commenced** **Date Completed**	06/06/2022 06/06/2022
Type & Diameter of Boring	Light Cable Percussion: 150mm diameter	**Sheet No**	1 of 2

Water Strikes, m		Water levels recorded during boring, m						
1	4.70	Date	06/06/2022	06/06/2022	06/06/2022			
2	6.90	Hole Depth	5.10	15.00	15.00			
3	11.00	Casing Depth	none	12.50	none			
4		Water Level	4.00	11.00	3.80			

Remarks

Starter pit completed to clear services

Samples or Tests		Standard Penetration Tests			Depth m	Legend	Strata Description
Type	Depth, m	Seat	Test Drive	*N*			
D	0.30						MADE GROUND (dark brown/grey sand with gravel and roots)
B	0.50						
D	1.00				1.00		
D	1.20-1.65	4,4	5,5,4,4	18			MADE GROUND (grey sand and gravel)
D	1.75				1.70		
D	2.00-2.45	1,1	2,2,2,3	9			Loose brown clayey SAND with gravel; gravel reduces with depth
D	2.75				2.60		Firm orange-brown/grey sandy CLAY
U	3.00-3.45						
D	3.75				3.70		
D	4.00-4.45	5,7	7,8,9,10	34			Very stiff green-grey very sandy CLAY
D	5.00-5.45	4,6	7,8,9,8	32	5.00		Dense grey-brown SAND
					5.40		Pale blue-grey/brown very sandy CLAY
D	6.00						
U	6.50-6.95				6.50		Stiff green-grey/brown very sandy CLAY with gravel
					6.90		Medium dense dark blue-grey/brown clayey SAND
D	7.50						
D	8.00-8.45	4,5	6,8,8,7	29			
D	9.00				8.70		Blue-grey very sandy CLAY

Sample Code: U - Intact 100mm Ø B - Large Disturbed D - Small Disturbed W - Water Sample (U) - Non-recovery of Intact 100mm Ø sample [+] - extrapolated SPT N value*

BOREHOLE	**1**
Report Ref	22/12385/KJC

Contract The Parade, Epsom

Samples or Tests		Standard Penetration Tests			Depth m	Legend	Strata Description
Type	Depth, m	Seat	Test Drive	*N*			
							Very stiff blue-grey very sandy CLAY (continued)
D	9.50-9.95	4,7	8,7,8,9	32			
D	10.50						
D	11.00-11.45	10,14	17,18,25,25	85	11.00		
							Very dense blue-grey SAND
D	12.00						
D	12.50-13.00	14,18	20,24,25,25	94			
D	13.50						
D	14.50-14.95	10,17	22,25,25,25	97			
					15.00		END OF BOREHOLE

Sample Code: U - Intact 100mm Ø B - Large Disturbed D - Small Disturbed W - Water Sample (U) - Non-recovery of Intact 100mm Ø sample [+] - extrapolated SPT N value*

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	**2**
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	blocked @ 2.50

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.60?	Diameter	0.06	Very easy		Difficult	GL-1.50
2				Moderate	1.50-3.10	Very hard	

Remarks
Obstruction at 0.70m on first attempted position

Samples or tests		**Shear Strength kPa**	**Depth**	**Legend**	**Strata Description**
Type	**Depth, m**				
D	0.10				MADE GROUND (grass over brown silty SAND with occasional brick fragments)
D	0.30				
D	0.50				
D	1.00				
			1.10		
D	1.30				Orange-brown silty SAND with seams of grey sandy clay with roots (1.30m)
D	1.50				
D	2.00				
			2.20		
					Brown SAND with rare gravel
D	2.50				
			2.60		
					Pale grey/brown sandy CLAY
D	3.00				
			3.10		END OF BOREHOLE

Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	**3**
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	blocked @ 2.50

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.50?	Diameter	0.06	Very easy		Difficult	GL-1.00
2				Moderate	1.00-3.10	Very hard	

Remarks

Samples or tests		**Shear Strength kPa**	**Depth**	**Legend**	**Strata Description**
Type	**Depth, m**				
D	0.10				MADE GROUND (grass over dark brown/grey silty SAND with extensive brick in the upper margins)
D	0.30				
D	0.50				
D	1.00				
			1.10		Orange-brown SAND with rare gravel
D	1.50				
			1.70		Brown/grey gravelly SAND
D	2.00				
D	2.50				
			2.60		Light brown very sandy CLAY
D	3.00				
			3.10		END OF BOREHOLE

Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	**4**
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	blocked @ 2.50

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.50?	Diameter	0.06	Very easy		Difficult	GL-1.00
2				Moderate	1.00-3.10	Very hard	

Remarks

Samples or tests		**Shear Strength kPa**	**Depth**	**Legend**	**Strata Description**
Type	**Depth, m**				
			0.10		MADE GROUND (paving over concrete)
D	0.20				MADE GROUND (grey/brown silty SAND with gravel and brick/ concrete fragments)
D	0.50				
			0.70		MADE GROUND (dark grey-brown clayey SAND with occasional gravel at depth)
D	1.00				
			1.20		Orange-brown SAND with rare gravel
D	1.50				
D	2.00				
D	2.50				
			2.60		
D	2.70				Green-grey/brown sandy CLAY with rare gravel
D	3.00				
			3.10		END OF BOREHOLE

Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	**5**
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	2.08

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.50?	Diameter	0.06	Very easy		Difficult	GL-1.00
2				Moderate	1.00-3.10	Very hard	

Remarks

Samples or tests		**Shear Strength kPa**	**Depth**	**Legend**	**Strata Description**
Type	**Depth, m**				
			0.10		MADE GROUND (concrete)
D	0.20				MADE GROUND (grey becoming dark brown silty SAND with gravel and brick fragments)
D	0.50				
			0.90		
D	1.00				Orange-brown SAND with gravel (tiny amount of chalk present on boundary @ 2.8m)
D	1.50				
D	2.00				
D	2.50				
			2.80		Green-grey/brown sandy CLAY
D	3.00				
			3.10		END OF BOREHOLE
W	(2.08)				

Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	6
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	blocked @ 2.50

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.50?	Diameter	0.06	Very easy		Difficult	
2				Moderate	1.50-3.10	Very hard	GL-1.50

Remarks

Samples or tests		**Shear Strength kPa**	**Depth**	**Legend**	**Strata Description**
Type	**Depth, m**				
D	0.10				MADE GROUND (grass over dark grey/brown silty SAND with gravel and roots)
D	0.30				
D	0.50				
			0.80		
D	1.00				Brown sandy GRAVEL; becoming gravelly SAND
D	1.50				
D	2.00				
D	2.50				
			2.60		
D	2.75				Pale grey/orange-brown sandy CLAY
D	3.00				
			3.10		END OF BOREHOLE

Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH		**BOREHOLE**	**7**
Contract	The Parade, Epsom	**Report Ref**	22/12385/KJC
Client	Weldin Builders Ltd	**Date**	07/06/2022
Site Address	Friars Garth, The Parade, Epsom, Surrey KT18 5DH	**Ground Level**	

Type of excavator	Window Sampler	**Water level after completion, m**	blocked @ 2.50

Water strikes, m		**Dimensions, m**		**Ease of excavation, m**			
1	2.50?	Diameter	0.06	Very easy		Difficult	1.30-1.80
2				Moderate	1.80-3.10	Very hard	GL-1.30

Remarks

Samples or tests		**Shear Strength kPa**	**Depth**		**Legend**	**Strata Description**
Type	**Depth, m**					
D	0.10					MADE GROUND (grass over dark grey/brown silty SAND with fine gravel and roots)
D	0.30					
			0.40			
D	0.50					Brown SAND AND GRAVEL
D	1.00					
			1.20			
						Brown silty SAND with rare gravel
D	1.50					
D	2.00					
			2.30			
						Grey/brown sandy CLAY
D	2.50					
D	3.00					
			3.10			
						END OF BOREHOLE

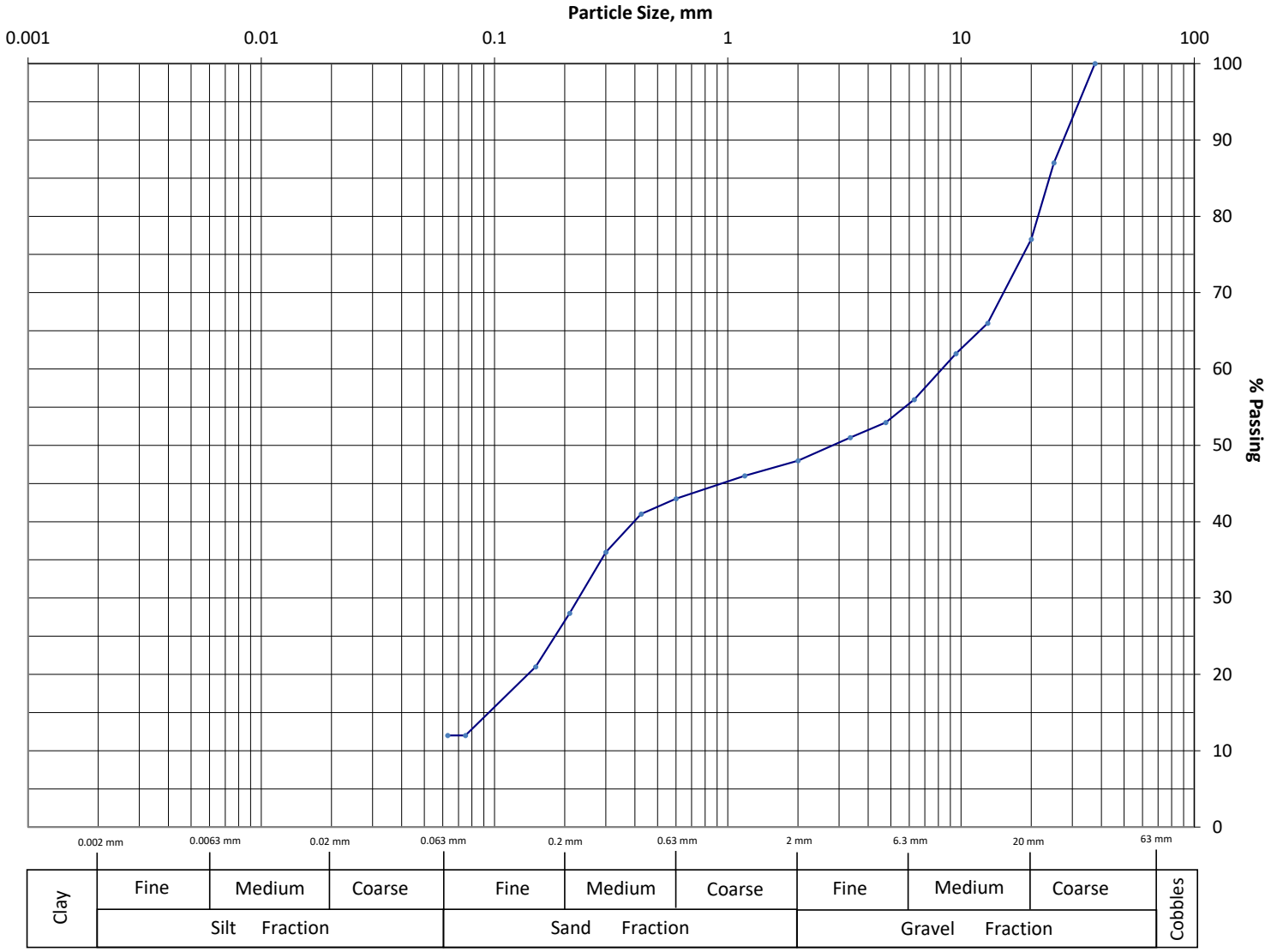
Sample Code: B - Large Disturbed D - Small Disturbed W - Water Sample R - Root Sample T - Tube Liner

