Mr. Mark Golinsky

6 Albert Terrace Mews, Primrose Hill, Camden, NW1 7ST

Geotechnical Site Assessment

29841-R01 (02)

DECEMBER 2018

RSK GENERAL NOTES

Project No.: 29841-R01 (02)

Title: Geotechnical Site Assessment: 6 Albert Terrace Mews, Primrose Hill, Camden

Client: Mr. Mark Golinsky

Date: 14th December 2018

Office: RSK Environment Limited, Anerley Court, Half Moon Lane, Hildenborough, Tonbridge, TN11 9HU

Status: Final

Authors	Chris Ball	**Technical reviewer**	Svetislav Trajkovski
Signatures		Signature	
Date:	14th December 2018	Date:	14th December 2018
Project manager	Chris Ball	**Quality reviewer**	Thomas Payne
Signature		Signature	
Date:	14th December 2018	Date:	14th December 2018

CONTENTS

1 INTRODUCTION 1
1.1 Objective 1
1.2 Scope 1
1.3 Existing reports 2
1.4 Limitations 2
2 THE SITE 3
2.1 Site location and description 3
2.2 Proposed development 3
3 DESK STUDY 4
3.1 Reconnaissance Survey 4
3.2 Ground conditions 5
3.2.1 Geology 5
3.2.2 Radon 5
3.2.3 Mining, quarrying, landfilling and reclamation 5
3.3 Hydrogeology 5
3.3.1 Aquifer characteristics 5
3.3.2 Risk from rising groundwater levels 6
3.3.3 Licensed groundwater abstraction 6
3.4 Hydrology 7
3.4.1 Surface watercourses and surface water abstractions 7
3.4.2 Surface water discharges 7
3.4.3 Preliminary flood risk assessment 7
3.5 History of site and surrounding area 7
3.5.1 Site history 8
3.5.2 Surrounding area history 8
3.6 Sensitive land uses 8
4 SITE INVESTIGATION METHODOLOGY 9
4.1 Sampling strategy and methodology 9
4.1.1 Health, safety and environment considerations 9
4.1.2 Investigation locations 9
4.1.3 Soil sampling, in-situ testing and laboratory analysis 10
5 GROUND AND GROUNDWATER CONDITIONS 11
5.1 Soil 11
5.1.1 Made Ground 11
5.1.2 London Clay Formation 12
5.2 Groundwater 13
5.3 Foundation trial pits 13
6 GEOTECHNICAL SITE ASSESSMENT 14
6.1 Engineering considerations 14
6.2 Geotechnical hazards 14
6.3 Foundations 15
6.3.1 General suitability 15

6.3.2 Underpinning 16
6.3.3 Basement raft 17
6.3.4 Piled foundations 17
6.4 Basement retaining wall design parameters 18
6.5 Chemical attack on buried concrete 19
7 WASTE CLASSIFICATION 21
7.1 Wastes for landfill disposal 21
7.1.1 Waste acceptance criteria 21
7.1.2 Waste sampling plan 21
7.1.3 Preliminary waste assessment 21
7.2 Landfill tax 22
7.3 Recommendations 22
8 CONCLUSIONS AND RECOMMENDATIONS 23
BIBLIOGRAPHY 24

TABLES

Table 1: Site setting 3
Table 2: Site description 4
Table 3: Exploratory hole and monitoring well location rationale 9
Table 4: Scheduled analysis – soil 10
Table 5: General succession of strata encountered 11
Table 6: Summary of in-situ and laboratory test results for the Made Ground 11
Table 7: Summary of in-situ and laboratory test results for the London Clay Formation 12
Table 8: Summary of main potential geotechnical hazards that may affect site 14
Table 9: Design and construction of piled foundations 17
Table 10: Illustration of typical pile working loads for bored cast-in-situ piles at 4mbgl 18
Table 11: Retaining wall design parameters 19

FIGURES

Figure 1 Site location plan
Figure 2 Exploratory hole location plan
Figure 3 SPT against depth chart
Figure 4 Shear strength against depth chart

APPENDICES

Appendix A Service constraints
Appendix B Proposed development plans
Appendix C Exploratory hole and groundwater monitoring records
Appendix D Trial pit foundation records
Appendix E Laboratory certificates of geotechnical analysis
Appendix F Laboratory certificates for chemical soil analysis and waste acceptance criteria
Appendix G Haswaste assessment

1 INTRODUCTION

RSK Environment Limited (RSK) was commissioned by Alan Baxter Ltd (the 'Engineer'), on behalf of Mr Mark Golinsky (the 'Client') to carry out a Geotechnical Site Assessment of the land at No.6 Albert Terrace Mews in Camden, here after referred to as the 'site'.

It is understood that the proposals for the site include structural refurbishment of the existing building and the construction of a single level beneath the entire footprint of the existing building.

This report is subject to the RSK service constraints given in Appendix A.

1.1 Objective

The objective of this assessment is to obtain sufficient information regarding ground conditions in order to provide geotechnical information for the design of the new basement structure, including an assessment of the potential waste classification implications of soil arisings. In addition, to provide information required for the production of a Basement Impact Assessment (BIA) in line with the London Borough of Camden (LBC) Planning Guidance for Basements – CPG4 Basements and Lightwells, as well as to form a part of supporting documentation required to satisfy the LBC planning conditions.

