

PHASE 2 REPORT ON A SITE INVESTIGATION

Site

**RUISLIP HIGH SCHOOL,
SIDMOUTH DRIVE, RUISLIP,
MIDDLESEX HA4 0BY**

Client

LONDON BOROUGH OF HILLINGDON

Consulting Engineer

ARCADIS LLP

Report Ref

17/10910/A/KJC

Issued

MARCH 2017



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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Consulting Engineer **ARCADIS LLP**

Reference	17/10910/A/KJC	
Revision	0	
Date of Issue	March 2017	
Reviewed by	K J Clark BSc Hons Director	
Approved by	G C D Owens BSc MSc FGS MEnvSc Director	

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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.

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1 INTRODUCTION

The London Borough of Hillingdon proposes to construct a number of buildings at Ruislip High School, Sidmouth Drive, Ruislip (“the site”). Accordingly, an investigation into ground conditions has been made in order 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. This Phase 2 investigation has been carried out following the completion of a Phase 1 Desk Study and Walkover Survey for the site by Albury S.I. Ltd, issued January 2017.

The programme of this investigation comprised the construction of three deep cable percussive boreholes and six shallow boreholes using hand-held window sampling techniques. This work was supplemented by the construction of two trial pits, using manual techniques, to expose the existing foundations. 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 and trial pits were constructed between 14th and 16th February 2017, at locations as shown on the site plans, drawing nos. 17/10910/A/1 and 17/10910/A/2, which are presented as Figures 1 and 2. The exploratory positions were located in order to provide adequate coverage in the areas of the proposed buildings footprints. The deep boreholes were numbered BH1 to BH3, whilst the shallow boreholes were denoted WS4 to WS9. The trial pits are referenced A and B.

The depths and descriptions of the strata encountered in the boreholes and trial pits 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.

3 GROUND CONDITIONS

3.1 Geology

Reference has been made to the earlier Desk Study, which indicated that the site was underlain by the Lambeth Group.

3.2 Stratigraphy

Consideration of the exploratory records indicates that made ground varying in composition from macadam, overlying sand and gravel, to dark brown silty sand with brick/concrete fragments and gravel was recorded at the investigatory locations and was proved to depths of between 0.3m and 1.8m. Borehole WS8 was relocated as WS8A after obstructions were encountered. Borehole WS9 was terminated within the made ground at 0.8m after several attempted positions due to obstructions.

Brown silty clay with variable rounded gravel content was exposed beneath the made ground at each location. These cohesive soils grade to sandy clay below 1.5m to 2m and were proved to the concluding depths of boreholes WS4-WS8A and trial pits A and B at 2.6m and 3.1m.

Multicoloured silty clay, becoming sandy below 13m, was revealed beneath the sandy clay in boreholes BH1 to BH3 at depths of between 4m and 5.5m. These predominantly cohesive soils, which are considered representative of the Lambeth Group, were proved to the full depth of this investigation at 15m.

3.3 Groundwater

During the construction of the exploratory positions a number of groundwater strikes were recorded at between 1.4m and 14.5m depths with the exception of boreholes WS7 and WS9. Short-term standing water levels upon completion of boreholes BH1 and BH2 of 13.9m and 14.5m were recorded, with temporary casing installed to 3m depth. Borehole BH3 remained dry. Short-term standing water levels ranging from 0.95m to 2.2m were recorded at the other investigatory locations where strikes were noted. Boreholes WS7 and WS9 remained dry throughout their construction.

3.4 In Situ Testing

During the construction of boreholes BH1 to BH3 a series of in situ Standard Penetration Tests [SPT] were performed. Increasing blow counts or *N* values ranging from 6 blows/0.3m to 38 blows/0.3m were recorded, which is indicative of a soft becoming very stiff in situ condition for a cohesive soil.

In situ hand shear vane tests were performed within the trial pits and borehole locations WS4 to WS9 using the Geonor Shear Vane test equipment. Shear strengths ranging from 60kPa to >250kPa were recorded, which reflect the firm to very stiff condition of these cohesive soils.

3.5 Existing Foundations

The details of the existing foundations exposed in trial pits A and B are given on the drawings presented as Figures 3 and 4. These suggest that mass concrete foundations support the structural loadings from the existing structure. At the location of trial pit B, the initial concrete layer beneath the school building extended to 0.58m, where it was noted to recede back beneath the wall of the building. A further concrete structure was recorded at 1.45m depth extending 1m from the wall. However, the full depth of the foundations could not be confirmed as the concrete was noted to extend beyond 1.65m and 2m. It should also be noted that a layer of plastic damp proofing was revealed above the first step of the concrete in trial pit A. In addition, polystyrene fragments were noted at isolated locations in both excavations.

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 Chemtest 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 cohesive soils encountered at this site have been determined. Water contents within the range 14.9% to 32.1% 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 intermediate to very high plasticity and variable shrinkage potential.