APPENDIX 2

LABORATORY TEST RESULTS

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	100
25	87
20	77
13	66
9.5	62
6.3	56
4.75	53
3.35	51
2	48
1.18	46
0.6	43
0.425	41
0.3	36
0.21	28
0.15	21
0.075	12
0.063	12

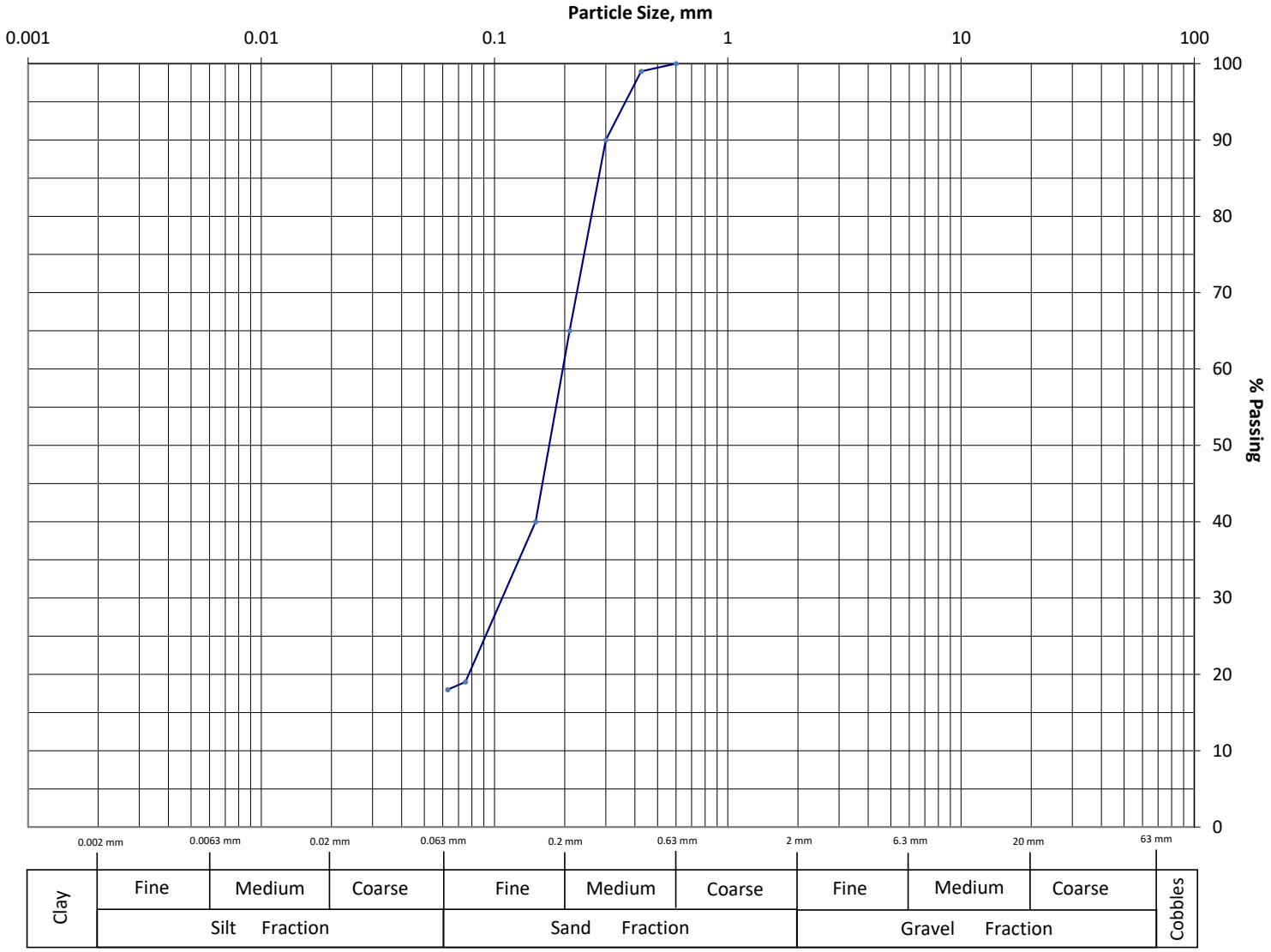
Particle Proportions (%)	
Cobbles	0
Gravel	52
Sand	36
Silt & Clay	12

BH/TP No.	**1**	**Depth, m**	1.20-1.65	**Report Ref**	22/12385/KJC
Visual Description	Made ground (grey sand and gravel)			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	
20	
13	
9.5	
6.3	
4.75	
3.35	
2	
1.18	
0.6	100
0.425	99
0.3	90
0.21	65
0.15	40
0.075	19
0.063	18

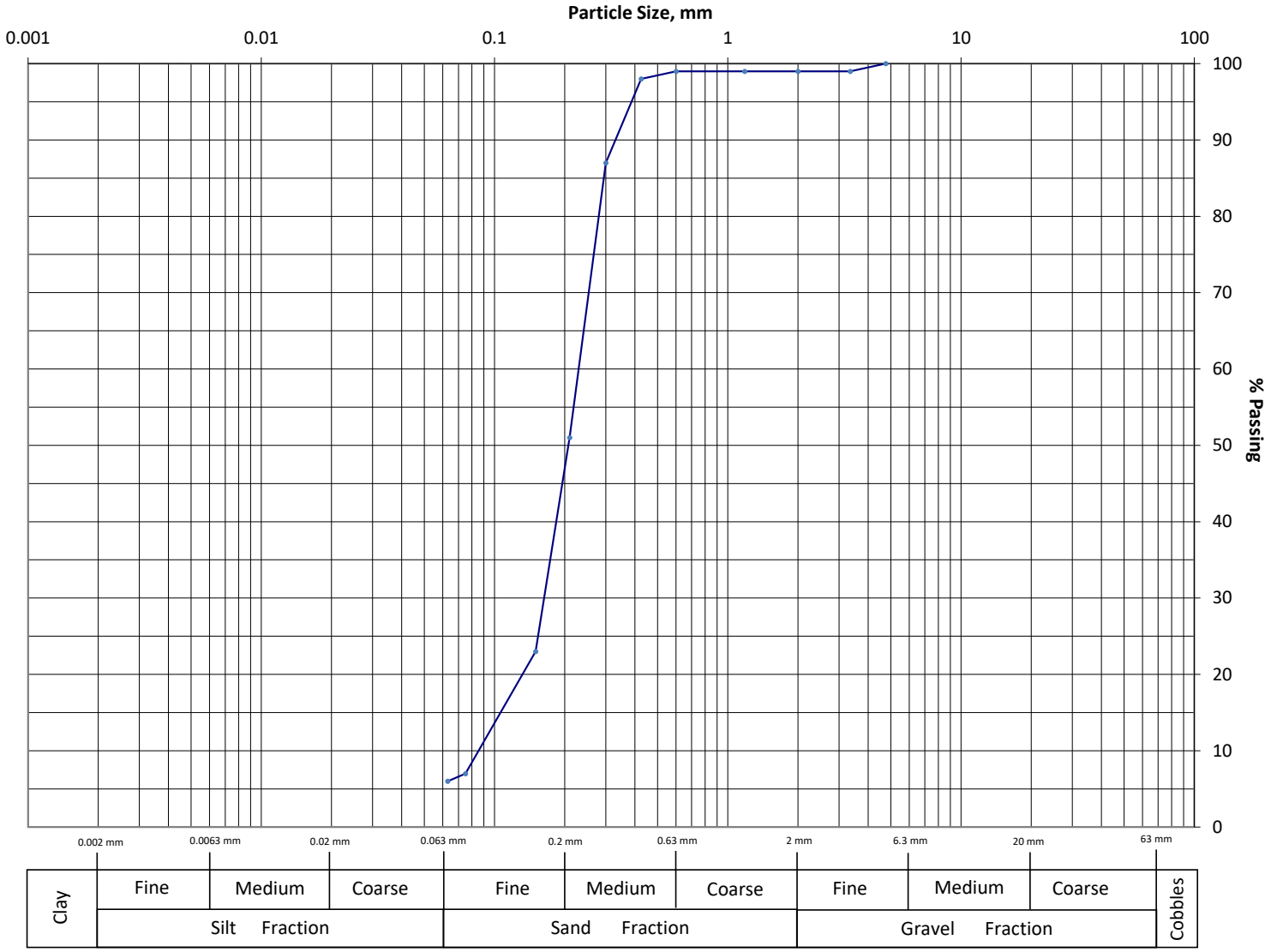
Particle Proportions (%)	
Cobbles	0
Gravel	0
Sand	82
Silt & Clay	18

BH/TP No.	**2**	**Depth, m**	1.30	**Report Ref**	22/12385/KJC
Visual Description	Orange-brown silty sand with rare seams of grey sandy clay			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	
20	
13	
9.5	
6.3	
4.75	100
3.35	99
2	99
1.18	99
0.6	99
0.425	98
0.3	87
0.21	51
0.15	23
0.075	7
0.063	6