1.2 Scope

The scope of the investigation and layout of this report has been designed with consideration of CLR11 (Environment Agency, 2004) and BS 10175: 2011 + A2:2017 (BSI, 2011) and guidance on land contamination reports issued by the Environment Agency (EA) (2010).

The project was carried out to an agreed brief as set out in RSK's proposal (29841 T01, dated 2nd March 2018. The scope of works for the assessment included:

- a review of the existing desk study including the geological, hydrogeological and hydrological information, a commercially available environmental database and historical plans, contained within RSK report 29123 R01(01), dated April 2017, and a site walkover;
- an intrusive investigation consisting of a single 10m deep cable percussive borehole and 3No. foundation trial pits with laboratory analysis;
- off-site analysis for geotechnical and waste classification purposes;
- interpretation of ground conditions and geotechnical data to provide recommendations with respect to foundation design;
- an assessment of the potential waste classification implications of soil arisings; and
- a factual and interpretative site investigation report.

The information gathered from the above scope will be used to produce a Basement Impact Assessment (BIA), including ground movement analysis and assessment on

potential damage to adjacent structures. The results of these assessments and findings will be reported under a separate cover, which should be read in conjunction to this report.

1.3 Existing reports

RSK carried out investigation works and subsequent numerical assessments for No.6 Albert Terrace adjacent to the west of site, the findings of which are contained within the Geo-Environmental Site Assessment Report (ref: 29123-R01(01), dated April 2017) and a Basement Impact Assessment (BIA) Report (ref: 29123-R02(03), dated May 2018). Pertinent information from these assessments has been provided in the relevant sections of this report.

We are not aware of any other reports relating to the site.

1.4 Limitations

The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of Made Ground not detected due to the limited nature of the investigation or the thickness and quality of Made Ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows may vary from those reported due to seasonal, or other, effects.

Whilst asbestos containing materials were not identified during the fieldworks or supporting laboratory analysis, the history of the site indicates asbestos may well be present. Asbestos is often present in discrete areas. Thus, although not encountered during the site investigation, may be found during more extensive ground works.

2 THE SITE

2.1 Site location and description

The site is located at No.6 Albert Terrace Mews, London, NW1 7TA at National Grid reference 528104^{E}, 183759^{N}, as shown on Figure 1. It covers approximately 120m^{2} at an elevation of approximately 35m above Ordnance Datum (mOD), bounded by the rear garden of No.6 Albert Terrace to the west, Regents Park Road to the north, Albert Terrace Mews (street) to the east, and similar residential properties to the south. An end of terrace two-storey mews house with associated garden and small storage shed occupies the site, as shown on Figure 2.

The area around the site is predominantly residential with Primrose Hill and Regents Park located to the west and south respectively, as detailed in Table 1.

Table 1: Site setting

To the north:	Residential housing across Regents Park Road
To the east:	Residential housing across Albert Terrace Mews (street), with residential housing and commercial properties of Camden Town beyond
To the south:	Residential housing immediately adjacent with Regents Park, Regents Canal and London Zoo beyond
To the west:	Residential housing and Primrose Hill across Albert Terrace

2.2 Proposed development

It is understood that the proposed development for the site is to install a basement beneath the footprint of the existing building, to include a pool plant room and a bike room/storage area. The ground floor and first floor of the existing building will be refurbished to include a swimming pool.

The existing building envelope (external walls and roof) will be kept in its entirety, and the existing ground floor will be lowered by 350mm to create a level access. The proposed basement will be formed by underpinning the existing foundations, and the overall depth will be approximately 4m.

Pre-construction drawings have been provided by the client and have been included in Appendix B, although as the development is still within planning stages, these may be subject to change.

3 DESK STUDY

The Desk Study includes a review of geological, hydrogeological and hydrological information, a review of a commercially available Environmental Database Report (including historical plans), and information from a site walkover. The information is used to develop an initial conceptual site model (CSM) and to consider any potential geotechnical risks.

3.1 Reconnaissance Survey

A site walkover was undertaken by RSK on 8th March 2018. The aim of the survey was to identify main site features, possible constraints in relation to the intrusive works, and to identify any obvious potential geotechnical risks.

Details of the walkover survey are summarised in Table 2.

Table 2: Site description

Feature	Description
Area of site	120m^2
Ground levels	35mOD
Depressions in the ground surface	None observed
Waterlogged or marshy ground	None observed
Surface water	None observed
Trees and hedges	Two mature trees are located on the northern boundary of the property
Existing buildings on site	A two-storey end of terrace building
Basements on site	No
External hardstanding	Yes, brick paving partially cover the site
Retaining walls and adjacent buildings	Similar two-storey terraced property adjacent to the south
Made Ground, earthworks and quarrying	None observed
Potentially unstable slopes on or close to site	None observed
Buried services present	Yes, gas, telecommunications and drainage present.
Invasive plant species including Japanese knotweed and hogweed	None observed.