4.3 Triaxial Compression

The undrained shear strength characteristics of samples of the clay associated with the Lambeth Group encountered at this site have been determined by testing specimens in the triaxial compression apparatus. Under the conditions of this work cohesions ranging

between 50kPa and 315kPa were recorded, which represent a firm to very stiff in situ condition for these cohesive soils.

4.4 Consolidation

The one dimensional consolidation characteristics of samples of the clay underlying the site have been determined by testing specimens in the Terzaghi Oedometer or Consolidation apparatus. The results of this work are presented in the form of coefficients of volume decrease and of consolidation, which relate to the magnitude and rate of settlement respectively. The results obtained suggest that moderate magnitudes of settlement may be expected, these movements occurring over a moderate period of time.

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 to moderate concentrations of soluble sulphate have been recorded in association with near neutral pH values.

4.6 Geochemical Testing

Selected samples of the made ground from 0.1m depth have been submitted to the UKAS accredited laboratories operated by Chemtest 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 number of new buildings adjacent to the existing school structures. The proposals also include the addition of another storey to the main school structure. At the time of the preparation of this report the anticipated structural loads and proposed layout were not known.

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 1m 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.

It is known that a number of trees are present in the vicinity of the proposed structures. 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 may be present within the near surface soils at the location of borehole BH3 at 2-2.5m depth. However, the presence of rounded gravel within the test sample is likely to have reduced the recorded water content.

It is considered that strip or spread foundations constructed within the Lambeth Group at a minimum depth of 1m can be designed to apply a maximum increase in load of 100kPa. At this loading intensity a factor of safety of three against general shear failure will be operative. Moreover, settlements should remain within tolerable limits for the type of construction under consideration. Where the proposed buildings are in close proximity a corresponding foundation depth will be required. It would also be prudent to incorporate a flexible construction joint where the proposed buildings abut the existing structure.

With respect to the possible additional storey on the existing school building, it is evident that any increased loads generated are likely to result in further settlements. The results of the laboratory consolidation test can be used to assess the magnitude of movement once the final loadings have been established.

It is thought that a satisfactory foundation solution can be formulated on the basis of the foregoing discussions. However, should they be considered unsuitable then an alternative foundation system could be adopted. The design of piles lies outside the scope of this report as it 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 1m 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 problems with respect to shallow excavations of less than 1m depth are unlikely. It should be appreciated that the clay soils revealed in this investigation are likely to be susceptible to rapid softening in the unconfined state. Where excavations are to be left open for extended periods then this susceptibility should be taken into account.

5.4 Ground Floor Slabs

It is possible that non-suspended floor slabs can be utilised provided the made ground is removed and replaced by approved granular fill adequately compacted in layers of convenient thickness upon which a reinforced slab can be cast. Alternatively, a fully suspended floor slab could be adopted. It should be appreciated that the presence of moisture deficiency at the location of borehole BH3 may preclude the use of non-suspended floors in this area.

5.5 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) of this publication the Aggressive Chemical Environment for Concrete Classification is AC-1, which coincides with a Design Sulphate Class DS-1. This Design Sulphate Class can be used to establish the design mix for buried concrete in accordance with Part D of the Digest.

6 GROUND CONTAMINATION

The Conceptual Site Model prepared as part of the earlier Phase 1 Desk Study has been reproduced below. Based upon the potential source identified, testing was undertaken on the shallow samples from 0.1m depth.

Table 1 - Preliminary Conceptual Site Model			
Source(s)	Potential Pathway(s)	Receptor(s)	Risk Level
Aerial delivered WW2 Unexploded Ordnance (UXO)	Explosion	Site Workers	In view of the distance to recorded bomb strikes together with the recent development of the site by Ruislip School, it is considered that there a low risk. Hence, it is suggested that no further investigation is required
Dry Cleaners 20m to the south	None	End Users	Negligible

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.

There are no standard land-use categories which are directly applicable to schools. Therefore, the results have been compared against the generic land-use category Public Open Spaces (POS_{RESI}) and 2.5% SOM. This is considered the nearest applicable generic land-use category, which considers young children as the critical sensitive receptor and includes grassed/landscaped areas with potential for tracking back of soil. This land-use is a modification of the residential land-use, but does not consider the consumption of home-grown produce or the ingress of vapour pathways.

A comparison of the results against the respective GAC indicates that there is an elevated level of 0.59mg/kg of Dibenz(a,h)Anthracene within the shallow made ground at borehole location WS4. It is evident that whilst an isolated elevated level of Dibenz(a,h)Anthracene has been recorded above the S4UL, the 95th percentile for these contaminants has been calculated at 0.42mg/kg, which is below the relevant S4UL of 0.57mg/kg. Hence, it is considered that its presence will not represent a risk to health and that specific remedial measures are not warranted.

6.2 Vegetation

The metals boron, copper, nickel and zinc are phytotoxic at certain levels, with their availability being dependent upon soil pH. These levels may not pose a significant long-term health risk to humans, but could be detrimental to plant growth or function. The results obtained suggest that problems with respect to plants are not anticipated.