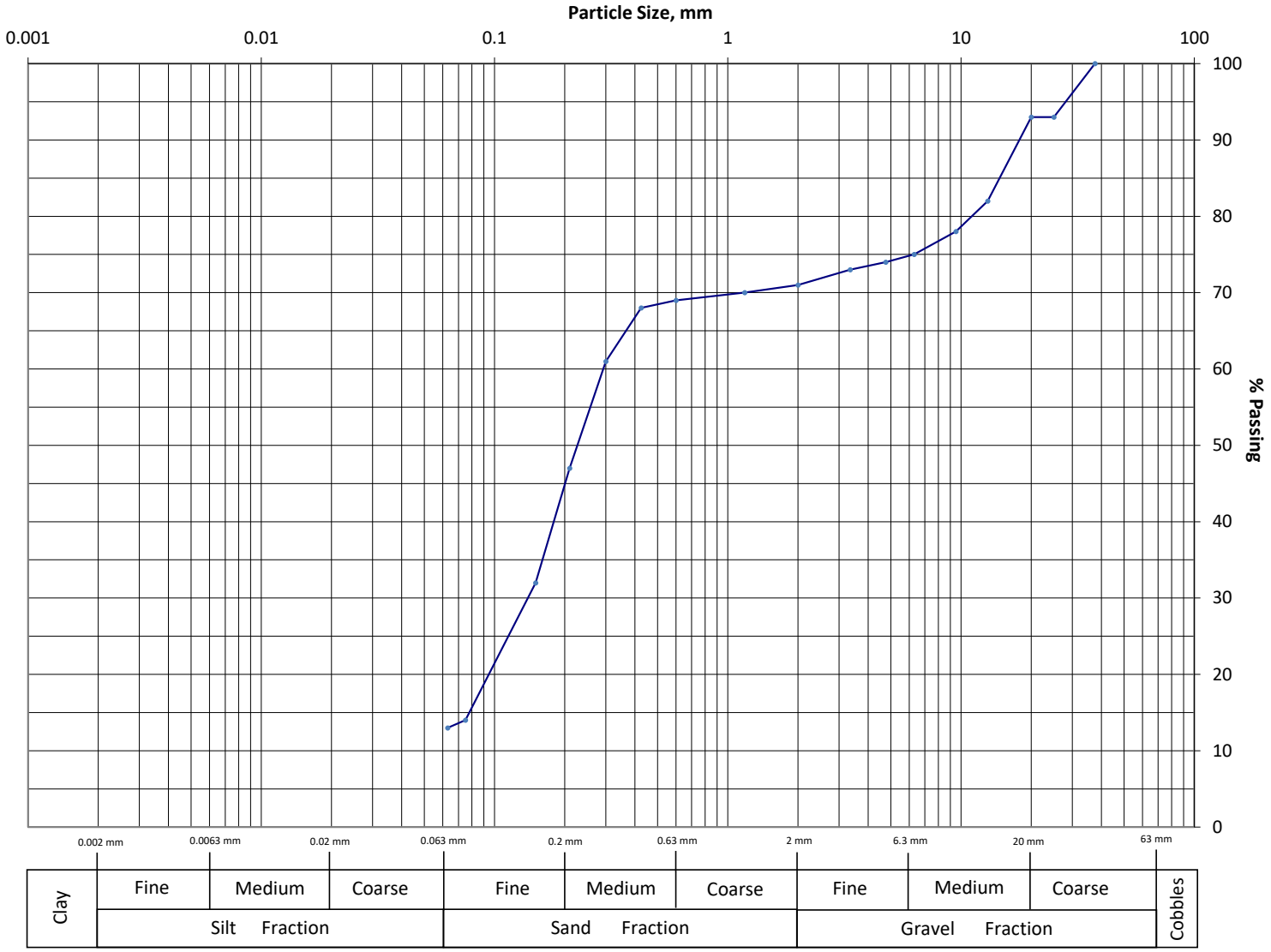
Particle Proportions (%)	
Cobbles	0
Gravel	1
Sand	93
Silt & Clay	6

BH/TP No.	**3**	**Depth, m**	1.50	**Report Ref**	22/12385/KJC
Visual Description	Orange-brown sand with rare gravel			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	100
25	93
20	93
13	82
9.5	78
6.3	75
4.75	74
3.35	73
2	71
1.18	70
0.6	69
0.425	68
0.3	61
0.21	47
0.15	32
0.075	14
0.063	13

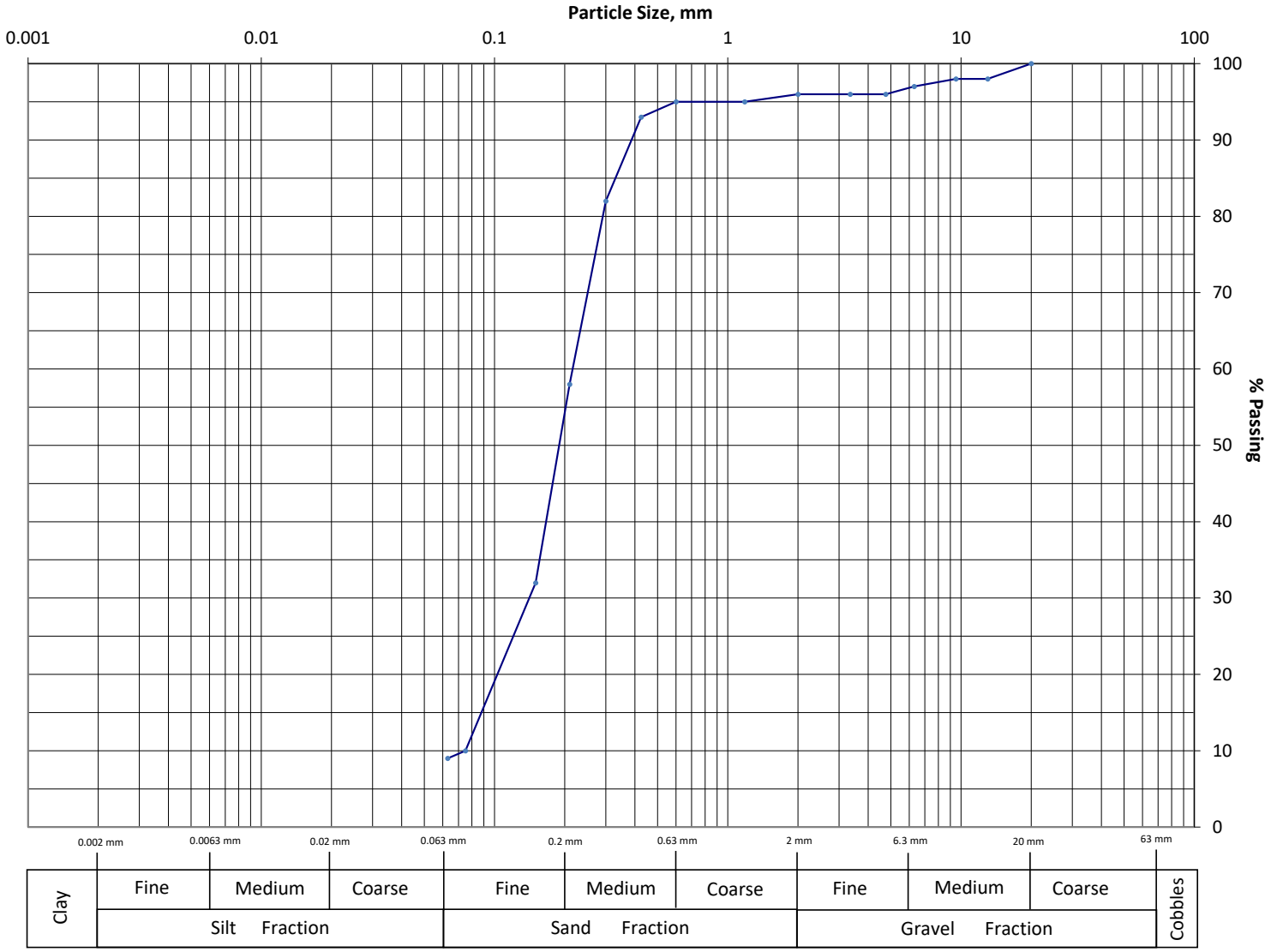
Particle Proportions (%)	
Cobbles	0
Gravel	29
Sand	58
Silt & Clay	13

BH/TP No.	**3**	**Depth, m**	2.50	**Report Ref**	22/12385/KJC
Visual Description	Brown/grey gravelly sand			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	
20	100
13	98
9.5	98
6.3	97
4.75	96
3.35	96
2	96
1.18	95
0.6	95
0.425	93
0.3	82
0.21	58
0.15	32
0.075	10
0.063	9

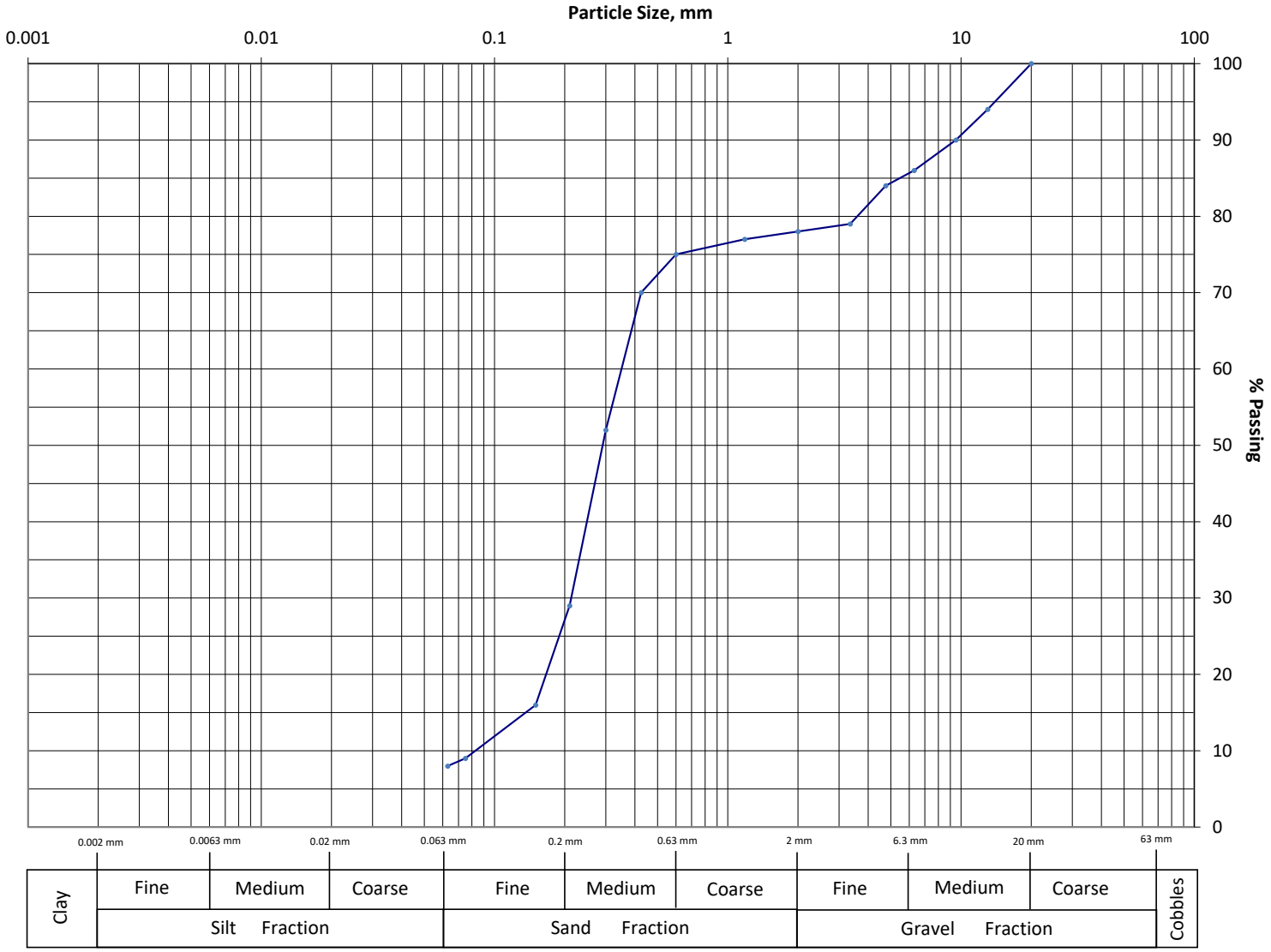
Particle Proportions (%)	
Cobbles	0
Gravel	4
Sand	87
Silt & Clay	9