3.2 Ground conditions

3.2.1 Geology

The published geological records of the area indicate that the site is underlain by the London Clay Formation. The available local British Geological Survey (BGS) boreholes nearest to the site and the findings of the previous investigation indicate that the London Clay is present to a depth in excess of 20m, recording the stratum as firm to very stiff brown silty clay. The deeper geology beneath the site is represented by the Reading Beds of the Lambeth Group, anticipated to extend around 40m below the base of the London Clay Formation, followed in turn by the Thanet Sand Formation and the White Chalk Sub-group

The existing topography and history of development of the site suggests that, in addition to these natural strata, made ground should be expected beneath the site.

In view of the prevailing ground conditions, with London Clay at shallow depth beneath the site, it is normal practice to consider the potential risk of ground subsidence and uplift related to the shrinkability of the underlying strata.

3.2.2 Radon

The environmental database report indicates that the site is not located within a radon 'Affected Area' as defined by the Documents of the National Radiological Protection Board (Radon Atlas of England and Wales, NRPB-W26-2002) as less than 1% of properties are above the Action Level. Therefore, no radon protective measures are required for the construction of a basement at the site.

3.2.3 Mining, quarrying, landfilling and reclamation

The Envirocheck report, old Ordnance Survey maps and plans and available geological maps indicate that a length of Regents Canal some 250m east and two small areas near London Zoo some 250m to the south have been infilled in 1950s.

According the same sources, there are no records of mines or quarries within a 500m radius of the site.

3.3 Hydrogeology

3.3.1 Aquifer characteristics

Based on the published geological map referred to above, the hydrogeology of the site is likely to be characterised by the unproductive strata of the London Clay Formation. Confined by the London Clay is a deep aquifer, comprising a sequence of deposits consisting of the lower part of the Lambeth Group and Thanet Sands (Basal Sands) and the White Chalk.

BGS borehole data suggest groundwater is present at some 85m below ground level within the Thanet Sands. It is also possible that localised perched water may also be present in any made ground.

The presence of low permeability clay at shallow depths beneath the site, while restricting downwards migration, may increase the potential for lateral migration of shallow groundwater. Lateral flow in these soils may contribute to groundwater recharge elsewhere in the catchment.

3.3.2 Risk from rising groundwater levels

Rising groundwater levels can affect foundations and structures and may result in flooding if not properly controlled. In certain areas groundwater levels are rising owing to reduced groundwater abstraction by industry, with London being at particular risk. The rise in groundwater levels started during the mid-1960s as a result of a significant reduction in groundwater abstraction from the Chalk aquifer. Prior to this, the Chalk aquifer had been increasingly exploited as a result of increasing industrialisation throughout the 19th century and early part of the 20th century.

As defined within CIRIA Special Publication 69 (Simpson et al., 1989) the site lies within the critical areas in the London Basin in which deep foundations and basements (basements up to 20m, or foundations extending up to 30m) are potentially at risk from the rising groundwater levels in the deep aquifer.

The deep aquifer beneath the site comprises the lower part of the Lambeth Group, the Thanet Sands and the Chalk. These units are expected to be in hydraulic continuity with each other and therefore have been considered as a single aquifer unit.

Following the issue of CIRIA Special Publication 69 (Simpson et al., 1989), the Rising Groundwater Level Working Group (GARDIT) was formed in March 1998. This group publicly launched a strategy proposal for controlling rising groundwater beneath London. As a result of the implementation of the GARDIT strategy, groundwater levels are now considered to be stabilising across much of the London Basin and the GARDIT Strategy is considered to have been successful. There will be ongoing monitoring and control of groundwater levels in the London Basin using the abstraction licensing process.

The EA status report issued in 2018 ‘Management of the London Basin Chalk Aquifer’ indicates that the potentiometric surface of the groundwater in the deep aquifer in the site area in January 2018 was at approximately -30mOD, i.e. approximately 65m below ground level.

3.3.3 Licensed groundwater abstraction

The Envirocheck report indicates the presence of four groundwater abstractions within 1km of the site, the closest of which refers to a borehole located at London Zoo, some 350m south of the site. Three other licenses refer to a Thames Water Utilities borehole some 430m west of the site.

In terms of aquifer protection, information available on the EA website indicates that the site does not lie within a designated groundwater SPZ however a Zone II Protection Zone and a Zone I Protection Zone are located 175m and 250m from the site, respectively.

3.4 Hydrology

3.4.1 Surface watercourses and surface water abstractions

The nearest watercourse is the Regents Canal 125m south of the site, and four surface water abstractions are noted on Regents Canal, some 450m to 470 m northeast of the site.

3.4.2 Surface water discharges

Two records of surface water discharges are located within 500m of the site, all of which have been revoked with the most recent being from 1989. The discharges relate to the River Thames and the Regents Canal.

Site surface drainage appears to be discharged into the mains drainage system.

3.4.3 Preliminary flood risk assessment

The Environment Agency and Hydrological Flood Map provided as part of the Envirocheck report indicates that he site does not lie within a zone at risk of flooding from rivers and seas.

3.5 History of site and surrounding area

The history of the land-use and development of the site and surrounding area has been assessed based on the following sources:

- early Ordnance Survey (OS) maps;
- pre-Ordnance Survey (County Series) maps;
- information from the Local Planning Authority;
- aerial photography; and
- an internet search.