6.3 Preliminary Waste Assessment

It is likely that, if excavated soils cannot be re-used or retained on site, 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 McArdle 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. Asbestos was not detected in any of the samples screened. Based on the output, waste soil arisings from have been tentatively identified as being non-hazardous waste.

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.

If hazardous material is to be disposed at a licensed waste landfill site then supplementary waste acceptance criteria [WAC] testing may also be required. Confirmation should be sought from the relevant licensed waste handler or landfill operator.

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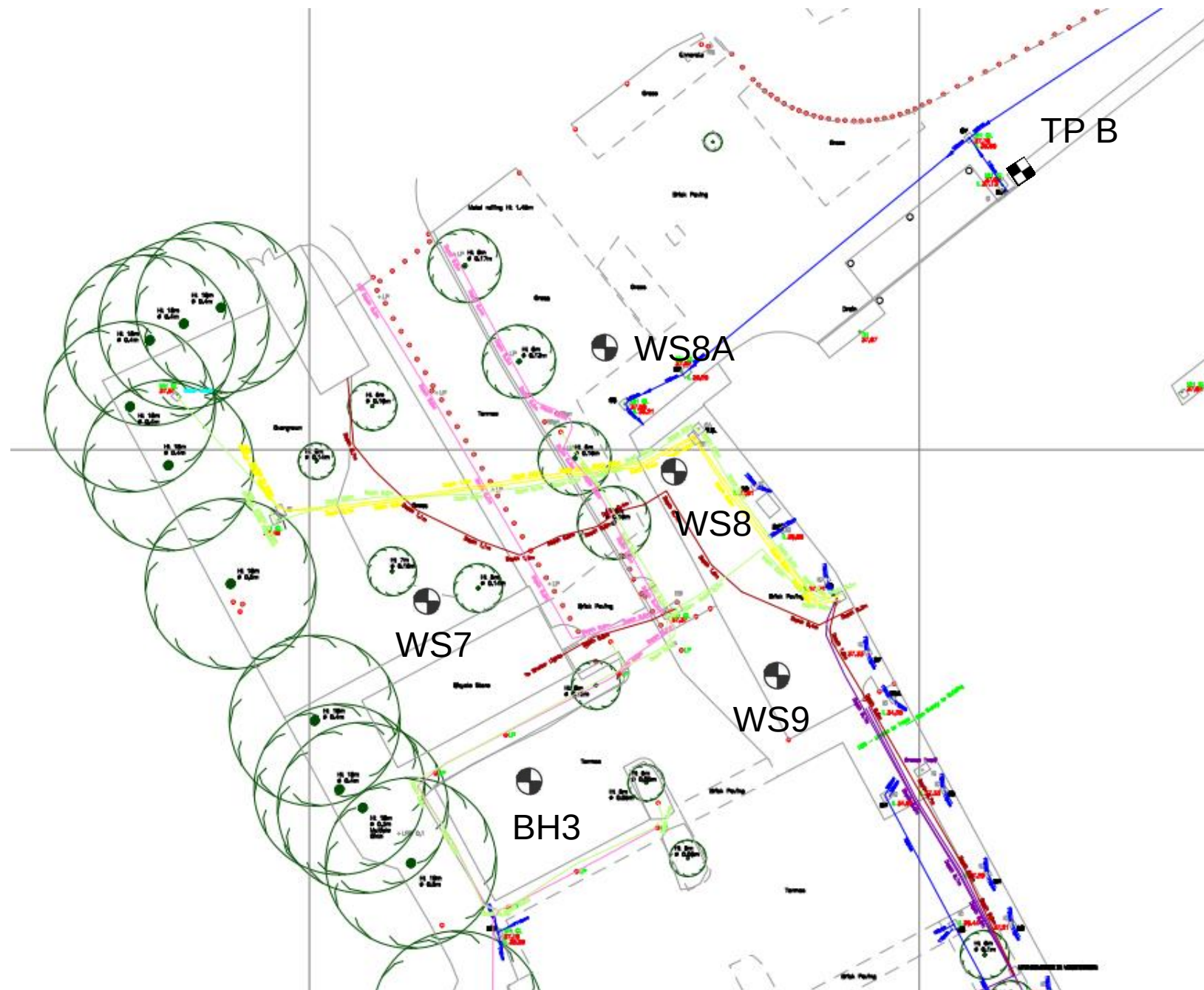
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LIST OF ABBREVIATIONS

AOD	-	Above Ordnance Datum
ACM	-	Asbestos-containing Material
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
SVOC	-	Semi-volatile Organic Compounds
TPH	-	Total Petroleum Hydrocarbon
UXB	-	Unexploded Bombs
UXO	-	Unexploded Ordnance
VOC	-	Volatile Organic Compound

FIGURES 1-2

SITE LAYOUT PLANS



Legend:

-  Borehole Location
-  Trial Pit Location

Title: Site Layout Plan

Dwg No: 17/10910/A/2

Drawn by: KJC

Client: London Borough of Hillingdon

Contract: Sidmouth Drive, Ruislip

Job Ref: 17/10910/A/KJC

Scale: NTS

Revision: 0

Issue Date: 10/02/2017

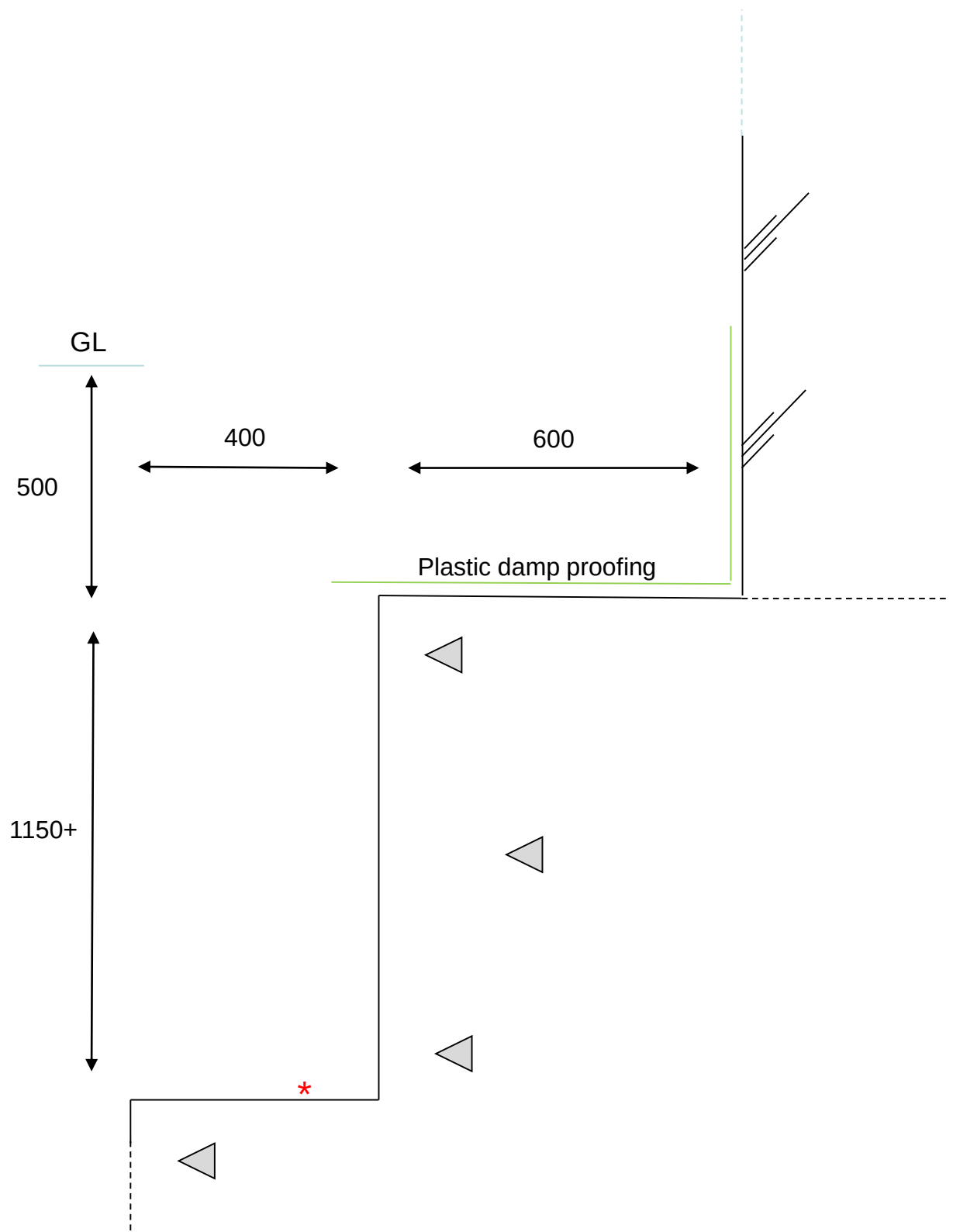


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FIGURES 3-4

TRIAL PIT SECTIONAL DRAWINGS



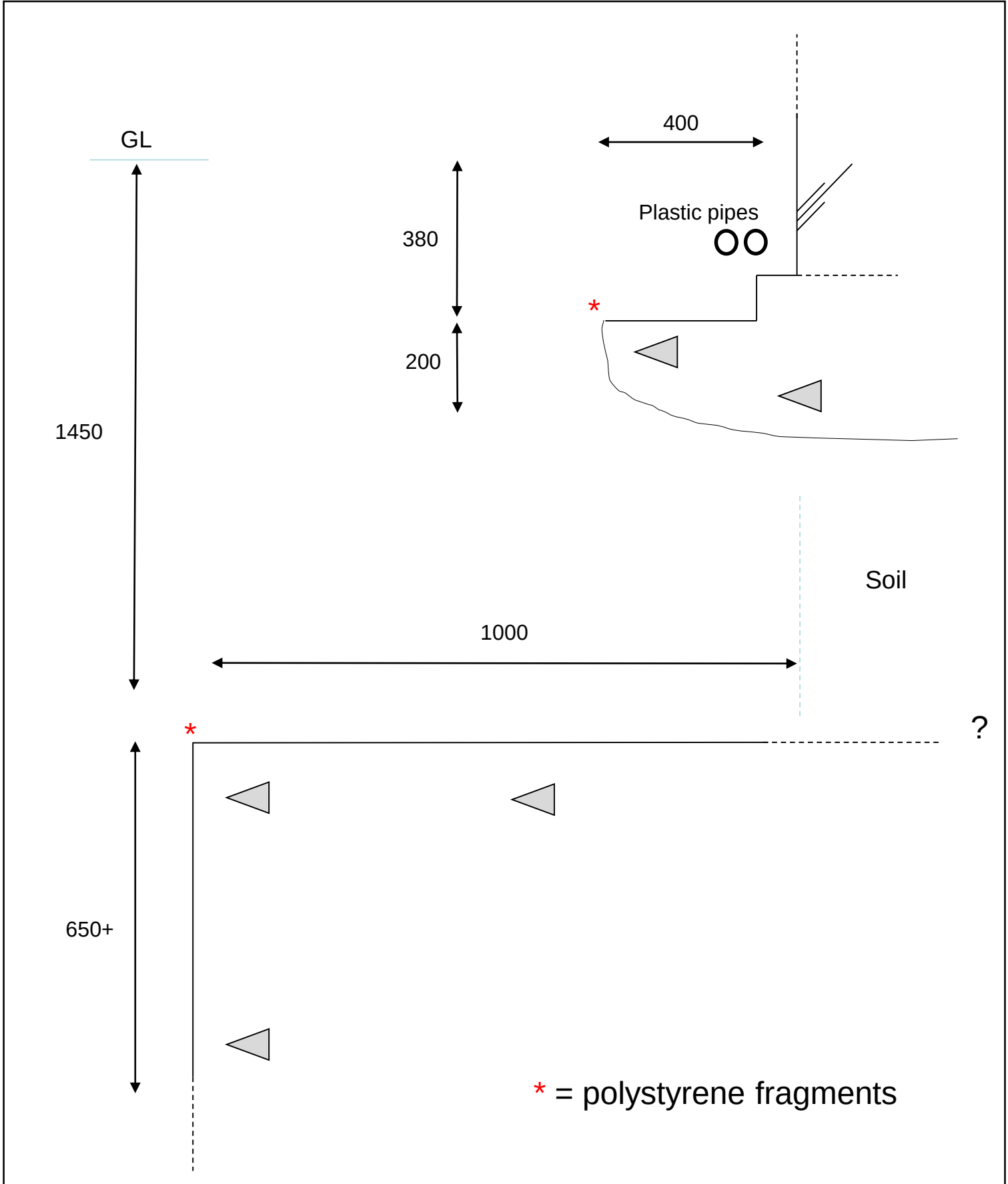
* = Polystyrene particle present

Contract: Sidmouth Drive, Ruislip
 Dwg No: 17/10910/A/3
 Title: Trial Pit A Section
 Scale: NTS – all dimensions in mm
 Revision: 0
 Issue Date: 01/03/2017



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* = polystyrene fragments

Contract: Sidmouth Drive, Ruislip
Dwg No: 17/10910/A/4
Title: Trial Pit B Section
Scale: NTS – all dimensions in mm
Revision: 0
Issue Date: 01/03/2017

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APPENDIX 1

EXPLORATORY RECORDS

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH				BOREHOLE		BH1		
Contract		Sidmouth Drive, Ruislip			Report Ref		17/10910/A/KJC	
Client		London Borough of Hillingdon			Ground Level			
Site Address		Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY			Date Commenced		14/02/2017	