BH/TP No.	**4**	**Depth, m**	1.50	**Report Ref**	22/12385/KJC
Visual Description	Orange-brown sand with rare gravel			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	
20	100
13	94
9.5	90
6.3	86
4.75	84
3.35	79
2	78
1.18	77
0.6	75
0.425	70
0.3	52
0.21	29
0.15	16
0.075	9
0.063	8

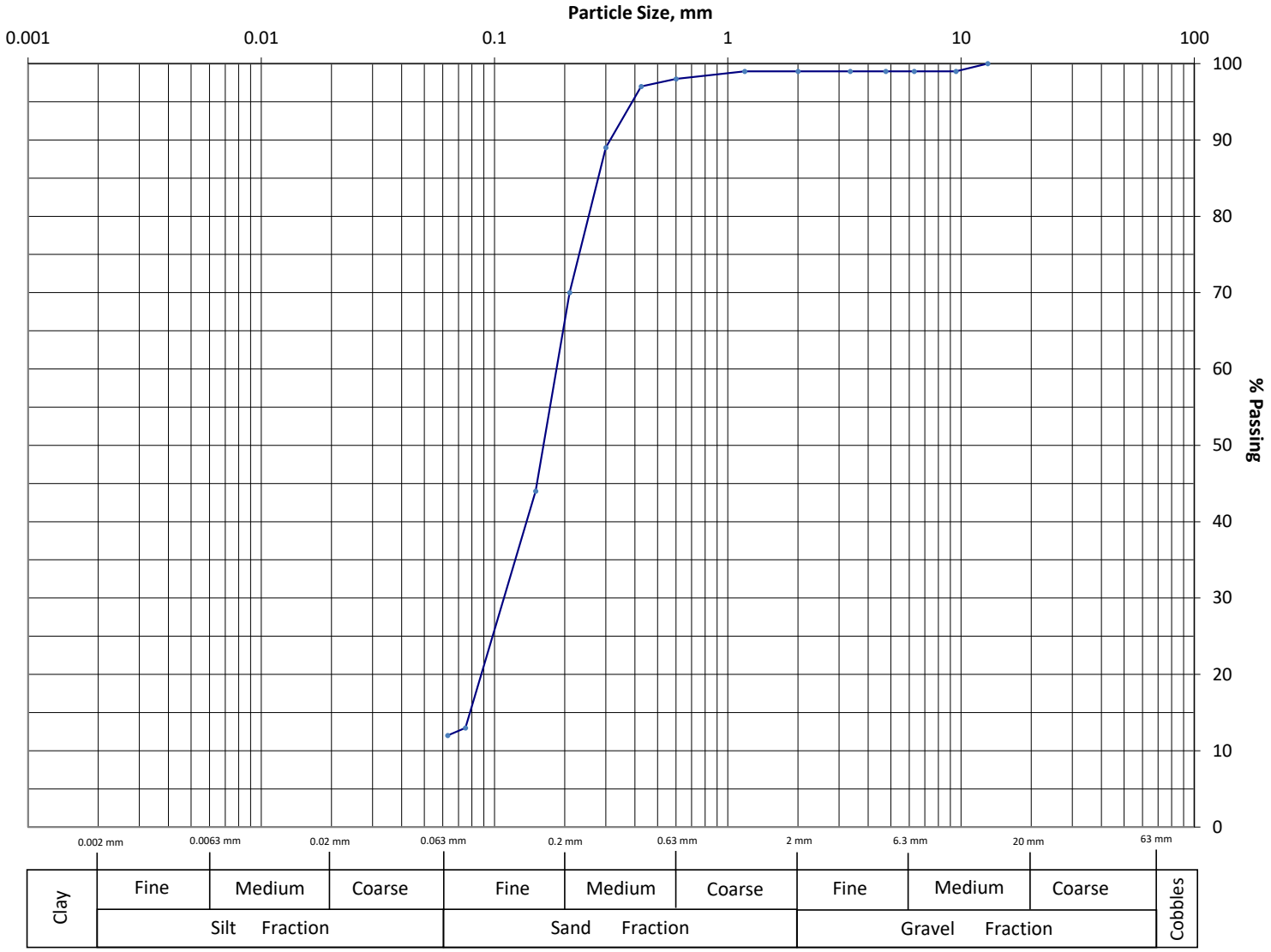
Particle Proportions (%)	
Cobbles	0
Gravel	22
Sand	70
Silt & Clay	8

BH/TP No.	**5**	**Depth, m**	1.00	**Report Ref**	22/12385/KJC
Visual Description	Orange-brown sand with gravel			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	
20	
13	100
9.5	99
6.3	99
4.75	99
3.35	99
2	99
1.18	99
0.6	98
0.425	97
0.3	89
0.21	70
0.15	44
0.075	13
0.063	12

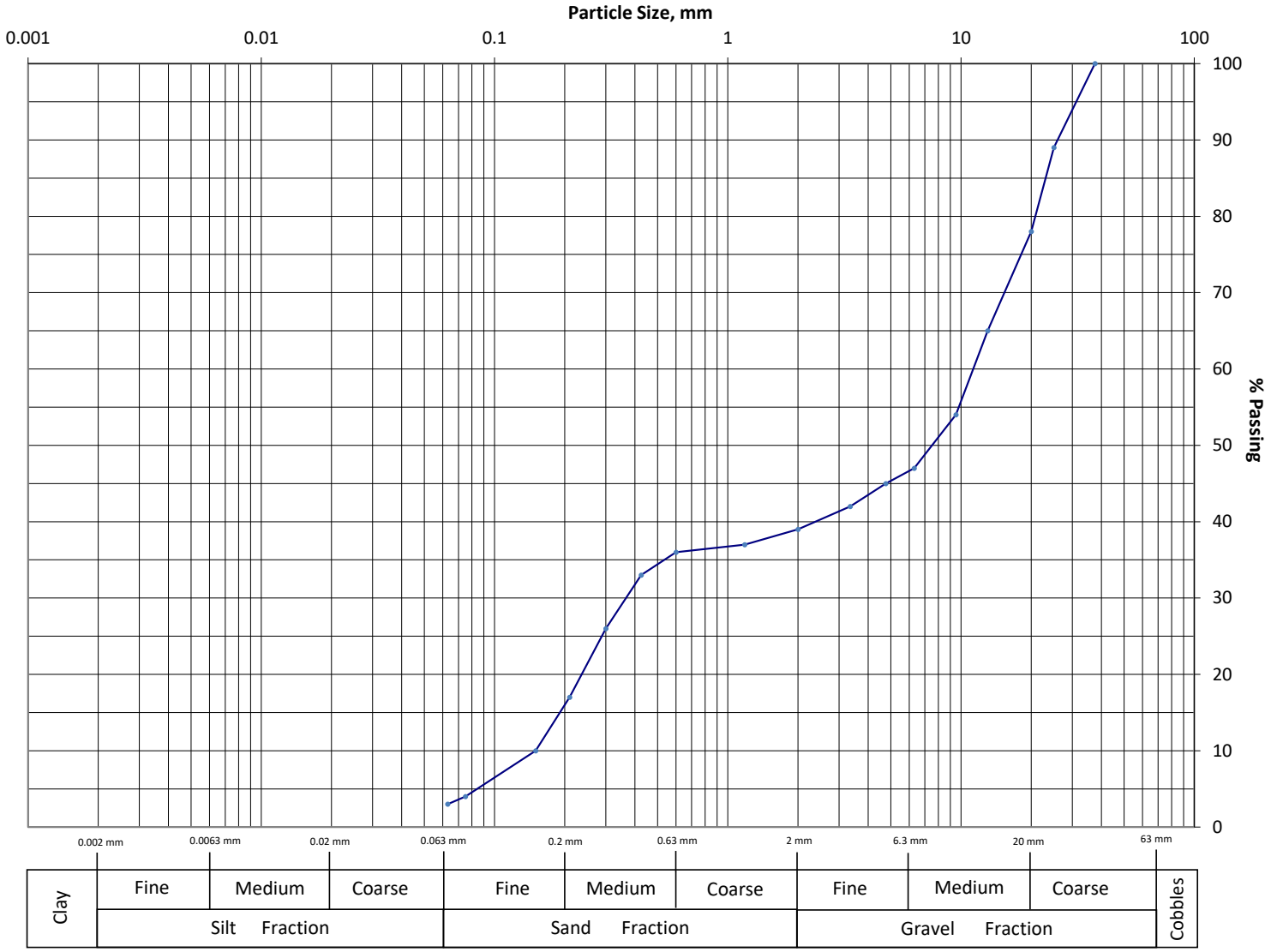
Particle Proportions (%)	
Cobbles	0
Gravel	1
Sand	87
Silt & Clay	12

BH/TP No.	**5**	**Depth, m**	2.00	**Report Ref**	22/12385/KJC
Visual Description	Orange-brown sand with rare gravel			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	100
25	89
20	78
13	65
9.5	54
6.3	47
4.75	45
3.35	42
2	39
1.18	37
0.6	36
0.425	33
0.3	26
0.21	17
0.15	10
0.075	4
0.063	3