Copies of OS and County Series maps are included in the Envirocheck report in **Appendix C** of RSK Report Reference 29123 R01 (00) (Note: Periods of history where historical data is not provided are not included within the historical map series.).

Reference to historical maps provides invaluable information regarding the land use history of the site, but historical evidence may be incomplete for the period pre-dating the first edition and between successive maps.

Relevant planning records held by Camden Council for the site include the following:

- November 1949 – Application registered for the conversion of a billiard room and store into a bad-sitting room, bathroom and store and the alteration of the elevatienal treatmest at the rear, granted in January 1951;
- October 1988 – Application granted for the formation of a new roof terrace and the erection of a chimney including minor alterations to the rear elevation;
- September 1991 – Application granted to Removal of middle one of three Lime trees in patio garden;

- July 1994 to August 2014 – Approve works (TPO) were granted to reduce the crown and shape of the Lime trees in the garden;

The development history of the site from the above sources is summarised below.

3.5.1 Site history

The earliest complete historical map edition of 1872 indicates that the area now occupied by the Mews property was part of the rear garden of 6 Albert Terrace. The Mews property was constructed on the end of two existing houses located to the south between 1872 and 1896. There are no further alterations and it is not clear from the maps when the shed between the property and northern boundary wall was constructed.

3.5.2 Surrounding area history

The earliest available maps from 1872 show that the site was bounded by predominantly residential properties, with the Regent's Canal, part of the Grand Union Canal network, approximately 125m to the south, and the London Zoo and the north of Regents Park 200m south. Primrose Hill was located 50m to the west, and piano works some 150m to the northwest.

In 1953, the piano works is shown as an electrical factory, and chemical works were present 200m northeast of the site. A warehouse and fish curing works were noted approximately 300m to the northeast, adjacent to a train depot near Camden Goods Station, with attached properties either side.

Historical maps from 1933 to 1969 indicate that the electrical factory to the northwest is now in use as a government building with the fish curing works being noted as a warehouse. The latest complete map from 1991 shows that the chemical works has been redeveloped for residential purposes.

3.6 Sensitive land uses

The site is located within the Primrose Hill Conservation Area, which protects buildings of historic and architectural value.

4 SITE INVESTIGATION METHODOLOGY

RSK carried out intrusive investigation work between 12th and 13th March 2018, followed by a groundwater monitoring visit in May 2018, to confirm ground conditions including the details of the existing foundations, and to inform geotechnical constraints potentially present with respect to the proposed basement design. Furthermore, the work was undertaken to provide an indication of the waste disposal characteristics of the soils.

4.1 Sampling strategy and methodology

4.1.1 Health, safety and environment considerations

Service plans were obtained, indicating the presence of gas, drainage and telecommunications. Any services identified on site were marked up in order to avoid a potential strike during the intrusive investigation. In addition, the exploratory hole location was scanned with a cable avoidance tool and excavated with hand tools to 1.20m depth to identify the presence of any buried services prior to commencement of drilling

4.1.2 Investigation locations

The investigation points were located provide sufficient geotechnical information in relation to the development proposals, and by reference to physical features present on the site at the time of investigation.

The techniques adopted for the investigation have been chosen considering the anticipated ground conditions, existing land use and the proposed development.

A summary and a rationale for these locations is given in Table 3.

Table 3: Exploratory hole and monitoring well location rationale

Investigation Type	Exploratory hole	Rationale
Boreholes – by modular (cut down) window sampler rig	BH1A	To prove the geological succession beneath the site and obtain data for the purpose foundation design To enable installation of a monitoring well
		Groundwater monitoring
Trial pit – hand excavated	TP1A to TP3A	To assess the existing foundations beneath the buildings and boundary walls of the Mews Property

The investigation and the soil descriptions were carried out in general accordance with 'BS 5930:2015 Code of Practice for Ground Investigations' (BSI, 2015). The exploratory holes were logged by an engineer in general accordance with the recommendations of BS 5930:2015 (which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1) Whilst every attempt is made to record full details of the strata

encountered in the exploratory holes, techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The investigation points were located approximately by reference to physical features present on the site at the time of investigation. The ground levels at the exploratory hole locations were interpolated from the levels shown on the site plan provided by the Architect.

The locations of the intrusive investigations are shown in Figure 2, and the exploratory hole logs are presented in Appendix C and Appendix D.

4.1.3 Soil sampling, in-situ testing and laboratory analysis

The sampling and in-situ testing strategy was designed to characterise the made ground and natural strata beneath the site, and to provide information on the mechanical characteristics of the underlying soils for the purpose of geotechnical design. Furthermore, samples of the made ground were collected from both the borehole and trial pits to help inform on methods of waste disposal from the basement excavation.

Standard penetration tests (SPTs) were carried out within the made ground and the natural strata, at regular intervals of approximately 1m to the terminal depth of the boring. Plot showing SPT 'N' values versus elevation is included on Figure 3. In situ shear strength was determined during the investigation works, by a hand vane method.