					Date Completed		15/02/2017	
Type and Diameter of Boring: Light Cable Percussion: 150mm diameter								
Water Strikes, m		Water levels recorded during boring, m						
1	2.50 (seepage)	Date	15.02	16.02				
2	13.90 (seepage)	Hole Depth	4.00	15.00				
3		Casing Depth	3.00	3.00				
4		Water Level	none	13.90				
Remarks1 hour dayworks reinstating surface, clearing, bagging and removing all spoil from site. Excavation of hand dug starter pit to 1.2m depth to clear buried services.								
Samples or Tests		SPT N	Depth m		Legend	Strata Description		
Type	Depth, m							
D	0.25	6	0.40			MADE GROUND (grey sand with gravel and roots)		
B	0.50		0.70			Brown silty CLAY with shells		
D	1.00-1.45					Soft to firm brown silty CLAY		
		13	1.70					
D	1.75					Stiff brown/grey silty CLAY with shells		
U	2.00-2.45							
		24	2.50					
D	2.75					Brown silty CLAY with pebbles		
D	3.00-3.45		3.10			Firm to stiff brown sandy CLAY with occasional rounded gravel		
								
								
D	4.00							
			4.80					
U	4.50-4.95					Stiff to very stiff multicoloured silty CLAY		
								
D	5.50							
								
D	6.00-6.45							
								
								
D	7.00							
								
U	7.50-7.95							
								
								
								