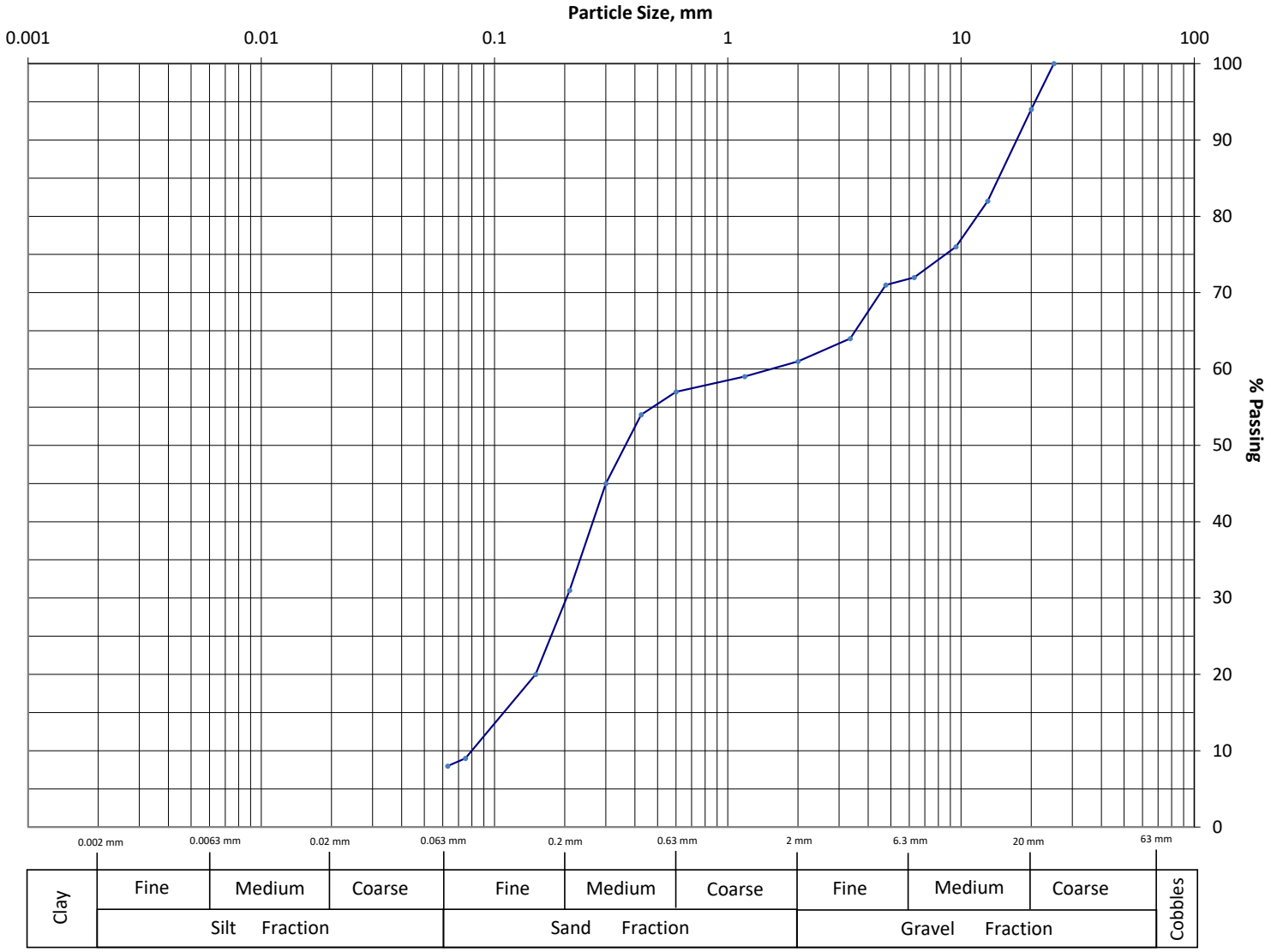
Particle Proportions (%)	
Cobbles	0
Gravel	61
Sand	36
Silt & Clay	3

BH/TP No.	**6**	**Depth, m**	1.00	**Report Ref**	22/12385/KJC
Visual Description	Brown sandy gravel			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 : Part 2 : Clauses 9.2, 9.3 : 1990 Particle Size Distribution by Wet/Dry Sieving Method



BS Test Sieve Aperture Size (mm)	Percentage Passing
75	
63	
50	
37.5	
25	100
20	94
13	82
9.5	76
6.3	72
4.75	71
3.35	64
2	61
1.18	59
0.6	57
0.425	54
0.3	45
0.21	31
0.15	20
0.075	9
0.063	8

Particle Proportions (%)	
Cobbles	0
Gravel	39
Sand	53
Silt & Clay	8

BH/TP No.	**6**	**Depth, m**	2.00	**Report Ref**	22/12385/KJC
Visual Description	Brown gravelly sand			**Contract**	The Parade, Epsom

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

INDEX PROPERTIES & TRIAXIAL COMPRESSION TESTS

BS 1377 : Parts 2 & 7 : 1990

Report Ref	22/12385/KJC	Contract	The Parade, Epsom

BH/TP No.	Sample		INDEX PROPERTIES						TRIAXIAL COMPRESSION							Remarks
	Depth m	Description	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Passing 425micron Sieve	Corrected Plasticity Index IP %	Soil Plasticity	Code	Lateral Pressure kPa	Compressive Strength kPa	Cohesion kPa	Angle of Friction °	Bulk Density kg/cu.m	Water Content % dry wt	
BH 1	2.00	Brown clayey sand with gravel				73		NP							15.8	Non-plastic
	3.00-3.45	Orange-brown/grey sandy clay							U100	70	75	40	0	2280	20.3	
	6.50-6.95	Green-grey/brown very sandy clay with gravel	31	20	11	76	8	CL	U100	140	150	75	0	2045	15.3	
BH 2	3.00	Pale grey/brown sandy clay	34	14	20	91	18	CL							19.6	
BH 4	2.70	Green-grey/brown sandy clay	30	15	15	91	14	CL							16.1	
BH 6	2.75	Pale grey/orange-brown sandy clay	35	15	20	94	19	CL/CI							16.6	

KEY:

Code: **38** - 38mm nominal diameter specimen; **100** - 100mm nominal diameter specimen; **R** - Remoulded; **F** - Functional; **LV** - Laboratory Vane

U - Undrained; **CD** - Consolidated Drained; **CU** - Consolidated Undrained; **M** - Multi Stage; **S** - Single Stage

Soil Type: **C** - Clay; **M** - Silt; **O** - Organic; **NP** - Non Plastic

Plasticity: **L** - Low; **I** - Intermediate; **H** - High; **V** - Very High; **E** - Extremely High

INDEX PROPERTIES & TRIAXIAL COMPRESSION TESTS

BS 1377 : Parts 2 & 7 : 1990

Report Ref	20/	Contract		*Continuation Sheet* 1

BH/TP No.	Sample		INDEX PROPERTIES						TRIAXIAL COMPRESSION							Remarks
	Depth m	Description	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Passing 425micron Sieve	Corrected Plasticity Index IP %	Soil Plasticity	Code	Lateral Pressure kPa	Compression Strength kPa	Cohesion kPa	Angle of Friction °	Bulk Density kg/cu.m	Water Content % dry wt	

KEY:

Code: **38** - 38mm nominal diameter specimen; **100** - 100mm nominal diameter specimen; **R** - Remoulded; **F** - Functional; **LV** - Laboratory Vane

U - Undrained; **CD** - Consolidated Drained; **CU** - Consolidated Undrained; **M** - Multi Stage; **S** - Single Stage

Soil Type: **C** - Clay; **M** - Silt; **O** - Organic; **NP** - Non Plastic

Plasticity: **L** - Low; **I** - Intermediate; **H** - High; **V** - Very High; **E** - Extremely High

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey, GU8 5LH

SUMMARY OF CHEMICAL ANALYSES

Determination of Soluble Sulphate Contents of Soil and Groundwater, Organic Matter Content and pH Value

Report Ref	22/12385/KJC	**Contract**	The Parade, Epsom

BH/TP No.	**Sample**			**Concentration of Sulphates expressed as SO_4**		**pH Value**	**Organic Content %**
	Depth m	Soil Type	% passing 2mm sieve	2:1 Water:Soil Extract mg/l	Groundwater mg/l		
BH1	0.50	Made ground	90	<250		7.2	
	1.20-1.65	Made ground	53	<250		7.6	
	3.00-3.45	Sandy clay	99	<250		7.7	
	6.50-6.95	Sandy clay with gravel	84	<250		8.1	
	11.00	Silty sand	100	436		6.1	
BH2	1.00	Made ground	47	<250		7.7	
	2.00	Silty sand with rare gravel	99	<250		7.9	
BH3	1.50	Silty sand and gravel	99	<250		7.9	
BH4	2.70	Sandy clay with rare gravel	98	<250		8.0	
BH5	1.00	Silty sand with gravel	78	<250		7.9	
	2.08	Water			<80	7.6	
BH6	2.00	Silty sand with gravel	61	<250		8.0	

Keith Clark
Albury SI Ltd
Miltons Yard
Petworth Road
Witley
Surrey
GU8 5LH

e: keith.clark@alburysi.co.uk

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

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

Analytical Report Number : 22-63376

Project / Site name:	The Parade Epsom	**Samples received on:**	08/06/2022
Your job number:	22 12385	**Samples instructed on/ Analysis started on:**	08/06/2022
Your order number:	14494	**Analysis completed by:**	15/06/2022
Report Issue Number:	1	**Report issued on:**	15/06/2022
Samples Analysed:	5 soil 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.

Analytical Report Number: 22-63376
Project / Site name: The Parade Epsom
Your Order No: 14494

Lab Sample Number				2305142	2305143	2305144	2305145	2305146
Sample Reference				1	2	3	5	7
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.10	0.30	0.20	0.10
Date Sampled				07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
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	46	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	7.7	11	5.5	5.8	13
Total mass of sample received	kg	0.001	NONE	0.6	0.6	0.6	0.6	0.6
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	7.9	7.7	8.0	10.4	4.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	2.5	< 1.0	< 1.0	2.5
Total Sulphate as SO4	mg/kg	50	MCERTS	510	690	650	3000	790
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	27	43	63	300	130
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.014	0.022	0.031	0.15	0.067
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	13.6	21.5	31.3	151	66.5
Sulphide	mg/kg	1	MCERTS	20	12	12	9.3	12
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0	37	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.1	1.7	1.8	0.9	-
Total Organic Carbon (TOC) – Manual	%	0.1	MCERTS	-	-	-	-	10
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	3
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	0.2	< 0.05	0.86	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.2	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.5	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.96	0.92	1	12	0.45
Anthracene	mg/kg	0.05	MCERTS	0.22	0.26	0.25	2.5	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.7	2.6	2.2	11	1.1
Pyrene	mg/kg	0.05	MCERTS	2.3	2.4	2	8.9	1.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2	1.6	1.5	4.9	0.86
Chrysene	mg/kg	0.05	MCERTS	1.5	1.7	1.1	4.2	0.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	2.1	1.7	3.6	0.82
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	1.1	0.82	1.8	0.51
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.9	1.8	1.4	3.3	0.64
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	1.2	0.81	1.6	0.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.24	0.28	0.22	0.41	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.2	1.4	1.1	1.9	0.57
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.3	17.5	14.1	59.4	7.28

Analytical Report Number: 22-63376
Project / Site name: The Parade Epsom
Your Order No: 14494

Lab Sample Number				2305142	2305143	2305144	2305145	2305146
Sample Reference				1	2	3	5	7
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.10	0.30	0.20	0.10
Date Sampled				07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	21	22	16	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.89	0.8	0.9	0.66	0.58
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.6	0.4	0.9	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	22	24	22	22	15
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	24	22	23	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	36	45	34	23	38
Lead (aqua regia extractable)	mg/kg	1	MCERTS	460	290	390	210	200
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	340	290	370	260	170
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	1.3	0.6	0.6	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	20	18	15	10
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38	40	41	38	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	130	190	160	72
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH C6 - C40 $_{EH\_CU+HS\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	50	43	39	100	86
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 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	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 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	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 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	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	13	12
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	12	13	13	31	20
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	33	29	26	47	54
TPH-CWG - Aromatic >EC21 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	38	29	26	55	54
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	8.5	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	44	43	39	91	86
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	44	43	39	100	86