Where appropriate, testing was undertaken in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes, or, where superseded, by the relevant part of BS EN ISO 17892:2014 Geotechnical investigation and testing – Laboratory Testing of Soil within RSK's UKAS accredited laboratory. Tests carried out in order to classify the concrete class required on site have been undertaken following the procedures within BRE SD1: 2005 by a UKAS accredited laboratory (Envirolab).

The rationale for soil sample chemical analysis is presented in Table 4.

Table 4: Scheduled analysis – soil

Strata	Tests undertaken	No of Tests
Made Ground	Hazardous Waste suite (including: pH, metals, TPH with ID, PAH17, moisture content and asbestos screen)	1
	Hazardous Waste Acceptance Criteria (WAC) suite	1
	Natural Moisture Content	1
	Liquid and Plastic Limits (1 point)	1
	BRE SD1 Suite Pyritic Soil - pH BRE, ws SO_4 BRE, acid sol SO_4, Total SO_4 BRE, Total S BRE	1
London Clay Formation	Natural Moisture Content	4
	Liquid and Plastic Limits (1 point)	4
	BRE SD1 Suite Pyritic Soil - pH BRE, ws SO_4 BRE, acid sol SO_4, Total SO_4 BRE, Total S BRE	4

5 GROUND AND GROUNDWATER CONDITIONS

The results of the intrusive investigation and subsequent laboratory analysis undertaken are detailed below. The descriptions of the strata encountered, notes regarding visual or olfactory evidence of contamination, list of samples taken, field observations of soil and groundwater, in-situ testing and details of monitoring well installations are included on the exploratory hole records presented in Appendix C and Appendix D.

5.1 Soil

The exploratory hole revealed that the site is underlain by a relatively thick made ground over the London Clay Formation. This confirms the stratigraphical succession described within the initial conceptual site model and found during the previous site investigation undertaken by RSK at the adjacent property. For the purpose of discussion, the ground conditions are summarised in Table 5 and the strata discussed in subsequent subsections

Table 5: General succession of strata encountered

Strata	Exploratory holes encountered	Depth to top of stratum m bgl	Thickness (m)
Made ground	All	Ground level	2.50 (not proven in TPs)
London Clay Formation	BH1	2.50	Not proven

5.1.1 Made Ground

The Made Ground comprises a mix of granular and cohesive material, ranging between clayey, sand and gravel to sandy, gravelly clay, including brick, concrete flint and occasional chalk fragments. The full depth of made ground was determined in BH1A only, where it was shown to extend to 2.5mbgl.

The Insitu and laboratory test results are summarised in Table 6.

Table 6: Summary of in-situ and laboratory test results for the Made Ground

Soil parameters	Range	Reference
Liquid limit (%)	60	App E
Plasticity limit (%)	27	
Plasticity index (%)	33	
Plasticity term	High	
Modified plasticity index (%)	26	-

Soil parameters	Range	Reference
Moisture content (%)	22	App E
Volume change potential	Medium	-
Consistency index	1.24	
Consistency term	Very stiff	
SPT 'N' values	10 to 12	App C; Fig 3
Undrained shear strength measured by hand vane testing (kN/m^2)	70	App C; Fig 4
Undrained shear strength inferred from SPT 'N' values (kN/m^2)	52	Fig 4
Strength term	Medium	-

5.1.2 London Clay Formation

The London Clay Formation was encountered in BH1A only, beneath the made ground at a depth of 2.50m, and proven to the full depth of investigation (6.45mbgl).

Based on the site descriptions and in-situ and laboratory testing carried out this stratum can be described as a grey, stiff to very stiff, medium to very high strength, silty clay. A band of weak Claystone was encountered between 3.70mbgl to 3.80mbgl.

A summary of the insitu and laboratory test results in this stratum is given in Table 7.

Table 7: Summary of in-situ and laboratory test results for the London Clay Formation

Soil parameters	Range	Reference
Liquid limit (%)	75 to 85	App E
Plasticity limit (%)	29 to 33	
Plasticity index (%)	42 to 56	
Plasticity term	Very High	
Modified plasticity index (%)	40 to 56	-
Moisture content (%)	31 to 36	App E
Volume change potential	High	-
Consistency index	0.88 to 1.06	
Consistency term	Stiff to Very Stiff	
SPT 'N' values	12 to 19	App C; Fig 3
Undrained shear strength measured by hand vane testing (kN/m^2)	70 to 192	App C; Fig 4
Undrained shear strength inferred from SPT 'N' values (kN/m^2)	52 to 82	Fig 4
Strength term	Medium to Very High	-

5.2 Groundwater

Groundwater was encountered during the site works within the claystone band, at approximately 3.80mbgl. The subsequent monitoring on 4th May 2018, shows the groundwater resting at 1.90mbgl. The results of the groundwater monitoring are given in Appendix C.

It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. Ongoing monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.

5.3 Foundation trial pits

Three foundation inspections were carried out on the mews property at locations dictated by the client (TP1A, TP2A and TP3A) as shown on Figure 2. Foundation pit drawings are presented in Appendix D.

TP1A exposed the foundations of the boundary wall and the northern wall of the mews property. The boundary wall sat on a single brick corbel, its base proven at a depth of 0.40mbgl. A thin layer of concrete (50mm) over another brick structure was then encountered at 0.50mbgl, extending some 0.30m from the wall, to a depth of 1.00mbgl. This later structure was interpreted to be a pre-existing wall.