D	8.50							
								
								

Sample Code: U - Intact 100mm Ø B - Large Disturbed D - Small Disturbed W - Water Sample (U)* - Non-recovery of Intact 100mm Ø sample

**Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Samples or Tests**SPT****Depth****Legend****Strata Description****Type****Depth, m****N****m****Legend****Strata Description**

D

9.00-9.45

30

— ×

Very stiff multicoloured silty CLAY

D

10.00

× —

U

10.50-10.95

× —

D

11.50

— ×

D

12.00-12.45

34

× —

D

13.00

× —

U

13.50-13.95

13.50

— ×

D

14.00

. —

Very stiff multicoloured sandy CLAY

D

14.55-15.00

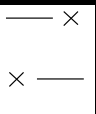
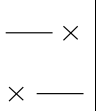
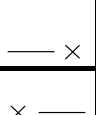
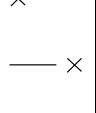
36

. —

15.00

. —

END OF BOREHOLE

 ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH					BOREHOLE		BH2	
Contract		Sidmouth Drive, Ruislip			Report Ref		17/10910/A/KJC	
Client		London Borough of Hillingdon			Ground Level			
Site Address		Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY			Date Commenced		14/02/2017	
					Date Completed		15/02/2017	
Type and Diameter of Boring: Light Cable Percussion: 150mm diameter								
Water Strikes, m		Water levels recorded during boring, m						
1	14.50	Date	16/02/17					
2		Hole Depth	15.00					
3		Casing Depth	3.00					
4		Water Level	14.50					
Remarks 1 hour dayworks reinstating surface, clearing, bagging and removing all spoil from site. Excavation of hand dug starter pit to 1.2m depth to clear buried services.								
Samples or Tests		SPT N	Depth m		Legend	Strata Description		
Type	Depth, m							
D B	0.25 0.50	9	0.70			MADE GROUND (grey/brown clayey sand with roots and concrete fragments)		
D	1.00-1.45							
D U	1.75 2.00-2.45							
D U	2.75 3.00-3.45	18	2.50			Firm brown silty CLAY with occasional rounded gravel, becoming stiff sandy CLAY		
D D	4.00							
D U	4.50-4.95							
D U	5.50 6.00-6.45	25	5.50			Stiff brown sandy CLAY with rounded gravel		
D D	7.00							
D U	7.50-7.95							
D U	8.50					Firm brown very sandy CLAY		
D U								
D U								
D U						Stiff multicoloured silty CLAY		
D U								
D U								

Sample Code: U - Intact 100mm Ø B - Large Disturbed D - Small Disturbed W - Water Sample (U)* - Non-recovery of Intact 100mm Ø sample

**Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Samples or Tests**SPT****Depth****Legend****Strata Description****Type****Depth, m****N****m****Legend****Strata Description**

D

9.00-9.45

33

× —

Stiff to very stiff multicoloured silty CLAY

D

10.00

— ×

U

10.50-10.95

× —

D

11.50

— ×

D

12.00-12.45

37

× —

D

13.00

— ×

U

13.50-13.95

× —

D

14.00

14.00

— ×

Very stiff multicoloured sandy CLAY

D

14.55-15.00

38

— •

15.00

• —

END OF BOREHOLE

ALBURY S.I. LTD Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH				BOREHOLE		BH3		
Contract		Sidmouth Drive, Ruislip			Report Ref		17/10910/A/KJC	
Client		London Borough of Hillingdon			Ground Level			
Site Address		Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY			Date Commenced		16/02/2017	
					Date Completed		16/02/2017	
Type and Diameter of Boring:				Light Cable Percussion: 150mm diameter				
Water Strikes, m		Water levels recorded during boring, m						
1	13.50	Date	16/02/17					
2		Hole Depth	15.00					
3		Casing Depth	3.00					
4		Water Level	none					
Remarks1 hour dayworks reinstating surface, clearing, bagging and removing all spoil from site. Excavation of hand dug starter pit to 1.2m depth to clear buried services.								
Samples or Tests		SPT N	Depth m		Legend	Strata Description		
Type	Depth, m							
D	0.25	9	0.25			MADE GROUND (macadam)		
B	0.50		0.70			MADE GROUND (grey/brown sand and gravel)		
D	1.00-1.45					Firm brown silty CLAY		
								
D	1.75	14	1.70			Stiff brown silty CLAY with rounded gravel		
U	2.00-2.45							
								
D	2.75	14						
D	3.00-3.45							
								
D	4.00	14	4.00			Stiff multicoloured silty CLAY		
U	4.50-4.95							
								
D	5.50	30						
								
D	6.00-6.45							
		30						
								
D	7.00							
U	7.50-7.95	30						
								
								
D	8.50	30						

Sample Code: U - Intact 100mm Ø B - Large Disturbed D - Small Disturbed W - Water Sample (U)* - Non-recovery of Intact 100mm Ø sample

**Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Samples or Tests**SPT****Depth****Legend****Strata Description****Type****Depth, m****N****m****Legend****Strata Description**

D

9.00-9.45

33

× —

Stiff multicoloured silty CLAY

D

10.00

— ×

U

10.50-10.95

× —

D

11.50

— ×

D

12.00-12.45

33

— ×

D

13.00

— ×

D

13.50-13.95

34

13.50

× —

D

14.00

— .