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

Analytical Report Number : 22-63376
Project / Site name: The Parade Epsom

* 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 *
2305142	1	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2305143	2	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2305144	3	None Supplied	0.3	Brown loam and clay with stones and vegetation.
2305145	5	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
2305146	7	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 22-63376
Project / Site name: The Parade Epsom

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
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
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
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
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
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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 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
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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 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
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 and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE

Analytical Report Number : 22-63376
Project / Site name: The Parade Epsom

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
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-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
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	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
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

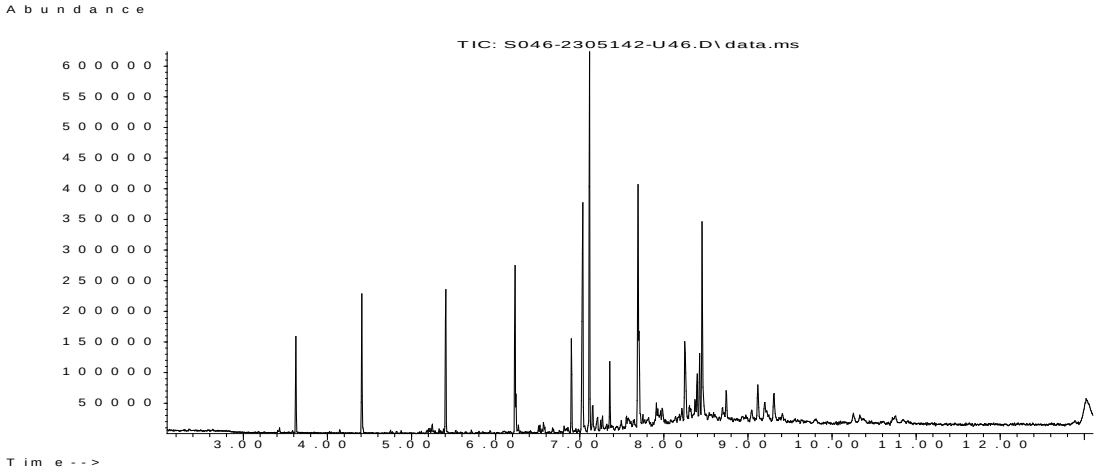
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received 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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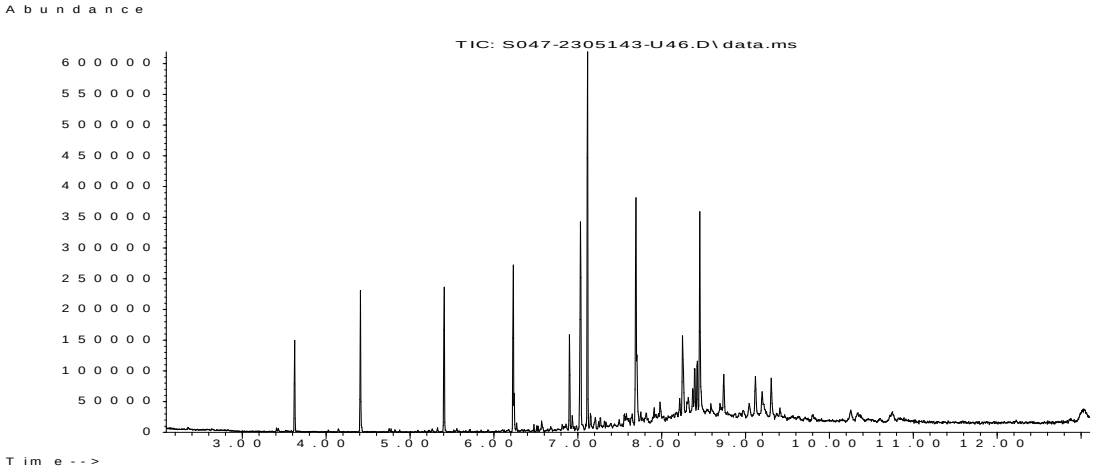
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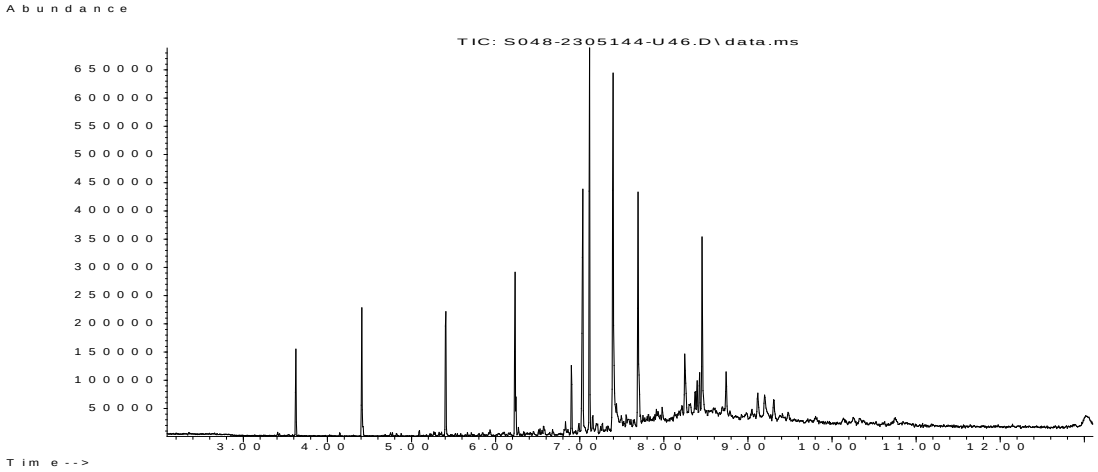
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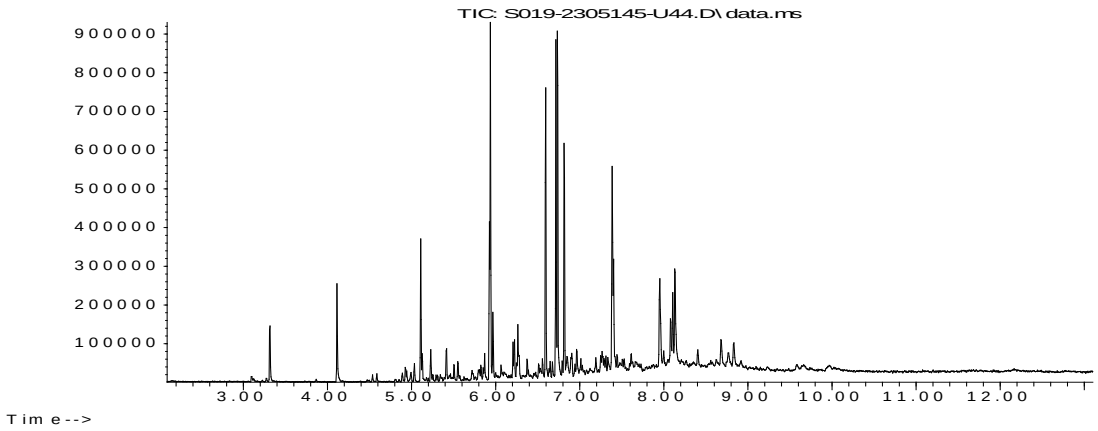
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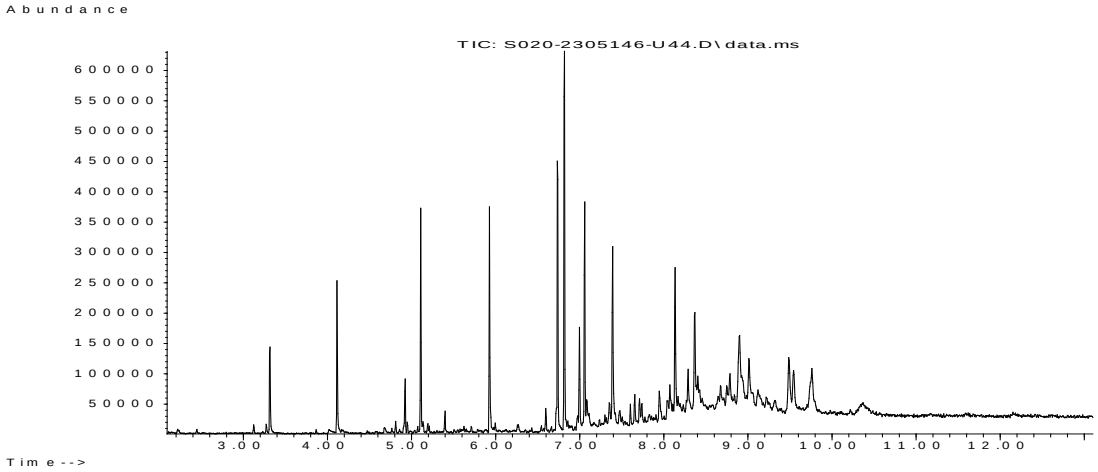
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Keith Clark
Albury SI Ltd
Miltons Yard
Petworth Road
Witley
Surrey
GU8 5LH

e: keith.clark@alburysi.co.uk

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

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

Analytical Report Number : 22-65374

Project / Site name:	The Parade Epsom	**Samples received on:**	16/06/2022
Your job number:	22 12385 KJC	**Samples instructed on/ Analysis started on:**	16/06/2022
Your order number:	14494	**Analysis completed by:**	23/06/2022
Report Issue Number:	1	**Report issued on:**	23/06/2022
Samples Analysed:	4 soil samples		

Signed:

Joanna Wawrzeczko
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: 22-65374
Project / Site name: The Parade Epsom
Your Order No: 14494

Lab Sample Number				2316380	2316381	2316382	2316383
Sample Reference				1	2	3	5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.30	0.50	0.50
Date Sampled				07/06/2022	07/06/2022	07/06/2022	07/06/2022
Time Taken				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
Moisture Content	%	0.01	NONE	7.1	6.4	8	8.8
Total mass of sample received	kg	0.001	NONE	1.3	0.5	0.6	0.5
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	0.58
Anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	1.4
Pyrene	mg/kg	0.05	MCERTS	-	-	-	1.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.79
Chrysene	mg/kg	0.05	MCERTS	-	-	-	0.81
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.91
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.52
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.43
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	0.54
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	8.11
Heavy Metals / Metalloids							
Lead (aqua regia extractable)	mg/kg	1	MCERTS	300	170	340	270

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

Analytical Report Number : 22-65374
Project / Site name: The Parade Epsom

* 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 *
2316380	1	None Supplied	0.5	Brown loam and sand with gravel.
2316381	2	None Supplied	0.3	Brown loam and sand with gravel and brick.
2316382	3	None Supplied	0.5	Brown loam and sand with gravel.
2316383	5	None Supplied	0.5	Brown loam and sand with gravel.

Analytical Report Number : 22-65374
Project / Site name: The Parade Epsom

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
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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
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

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.

APPENDIX 3

DESICCATION

DESICCATION

Classification

The removal of moisture from a soil as a result of external influences with a constant stress regime, results in shrinkage or settlement of the soil. The magnitude of shrinkage is dependent upon the geological stress history of the soil, its clay content and the composition of the clay minerals. Under normal climatic conditions, there is a seasonal cyclic variation in soil moisture and, hence, volume change, which extends to depths of approximately 1m. When the soil moisture deficit attains a critical value, the shrinkage of the soil can become significant. In these circumstances, the soil can be regarded as being present in a desiccated state.