The northern wall of the property consisted of two brick corbels stepping out 0.15m from the wall, sitting on a concrete that extended across the base of the pit. Breaking out confirmed the base of the concrete extended to a depth of 1.18mbgl.

The foundations exposed in TP2A located on the northern wall of the property consisted of two brick corbels extending 0.14m from the wall. The corbels sat on a concrete screed that extended 0.40m from the wall. Breaking out confirmed that this concrete was a thin screed over brick footing, which extended to a total depth of 0.85mbgl.

A large tree root, some 50mm in diameter was encountered within this trial pit at a depth of around 0.55mbgl, associated with the nearby tree. The root appeared healthy showing no signs of distress.

The foundations of the building encountered within TP3A comprised of concrete with a single step extending approximately 0.2m from the property, to a depth of 0.76mbgl. The trial pit also uncovered the foundations of the boundary wall with 6 Albert Terrace. These showed a brick foundation extending to a depth of 0.25m.

6 GEOTECHNICAL SITE ASSESSMENT

6.1 Engineering considerations

It is understood that the proposed development for the site is to install a basement beneath the footprint of the existing build, to include a pool plant room and a bike room/storage area. The ground floor and first floor of the existing building will be refurbished to include a swimming pool.

The proposed basement will be formed by underpinning the existing foundations with a ground bearing reinforced concrete slab, and the overall depth to the formation level of the proposed basement will be approximately 4m below existing ground floor level.

Pre-construction drawings have been provided by the client and have been included in Appendix B, although as the development is still within planning stages, these may be subject to change.

6.2 Geotechnical hazards

A summary of commonly occurring geotechnical hazards is given in Table 8 together with an assessment of whether the site may be affected by each of the stated hazards.

Table 8: Summary of main potential geotechnical hazards that may affect site

Hazard category (excluding contamination issues)	Hazard status based on investigation findings and proposed development			Engineering considerations if hazard affects site
	Found to be present on site	Could be present but not found	Unlikely to be present and/or affect site	
Sudden lateral changes in ground conditions	✓	Variable depth and composition of made ground across the site.		Likely to affect ground engineering and foundation design and construction
Shrinkable clay soils	✓	Cohesive portion of the made ground with high plasticity and medium volume change potential London Clay Formation of very high plasticity and high volume change potential.		Design to NHBC Standards Chapter 4 or similar
Highly compressible and low bearing capacity soils, (including peat and soft clay)		✓		Likely to affect ground engineering and foundation design and construction
Silt-rich soils susceptible to loss of strength in wet conditions	✓	London Clay with variable silt content		Likely to affect ground engineering and foundation design and construction

Hazard category (excluding contamination issues)	Hazard status based on investigation findings and proposed development			Engineering considerations if hazard affects site
	Found to be present on site	Could be present but not found	Unlikely to be present and/or affect site	
Running sand at and below water table			✓	Likely to affect ground engineering and foundation design and construction
High groundwater table (including waterlogged ground)	✓	Highest recorded groundwater level above the proposed basement formation level		May affect temporary and permanent works
Rising groundwater table due to diminishing abstraction in urban area	✓	Within a critical are of the London Basin in accordance with CIRIA SP69 for deep foundations and basements (See Section 3.3.2)		May affect deep foundations, basements and tunnels
Underground mining			✓	Likely to require special stabilisation measures
Existing sub-structures (e.g. tunnels, foundations, basements, and adjacent sub-structures)	✓	Existing foundations of the current building and party wall of neighbouring property, and foundations of historical structures and services		Likely to affect ground engineering and foundation design and construction
Filled and Made Ground (including embankments, infilled ponds and quarries)	✓	Made ground up to 2.5m thick encountered across site		Likely to affect ground engineering and foundation design and construction
Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates)	✓	See Section 6.5		May affect ground engineering and foundation design and construction

6.3 Foundations

6.3.1 General suitability

The ground conditions encountered beneath the site generally comprised an initial thickness of Made Ground (up to 2.50m), over stiff to very stiff, high to very high strength, silty clay of the London Clay Formation, encountered to the terminal depth of investigation at 7.00mbgl. Groundwater was encountered in BH1A at 3.70mbgl, within a claystone band, with resting level recorded during the monitoring to be at 1.90mbgl.

The new proposed new basement construction will require excavation (including the basement slab) to a depth of around 4.00mbgl, within the medium to high strength, sily clay of the London Clay Formation, below the current groundwater levels.

The sub-structure design and construction will be primarily determined by the proposal to construct a basement beneath the entire footprint of the existing building, and the need to ensure compatibility with the existing and adjoining buildings. Given the presence of groundwater above the proposed formation level, it will be necessary to form an effective cut-off perimeter wall taken sufficiently deep for stability purposes and to control the seepage within the excavation. Furthermore, the basement will need to be designed as a fully water-retaining structure.

The removal of overburden to form the basement will be accompanied by immediate elastic and long term swelling heave of the underlying clay soils. The magnitude of heave will be a function of the depth and breadth of excavation and period of time that elapses between excavation and subsequent construction.