Very stiff multicoloured sandy CLAY

D

14.55-15.00

35

— .

15.00

. —

END OF BOREHOLE

**ALBURY S.I. LTD**

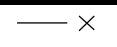
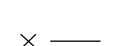
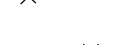
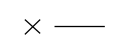
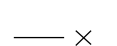
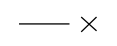
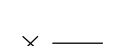
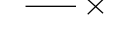
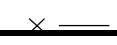
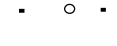
Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS4**

Contract	Sidmouth Drive, Ruislip	Report Ref	17/10910/A/KJC
Client	London Borough of Hillingdon	Date	14/02/2017
Site Address	Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY	Ground Level	

Type of excavator:	Window Sampler	Water level after completion, m	2.20
Water strikes, m	Dimensions, m	Ease of excavation, m	
1 2.20	Diameter 0.06	Very easy Difficult c.2.20	
2	0.06	Moderate GL-3.10 Very hard	

Remarks

Samples or tests		Shear Strength kPa	Depth		Legend	Strata Description
Type	Depth, m					
D	0.10		0.30			MADE GROUND (dark brown silty SAND with occasional brick fragments and drainage shingle)
D	0.50					Stiff orange-brown silty CLAY, becoming very stiff brown/grey
						
D	1.00	90				
						
D	1.50	140				Bown very sandy CLAY with occasional rounded gravel in the upper margins
						
D	2.00	>250				
						
D	2.50					
						END OF BOREHOLE
D	3.00					
						
						
						

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Miltens Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS5**

Contract	Sidmouth Drive, Ruislip	Report Ref	17/10910/A/KJC
Client	London Borough of Hillingdon	Date	15/02/2017
Site Address	Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY	Ground Level	

Type of excavator:	Window Sampler	Water level after completion, m	1.55
Water strikes, m	Dimensions, m	Ease of excavation, m	
1 2.50	Diameter 0.06	Very easy	Difficult
2	0.06	Moderate GL-3.10	Very hard

Remarks

Samples or tests		Shear Strength kPa	Depth		Legend	Strata Description
Type	Depth, m					
D	0.10					MADE GROUND (dark brown silty SAND with occasional brick, gravel and concrete fragments)
			0.30			
D	0.50					Orange-brown silty CLAY
			0.70			
D	1.00	120				Stiff orange-brown/grey silty CLAY
			1.10			
						Stiff brown silty CLAY with grey veining
D	1.50	120				
D	2.00	200	2.00			Very stiff brown sandy CLAY
D	2.50					
			2.80			
D	3.00					Brown very sandy CLAY with rounded gravel
			3.10			
						END OF BOREHOLE

**ALBURY S.I. LTD**

Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS6****Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Client

London Borough of Hillingdon

Date

15/02/2017

Site AddressRuislip High School, Sidmouth Drive, Ruislip,
Middlesex HA4 0BY**Ground Level****Type of excavator:**

Window Sampler

Water level after completion, m

0.95

Water strikes, m

Dimensions, m

Ease of excavation, m

1

2.00

Diameter

0.06

Very easy

Difficult

2

0.06

Moderate

GL-3.10

Very hard

Remarks**Samples or tests****Shear
Strength
kPa****Depth****Legend****Strata Description****Type****Depth, m**

D

0.10

0.30

D

0.50

0.60

D

1.00

90

D

1.50

160

1.50

D

2.00

240

2.00

D

2.50

2.40

D

3.00

3.10

W

(0.95)

END OF BOREHOLE



WS7

17/10910/A/KJC

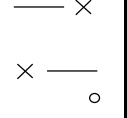
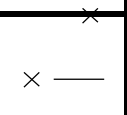
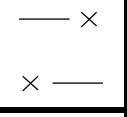
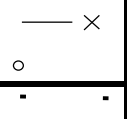
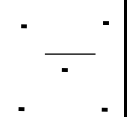
14/02/2017

dry

Ease of excavation, m

Moderate GL-3.10 Very hard

Remarks

Samples or tests		Shear Strength kPa	Depth		Legend	Strata Description		
Type	Depth, m							
D	0.10	120	0.40			MADE GROUND (dark brown clayey SAND with roots and brick fragments)		
D	0.50					0.60		MADE GROUND (brown CLAY with gravel and brick fragments)
D	1.00	160	1.20			Stiff orange-brown silty CLAY with occasional rounded gravel		
						1.20		Stiff brown silty CLAY with grey veining
D	1.50							
		160	1.90			Brown very sandy CLAY with rounded gravel		
D	2.00					2.20		Brown/grey very sandy CLAY
D	2.25							
D	2.50	160	2.50			Brown/grey very sandy CLAY		
						3.10		END OF BOREHOLE
D	3.00							
		160	3.10			END OF BOREHOLE		
						3.10		END OF BOREHOLE