Causes

A common cause of desiccation consists of the reduction in soil moisture by tree root action. In the absence of a water table at shallow depth, root action of trees will reduce the soil moisture level in order to maintain growth. In general terms, the increase in rainfall which occurs during winter periods will allow for some replacement of the moisture content of the soil, particularly where isolated or immature trees are concerned.

However, when drought summer conditions or limited winter rainfall occurs, desiccated zones will develop within the zone of influence of tree roots. In woodland, desiccation develops as it is not possible for rainfall to overcome the soil moisture deficit. Other causes of desiccation, which have created problems to structures, include incorrectly installed and insulated heating pipes or ducts and industrial processes, ie furnaces or brick kilns.

Effects

The development of desiccation in clay soils will result in an increase in strength of the material. In addition, negative pore water pressure or soil suction will develop. Any foundation system located within soil which is subject to a reduction in soil moisture can experience structural distress, which results from the loss in volume or shrinkage of the ground. Also, if the source of the desiccation is removed, there will be heave of the soils as a result of an increase in equilibrium water content

It is evident, therefore, that foundation systems founded in soils which are actively experiencing an increase or decrease in soil moisture, will be subject to either heave or settlement, which can induce stresses within the structure. It should also be appreciated that a desiccated soil, which is experiencing an increase in equilibrium water content, will attempt to increase its volume in a horizontal as well as vertical plane. It is important, therefore, to ensure that horizontal movements do not apply differential stresses to structural elements, by incorporating collapsible membranes within remedial works.

Identification

A soil in a state of equilibrium is present in a semi-solid state. At the onset of desiccation, the condition of the soil moves towards the boundary between a solid and semi-solid state, this boundary being defined as the plastic limit of the soil. It follows, therefore, that when the natural water content of a soil lies close to, or falls below, the value of the plastic limit, the soil can be considered to be desiccated.

An alternative proposal was made by Driscoll (1983), who related the soil suction induced by desiccation to a function of the liquid limit of the soil. In general terms, desiccation is assumed to be present when the moisture content falls below a level of 40% liquid limit. The arbitrary factor of 0.4 relates to a soil suction value proposed by Croney (1977) and may vary with the composition and mineralogy of different soil types. This approach is only considered to be valid over a limited depth range as the overburden effect will result in a natural reduction in soil moisture and result in the development of negative pore pressures.

A further approach, which considers the shear strength of the clay, Pugh et al (1995), recognises the fact that a reduction in soil moisture will result in an increase in undrained shear strength as well as the development of negative pore pressures. Whilst this approach has a considerable amount of merit, care is required in establishing the value of the soil's in situ shear strength, particularly if it is not possible to obtain representative "undisturbed" samples from cable percussion boreholes. The proposal made in the Pugh paper that the simple pocket penetrometer will provide accurate consistent results should be treated with care, as the pocket penetrometer can take no account of the effects of disturbance and remoulding that are inevitable when completing a trial pit with a mechanical excavator. It is for this reason that this Company attempts to establish the shear strength of clay soils by using the Geonor Field Vane. With this test equipment the appropriate-sized vane is pushed into the side of the pit, through the thin disturbed zone which is caused by the teeth of the bucket during excavation. Furthermore, by use of the 'blank' probe, it is possible to take account of any skin friction which builds up on the shaft of the vane and thus provide a more accurate assessment of the shear strength of the soils.

Hence, a combination of the methods discussed above should be considered in order to confirm whether the development of soil moisture reduction to achieve a desiccated state has occurred within a particular site. The data for affected areas should, where possible, be compared with soils which lie outside the influence of tree root bulbs and may, therefore, be considered to be present in a stable and equilibrium state.

References

Croney D (1977)	The Design and Performance of Road Pavements London HMSO pp 674
Driscoll R (1983)	The Influence of Vegetation on the Swelling and Shrinking of Clay Soils in Britain Geotechnique 33.4 pp 93-105
Pugh RS, Parnell PG and Parks RD (1995)	A rapid and reliable on site method of assessing desiccation in clay soils Geotechnical Engineering 13 Jan 1995 pp 25—30

APPENDIX 4

WASTE

WASTE CLASSIFICATION

The European Waste Framework Directive is implemented in the UK by the 2002 Landfill Regulations, together with a number of other acts and regulations. A key part of this process is to establish the hazardous properties of potential waste. The classification and definition of hazardous waste is interpreted within the Environment Agency guidance WM3 and all wastes require classifying in accordance with the European Waste Catalogue [EWC]. The EWC is a detailed list of typical industry waste types and each has a 6 digit code. Typically the appropriate EWC codes for excavated soil being disposed off site are:

17 05 03* soil and stones containing dangerous substances, or
17 05 04 soil and stones other than those mentioned in 17 05 03

If excavated soils are to be discarded or exported from site then they would be considered controlled waste and require classification. However, if soils can be re-used on site then they are not considered to be controlled waste. A Desk Study, soil descriptions, laboratory chemical analysis and risk assessment can all contribute to basic waste characterisation. Depending upon the chemical composition or levels of contaminants in the waste (e.g. metals, TPH, asbestos), soil and stones can either be hazardous or non-hazardous. Waste Acceptance Criteria [WAC] test results are used to determine the suitability of the waste intended for disposal against the acceptance criteria for a particular class of landfill site. WAC tests are not used for the classification of waste soils and are only required for inert or hazardous excavated material which is destined for landfill.

Wastes containing asbestos with a concentration of >0.10% weight/weight (w/w) are generally considered to be hazardous. While waste with <0.10% w/w of asbestos are considered non-hazardous. Where free fibres or fibrous asbestos is present at concentrations of >0.001% then these are considered to pose a risk to human health and are deemed hazardous waste. These waste materials also require a suitably licensed company to handle them.

Waste Treatment

It is a requirement of the 2002 Landfill Regulations that all wastes must undergo some form of pre-treatment prior to disposal at an appropriately licensed landfill. Treatment is defined using a 'three-point test' and can include physical, chemical, biological or thermal processes, which must change the characteristics of the waste in order to:

- reduce its volume, or
- reduce its hazardous nature, or
- facilitate its handling, or
- enhance its recovery.

The exceptions to this are:

- inert waste for which treatment is not technically feasible.
- it is waste other than inert waste and treatment would not reduce its quantity or its hazards to human health or the environment.

The waste producer should either treat their own waste or ensure that the waste will be treated by a subsequent handler. The waste producer should record the type and amount of pre-treatment undertaken prior to disposal.

Examples of treatment include mechanical segregation or sorting, compositing, soil treatment hubs and incineration. This can include physical sorting of waste soil types into separate stockpiles at the producer site, e.g. topsoil, made ground and natural clay, sand or gravels.

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Hazard Summary Sheet

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Hazardous Waste Y/N	HP1	HP2	HP3	HP4	HP5	HP6	HP7	HP8	HP9	HP10	HP11	HP12	HP13	HP14	HP15	HP16
1	0.30	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2	0.10	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3	0.30	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
5	0.20	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
7	0.10	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Individual Compound Information

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Contaminant	Contaminant Concentration (%)	Hazardous Waste Y/N	Hazard Property	Individual Hazard Statements Exceeded	Cumulative Hazard Statements Exceeded	Additional Hazard Statements (see notes section)
1	0.30	pH	0.00000	N				
1	0.30	Benzene	0.00010	N				H225 test
1	0.30	Toluene	0.00010	N				H225 test
1	0.30	Ethylbenzene	0.00010	N				H225 test
1	0.30	m,p-xylene	0.00010	N				H226 test
1	0.30	o-xylene	0.00000	N				H226 test
1	0.30	Naphthalenene	0.00001	N				H228 test
1	0.30	Acenaphthylene	0.00001	N				
1	0.30	Acenaphthene	0.00001	N				
1	0.30	Fluorene	0.00001	N				
1	0.30	Phenanthrene	0.00010	N				
1	0.30	Anthracene	0.00002	N				
1	0.30	Fluoranthene	0.00027	N				
1	0.30	Pyrene	0.00023	N				
1	0.30	Benzo(a)anthracene	0.00020	N				
1	0.30	Chrysene	0.00015	N				
1	0.30	Benzo(b)fluoranthene	0.00021	N				
1	0.30	Benzo(k)fluoranthene	0.00012	N				
1	0.30	Benzo(a)pyrene	0.00019	N				
1	0.30	Indeno(1,2,3-cd)pyrene	0.00011	N				
1	0.30	Di-benz(a,h,)anthracene	0.00002	N				
1	0.30	Benzo(g,h,i)perylene	0.00012	N				
1	0.30	Phenol	0.00010	N				
1	0.30	hydrocarbon/oil with marker	0.00500	N				H225 test
1	0.30	Arsenic	0.00322	N				
1	0.30	Boron	0.00162	N				
1	0.30	Cadmium	0.00004	N				
1	0.30	Hexavalent Chromium	0.00012	N				
1	0.30	Chromium (Total)	0.00304	N				
1	0.30	Copper	0.00904	N				
1	0.30	Lead	0.00000	N				
1	0.30	Leadx	0.04600	N				
1	0.30	Manganese	0.09346	N				
1	0.30	Mercury	0.00009	N				
1	0.30	Nickel	0.00422	N				
1	0.30	Selenuim	0.00038	N				
1	0.30	Zinc	0.00000	N				
1	0.30	Zincx	0.04198	N				
1	0.30	Vanadium	0.00678	N				
2	0.10	pH	0.00000	N				
2	0.10	Benzene	0.00010	N				H225 test
2	0.10	Toluene	0.00010	N				H225 test
2	0.10	Ethylbenzene	0.00010	N				H225 test
2	0.10	m,p-xylene	0.00010	N				H226 test
2	0.10	o-xylene	0.00000	N				H226 test
2	0.10	Naphthalenene	0.00001	N				H228 test
2	0.10	Acenaphthylene	0.00002	N				

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Individual Compound Information