An assessment on potential heave occurring within the clay soils immediately after excavation and over a longer period following construction are discussed within the accompanying Basement Impact Assessment report for the site.

As stated above, the preferred method for the basement construction is by underpinning and a reinforced concrete basement slab, transferring anticipated loading over a greater area, thus reducing the risk of potential differential movements.

The following sections provide recommendations for the design and construction of both foundation types, in addition to the piled foundations, should this option is also considered.

6.3.2 Underpinning

On the basis of the ground conditions encountered, and the information provided by the Engineer, the construction of the new basement will take the underpinning formation level at approximately 4.50m below the existing ground level, within the medium to high strength, silty clay of the London Clay Formation.

A net allowable bearing pressure of 125kN/m^2 can be used for the design of strip foundations with a width of up to 1.5m and constructed at the above depth. The allowable bearing capacity includes an overall safety factor of 3.0 against bearing capacity failure and with total settlements associated with the bearing pressure estimated to be less than 25mm.

The highest groundwater level encountered during the monitoring was at 1.90m below existing ground level, above the proposed basement formation levels, it is therefore considered that dewatering will be required to facilitate foundation excavation. Given the predominantly cohesive nature of the soils, pumping from open sumps should be sufficient to keep the excavations reasonably dry. Given the presence of claystone band between 3.70mbgl and 3.80mbgl, it would be prudent to make allowance for excavation support systems during the groundwork stage of the development.

All foundation excavations should be inspected and any made ground and soft, organic or otherwise unsuitable materials removed and replaced with mass concrete.

6.3.3 Basement raft

Based on the soil profile encountered, the anticipated formation level of the proposed basement (around 4.00m below the existing ground level), the basement raft would be constructed within medium to high, silty clay of the London Clay Formation.

For preliminary design purposes, a net safe bearing pressure in the order of 150kN/m^2 (safety factor F_s=3.0) is considered suitable for a raft foundation, although it will be necessary to check that the associated movements related to the removal of overburden to form the basement structure (heave), and subsequent settlements following the construction of the new structure are acceptable to the proposed structure and surrounding buildings. As stated in previous sections, this analysis will form a part of the Basement Impact Assessment and will be contained with the BIA report.

Based on the groundwater monitoring records, the proposed basement formation level will be below the groundwater level, therefore allowance should be made in the design and construction of the raft for the resulting uplift hydrostatic pressures. Dewatering will also be required during the construction.

6.3.4 Piled foundations

Recommendations for the design and construction of pile foundations in relation to the ground conditions are set out in Table 9.

Table 9: Design and construction of piled foundations

Design/construction considerations	Design/construction recommendations	
Pile type	The construction of both rotary bored and CFA piles is considered technically feasible at this site	
Possible constraints on choice of pile type	Given the close proximity of the site to adjacent properties the use of driven piles will not be acceptable due to ground heave, vibration and noise related problems.	
Hard strata	An allowance should be made for chiselling thin 'rock' bands (claystone) within the London Clay Formation. Claystone was encountered in borehole BH1A, between 3.70mbgl and 3.80mbgl.	
Made Ground	For the purpose of this assessment, the contribution of the made ground has been ignored in the calculations.	
Temporary casing	Given the presence of groundwater within the claystone band at relatively shallow depth, bored piles will require temporary casing throughout their depth. Alternatively, the use of continuous-flight-auger (CFA) injected bored piles or driven piles usually overcomes this issue	
Pile design parameters for London Clay Formation	Undrained shear strength c_u (kN/m^2)	75+9z kN/m^2 – up to 7.0mbgl (between 28.93 and 26.43mAOD) 103+6.6z kN/m^2 – below 7.0mbgl (below 26.43mAOD) where z = depth into clay
	Adhesion factor α	0.5

Design/construction considerations	Design/construction recommendations	
	Bearing Capacity Factor (N_c)	9.0
General parameters	Limiting Shaft Friction (kN/m^2)	110
	Limiting concrete stress	$7.5N/mm^2$
	Global margin of safety	2.6
Special precautions relating to bored pile shafts and bases	Bored pile concrete should be cast as soon after completion of boring as possible and in any event the same day as boring. Prior to casting the base of the pile bore should be clean, otherwise a reduced safe working load will be required. Similarly, if the pile bore is left open the shaft walls may relax/soften, leading to a reduced safe working load.	

The design procedure for piles varies considerably, depending on the proposed type of pile. However, for illustrative purposes Table 10 gives likely working pile loads for traditional bored, cast-in-situ concrete piles of various diameters and lengths, based on the design parameters given in Table 9

Table 10: Illustration of typical pile working loads for bored cast-in-situ piles at 4mbgl

Typical pile working loads (kN)				
Depth of pile below proposed basement level (m)	Pile diameter			
	300 mm	350 mm	400 mm	450 mm
5.0[1)]	116	141	167	195
7.5[1)]	177	212	250	289
10.0[1)]	245	293	343	395
12.5[1)]	321	382	446	512
15.0[1)]	404	480	559	640

[1)] pile toe below the final depth of the current investigation (capacities based on the information from the original investigation)

It should be stressed that the above capacities do not take into consideration pile group effects, which is more pronounced for a large number of closely spaced piles.