Sample Code: **U** - 100mm diameter **B** - Large Disturbed **D** - Small Disturbed **W** - Water Sample

**ALBURY S.I. LTD**

Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS8****Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Client

London Borough of Hillingdon

Date

14/02/2017

Site AddressRuislip High School, Sidmouth Drive, Ruislip,
Middlesex HA4 0BY**Ground Level****Type of excavator:**

Window Sampler

Water level after completion, m

dry

Water strikes, m

Dimensions, m

Ease of excavation, m

1

none

Diameter

0.06

Very easy

Difficult

GL-0.80

2

0.06

Moderate

Very hard

Remarks**Samples or tests****Shear
Strength
kPa****Depth****Legend****Strata Description****Type****Depth, m**

D

0.10

D

0.50

0.60

0.80

MADE GROUND (brown sandy CLAY with concrete fragments and roots)

MADE GROUND (brown CLAY)

Obstruction on 2 no. attempts at 0.80m, also obstruction (concrete) at a further 2 no. attempts at 0.30m

**ALBURY S.I. LTD**

Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS8A**

Contract	Sidmouth Drive, Ruislip	Report Ref	17/10910/A/KJC
Client	London Borough of Hillingdon	Date	14/02/2017
Site Address	Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY	Ground Level	

Type of excavator:	Window Sampler	Water level after completion, m	1.90
Water strikes, m	Dimensions, m	Ease of excavation, m	
1 2.50	Diameter 0.06	Very easy	Difficult
2	0.06	Moderate GL-3.10	Very hard

Remarks

Samples or tests		Shear Strength kPa	Depth		Legend	Strata Description
Type	Depth, m					
D	0.10					MADE GROUND (dark brown clayey SAND with roots and brick fragments)
D	0.50		0.40			Brown silty CLAY with rounded gravel
D	1.00	120	0.80			Stiff brown silty CLAY
D	1.50	160	1.50			Very stiff brown/grey sandy CLAY
D	2.00	200	2.10			Brown very sandy clay with rounded gravel in the upper margins
D	2.50					
D	3.00		3.10			
W	(1.90)					END OF BOREHOLE

**ALBURY S.I. LTD**

Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

BOREHOLE**WS9****Contract**

Sidmouth Drive, Ruislip

Report Ref

17/10910/A/KJC

Client

London Borough of Hillingdon

Date

14/02/2017

Site AddressRuislip High School, Sidmouth Drive, Ruislip,
Middlesex HA4 0BY**Ground Level****Type of excavator:**

Window Sampler

Water level after completion, m

dry

Water strikes, m

Dimensions, m

Ease of excavation, m

1

none

Diameter

0.06

Very easy

Difficult

GL-0.80

2

0.06

Moderate

Very hard

Remarks**Samples or tests****Shear
Strength
kPa****Depth****Legend****Strata Description****Type****Depth, m**

D

0.10

0.40

D

0.50

0.80

MADE GROUND (brown clayey SAND with gravel)

MADE GROUND (crushed concrete/sand and gravel)

Obstruction at 3 no. attempts



A

17/10910/A/KJC

15/02/2017

Ground Level

1.50

Ease of excavation, m

GL-0,60

Very hard

Base of foundation not determined, trial pit concluded @1.65m. Trial pit extended by window sampling techniques.

Sample Code: **U** - 100mm diameter **B** - Large Disturbed **D** - Small Disturbed **W** - Water Sample

**ALBURY S.I. LTD**

Miltons Yard, Petworth Road, Witley, Surrey GU8 5LH

TRIAL PIT**B**

Contract	Sidmouth Drive, Ruislip	Report Ref	17/10910/A/KJC
Client	London Borough of Hillingdon	Date	14/02/2017
Site Address	Ruislip High School, Sidmouth Drive, Ruislip, Middlesex HA4 0BY	Ground Level	
Type of excavator:	Manual/WS	Water level after completion, m	1.30
Water strikes, m	Dimensions, m	Ease of excavation, m	
1 1.40	Diameter 0.06	Very easy	Difficult GL-1.00
2	0.06	Moderate 1.00-3.10	Very hard

Remarks

Base of foundation not determined, trial pit concluded @1.45m. Trial pit extended by window sampling techniques.

Samples or tests		Shear Strength kPa	Depth		Legend	Strata Description
Type	Depth, m					
D	0.10	60	0.10			MADE GROUND (dark brown silty SAND with roots)
						MADE GROUND (dark brown sandy CLAY with occasional gravel and brick fragments)
D	0.50		0.40			MADE GROUND (brown/grey sandy CLAY with occasional roots)
		80	0.80			MADE GROUND (brown CLAY)
D	1.00					
D	1.50	80	1.80			
D	2.00		2.10		— ×	Brown/grey-brown silty CLAY
		80			× —	
					— ×	Brown very silty CLAY
D	2.50				× —	
		80			— ×	
					× —	
D	3.00		3.10			END OF TRIAL PIT