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Contaminant	Contaminant Concentration (%)	Hazardous Waste Y/N	Hazard Property	Individual Hazard Statements Exceeded	Cumulative Hazard Statements Exceeded	Additional Hazard Statements (see notes section)
2	0.10	Acenaphthene	0.00001	N				
2	0.10	Fluorene	0.00001	N				
2	0.10	Phenanthrene	0.00009	N				
2	0.10	Anthracene	0.00003	N				
2	0.10	Fluoranthene	0.00026	N				
2	0.10	Pyrene	0.00024	N				
2	0.10	Benzo(a)anthracene	0.00016	N				
2	0.10	Chrysene	0.00017	N				
2	0.10	Benzo(b)fluoranthene	0.00021	N				
2	0.10	Benzo(k)fluoranthene	0.00011	N				
2	0.10	Benzo(a)pyrene	0.00018	N				
2	0.10	Indeno(1,2,3-cd)pyrene	0.00012	N				
2	0.10	Di-benz(a,h,)anthracene	0.00003	N				
2	0.10	Benzo(g,h,i)perylene	0.00014	N				
2	0.10	Phenol	0.00010	N				
2	0.10	hydrocarbon/oil with marker	0.00430	N				H225 test
2	0.10	Arsenic	0.00322	N				
2	0.10	Boron	0.00139	N				
2	0.10	Cadmium	0.00004	N				
2	0.10	Hexavalent Chromium	0.00012	N				
2	0.10	Chromium (Total)	0.00333	N				
2	0.10	Copper	0.01130	N				
2	0.10	Lead	0.00000	N				
2	0.10	Leadx	0.02900	N				
2	0.10	Manganese	0.07971	N				
2	0.10	Mercury	0.00013	N				
2	0.10	Nickel	0.00527	N				
2	0.10	Selenuim	0.00038	N				
2	0.10	Zinc	0.00000	N				
2	0.10	Zincx	0.03210	N				
2	0.10	Vanadium	0.00714	N				
3	0.30	pH	0.00000	N				
3	0.30	Benzene	0.00000	N				H225 test
3	0.30	Toluene	0.00000	N				H225 test
3	0.30	Ethylbenzene	0.00000	N				H225 test
3	0.30	m,p-xylene	0.00000	N				H226 test
3	0.30	o-xylene	0.00000	N				H226 test
3	0.30	Naphthalenene	0.00001	N				H228 test
3	0.30	Acenaphthylene	0.00001	N				
3	0.30	Acenaphthene	0.00001	N				
3	0.30	Fluorene	0.00001	N				
3	0.30	Phenanthrene	0.00010	N				
3	0.30	Anthracene	0.00003	N				
3	0.30	Fluoranthene	0.00022	N				
3	0.30	Pyrene	0.00020	N				
3	0.30	Benzo(a)anthracene	0.00015	N				
3	0.30	Chrysene	0.00011	N				

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Individual Compound Information

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Contaminant	Contaminant Concentration (%)	Hazardous Waste Y/N	Hazard Property	Individual Hazard Statements Exceeded	Cumulative Hazard Statements Exceeded	Additional Hazard Statements (see notes section)
3	0.30	Benzo(b)fluoranthene	0.00017	N				
3	0.30	Benzo(k)fluoranthene	0.00008	N				
3	0.30	Benzo(a)pyrene	0.00014	N				
3	0.30	Indeno(1,2,3-cd)pyrene	0.00008	N				
3	0.30	Di-benz(a,h,)anthracene	0.00002	N				
3	0.30	Benzo(g,h,i)perylene	0.00011	N				
3	0.30	Phenol	0.00010	N				
3	0.30	hydrocarbon/oil with marker	0.00390	N				H225 test
3	0.30	Arsenic	0.00337	N				
3	0.30	Boron	0.00093	N				
3	0.30	Cadmium	0.00004	N				
3	0.30	Hexavalent Chromium	0.00012	N				
3	0.30	Chromium (Total)	0.00304	N				
3	0.30	Copper	0.00854	N				
3	0.30	Lead	0.00000	N				
3	0.30	Leadx	0.03900	N				
3	0.30	Manganese	0.10170	N				
3	0.30	Mercury	0.00006	N				
3	0.30	Nickel	0.00475	N				
3	0.30	Selenuim	0.00038	N				
3	0.30	Zinc	0.00000	N				
3	0.30	Zincx	0.04691	N				
3	0.30	Vanadium	0.00732	N				
5	0.20	pH	0.00000	N				
5	0.20	Benzene	0.00000	N				H225 test
5	0.20	Toluene	0.00000	N				H225 test
5	0.20	Ethylbenzene	0.00000	N				H225 test
5	0.20	m,p-xylene	0.00000	N				H226 test
5	0.20	o-xylene	0.00000	N				H226 test
5	0.20	Naphthalenene	0.00001	N				H228 test
5	0.20	Acenaphthylene	0.00009	N				
5	0.20	Acenaphthene	0.00012	N				
5	0.20	Fluorene	0.00015	N				
5	0.20	Phenanthrene	0.00120	N				
5	0.20	Anthracene	0.00025	N				
5	0.20	Fluoranthene	0.00110	N				
5	0.20	Pyrene	0.00089	N				
5	0.20	Benzo(a)anthracene	0.00049	N				
5	0.20	Chrysene	0.00042	N				
5	0.20	Benzo(b)fluoranthene	0.00036	N				
5	0.20	Benzo(k)fluoranthene	0.00018	N				
5	0.20	Benzo(a)pyrene	0.00033	N				
5	0.20	Indeno(1,2,3-cd)pyrene	0.00016	N				
5	0.20	Di-benz(a,h,)anthracene	0.00004	N				
5	0.20	Benzo(g,h,i)perylene	0.00019	N				
5	0.20	Phenol	0.00010	N				
5	0.20	hydrocarbon/oil with marker	0.01000	N				H225 test

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Individual Compound Information

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Contaminant	Contaminant Concentration (%)	Hazardous Waste Y/N	Hazard Property	Individual Hazard Statements Exceeded	Cumulative Hazard Statements Exceeded	Additional Hazard Statements (see notes section)
5	0.20	Arsenic	0.00245	N				
5	0.20	Boron	0.00208	N				
5	0.20	Cadmium	0.00004	N				
5	0.20	Hexavalent Chromium	0.00012	N				
5	0.20	Chromium (Total)	0.00319	N				
5	0.20	Copper	0.00578	N				
5	0.20	Lead	0.00000	N				
5	0.20	Leadx	0.02100	N				
5	0.20	Manganese	0.07147	N				
5	0.20	Mercury	0.00006	N				
5	0.20	Nickel	0.00395	N				
5	0.20	Selenuim	0.00038	N				
5	0.20	Zinc	0.00000	N				
5	0.20	Zincx	0.03951	N				
5	0.20	Vanadium	0.00678	N				
7	0.10	pH	0.00000	N				
7	0.10	Benzene	0.00010	N				H225 test
7	0.10	Toluene	0.00010	N				H225 test
7	0.10	Ethylbenzene	0.00010	N				H225 test
7	0.10	m,p-xylene	0.00010	N				H226 test
7	0.10	o-xylene	0.00010	N				H226 test
7	0.10	Naphthalenene	0.00001	N				H228 test
7	0.10	Acenaphthylene	0.00001	N				
7	0.10	Acenaphthene	0.00001	N				
7	0.10	Fluorene	0.00001	N				
7	0.10	Phenanthrene	0.00005	N				
7	0.10	Anthracene	0.00001	N				
7	0.10	Fluoranthene	0.00011	N				
7	0.10	Pyrene	0.00011	N				
7	0.10	Benzo(a)anthracene	0.00009	N				
7	0.10	Chrysene	0.00007	N				
7	0.10	Benzo(b)fluoranthene	0.00008	N				
7	0.10	Benzo(k)fluoranthene	0.00005	N				
7	0.10	Benzo(a)pyrene	0.00006	N				
7	0.10	Indeno(1,2,3-cd)pyrene	0.00005	N				
7	0.10	Di-benz(a,h,)anthracene	0.00001	N				
7	0.10	Benzo(g,h,i)perylene	0.00006	N				
7	0.10	Phenol	0.00030	N				
7	0.10	hydrocarbon/oil with marker	0.00860	N				H225 test
7	0.10	Arsenic	0.00169	N				
7	0.10	Boron	0.00231	N				
7	0.10	Cadmium	0.00004	N				
7	0.10	Hexavalent Chromium	0.00012	N				
7	0.10	Chromium (Total)	0.00216	N				
7	0.10	Copper	0.00955	N				
7	0.10	Lead	0.00000	N				
7	0.10	Leadx	0.02000	N				

ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Individual Compound Information

Site Name	The Parade
Location	Epsom
Site ID	
Job Number	22/12385/KJC
Date	27/06/2022
User Name	
Company Name	Albury S.I Ltd

Hole ID	Sample Depth	Contaminant	Contaminant Concentration (%)	Hazardous Waste Y/N	Hazard Property	Individual Hazard Statements Exceeded	Cumulative Hazard Statements Exceeded	Additional Hazard Statements (see notes section)
7	0.10	Manganese	0.04673	N				
7	0.10	Mercury	0.00006	N				
7	0.10	Nickel	0.00264	N				
7	0.10	Selenuim	0.00038	N				
7	0.10	Zinc	0.00000	N				
7	0.10	Zincx	0.01778	N				
7	0.10	Vanadium	0.00464	N				

Notes - Additional Information on Hazard Properties

Hazardous Property	Description	Hazard Statement	Note
HP1	Explosive	H200, H201, H202, H203, H204, H240 and H241	A waste is assessed for HP1 via test methods, rather than a concentration limit. If you have substances or a mixture containing explosive properties the waste should be tested in accordance with the European Chemical Agency's guidance on the application of the CLP Criteria.
HP2	Oxidising	H270, H271, H272	A waste is assessed for HP2 via test methods, rather than a concentration limit. If you have substances or a mixture containing oxidising properties the waste should be tested in accordance with the European Chemical Agency's guidance on the application of the CLP Criteria.
HP3	Flammable	H220 to H226, H228, H242, H250, H251m H252, H260, H261	A waste is assessed for HP3 via test methods, rather than a concentration limit. If you have substances or a mixture containing flammable properties the waste should be tested in accordance with the European Chemical Agency's guidance on the application of the CLP Criteria. If a waste contains either H220, H221, H260 or H261 a calculation can be performed to identify the minimum amount of that substance that will trigger HP3.
HP5	Specific Target Organ Toxicity (STOT)	H304	Should a waste contain two or more compounds displaying H304 (Asp. Tox 1) and equal or exceed its specific concentration limit of 10%, then a waste will be hazardous by HP5 if its kinematic viscosity exceeds 20.5 mm^2/s. Guidance should be sought from the CLP Criteria.
HP9	Infectious	N/A	A waste is assessed for HP9 via further testing, rather than a concentration limit. In cases where there is the potential for toxins to be present, further testing will be required. For healthcare waste reference should be made to the Department of health guidance: Safe management of healthcare waste.
HP12	Release of acute toxic gas	EUH029, EUH031, EUH032, H260 or H261	A waste is assessed for HP12 via test methods, rather than a concentration limit. If you have substances or a mixture that may release acute toxic gas the waste should be tested in accordance with the European Chemical Agency's guidance on the application of the CLP Criteria.
HP15	Explosive or explosive properties	H205, EUH001, EUH019 or EUH044	A waste is assessed for HP15 via test methods, rather than a concentration limit. If you have substances or a mixture that may exhibit explosive or explosive properties the waste should be tested in accordance with the European Chemical Agency's guidance on the application of the CLP Criteria.
HP16	Persistent organic pollutants	N/A	A waste is considered hazardous if the concentration of one or more compound (persistent organic pollutant) as listed in Appendix C of Environment Agency guidance WM3 is above its assigned concentration limit. For reference for dioxins and furans, this assessment incorporates the use of specific toxicity equivalent factors.