The preliminary pile loads given above are based on an undrained method of analysis and should be checked against an effective stress approach due to the significant unloading associated with the basement excavation. It should be noted that an effective stress approach might return lower capacities than indicated above.

6.4 Basement retaining wall design parameters

In order to facilitate basement construction it may be necessary to construct some form of retaining wall around basement perimeter. Either a sheet pile or a secant piled retaining wall would appear suitable options for the site conditions. On the basis of the ground

investigation information the following soil parameters in Table 11, are recommended for retaining wall design purposes.

Table 11: Retaining wall design parameters

Soil type	C_U (kN/m^2)	SPT 'N' value	Unit weight (kN/m^3)	Short Term Characteristics		Long Term Characteristics	
				C_U (kN/m^2)	ϕ (°)	c' (kN/m^2)	ϕ' (°)
Made Ground	-	10 to 12	17[1)]	-	28[1)]	-	28[1)]
London Clay	58 at surface (30.93mAOD) 103 at 7.0mbgl (26.43mAOD)	12 to 19	20	58 + 9z; z-depth into clay	-	2[2)]	23[2)]

[1)] estimated values based on predominantly granular in nature

[2)] presumed values – no drained analysis undertaken

Groundwater was encountered within the claystone band at 3.70mbg, with resting recorded level at 1.90mbgl, above the proposed basement formation level, therefore temporary groundwater control will be required to allow construction of the basement. Furthermore, allowance should be made for the resulting hydrostatic pressures acting behind retaining structures. The new basement construction must be designed to be fully sealed to prevent any future groundwater ingress unless allowance is made for an effective drainage system in accordance with BSI 8102

In order to prevent damage to adjacent structures, the design of the retaining wall and basement excavation must address the risk of excessive deformation of the wall and bracing, both in the temporary and permanent condition, to ensure that any horizontal and vertical soil movements around and below the excavation remain within acceptable levels.

6.5 Chemical attack on buried concrete

This assessment of the potential for chemical attack on buried concrete at the site is based on *BRE Special Digest 1: Concrete in aggressive ground*, which represents the most up-to-date guidance on this topic currently available in the UK.

The desk study and site walkover indicate that, for the purposes of assessing the aggressive chemical environment of the site, the site should be considered as comprising natural ground likely to contain pyrite.

As the site is considered likely to contain pyrite, the characteristic percentage of oxidisable sulphide (OS) in the soil has been calculated as 0.91%, which is above the 0.3% limit set in *BRE Special Digest 1*. As such, the soil can be considered pyritic.

Based on the characteristic water-soluble sulphate and total potential sulphate concentrations in the soil of 2810mg/l (SO_4) and 1.77% (SO_4), the Design Sulphate (DS) Class for the London Clay Formation is DS-4, as determined from Table C1 of *BRE Special Digest 1*.

Based on the mobile groundwater conditions and the characteristic pH values measured in the London Clay, the aggressive chemical environment for concrete (ACEC) is AC-4.

7 WASTE CLASSIFICATION

7.1 Wastes for landfill disposal

Wastes require pre-treatment prior to disposal at landfill. Pre-treatment must be a physical, thermal, chemical or biological process (including sorting) that changes the characteristics of the waste to reduce its volume, reduce its hazardous nature, facilitate its handling and enhance its recovery.

The latest, edition of the EA's 'Technical Guidance WM3' (2015) Guidance on the classification and assessment of waste, requires that within a mixed waste* the separately identifiable wastes are assessed separately. Mixing of different types of hazardous waste and hazardous waste with other waste substances is prohibited under the Waste Framework Directive. Wastes that have been mixed must be separated whenever possible.

It is best practice to provide your waste carrier (or the disposal site) with details of how the waste has been treated. Your waste carrier may provide a pre-treatment confirmation form or space on the waste transfer note to detail the pre-treatment.

The classification of waste soil is a two-stage process, the first being an assessment of whether the soil is considered hazardous or not following the guidance within Technical Guidance WM3. For off-site disposal to landfill the results of Waste Acceptance Criteria (WAC) testing must then be reviewed to establish if the soil is acceptable at the relevant class of landfill or requires pre-treatment to reduce specific hazardous properties.

7.1.1 Waste acceptance criteria

All inert, stable non-reactive hazardous and hazardous wastes have limit values (waste acceptance criteria) set out in legislation that must be met before that class of landfill can accept the waste. Currently, no WAC are in place for non-hazardous waste.

Soil and other materials that are found not to be hazardous may be classified as either non hazardous or inert. In order to determine whether they can be classed as inert the soil must be tested and found to be below the inert waste acceptance criteria.

7.1.2 Waste sampling plan

Technical Guidance WM3 sets requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity.

RSK recommends that a Sampling Plan be prepared to support any waste classifications and hazardous waste assessments, prior to development.

7.1.3 Preliminary waste assessment

Given the level of data obtained, scale of the development and heterogeneity of the site soils the following assessment should be considered indicative and further assessment should be undertaken following the preparation of a Waste Sampling Plan.

Envirolab (an RSK company) has developed a waste soils characterisation assessment tool (HASWASTE), which follows the guidance within Technical Guidance WM3. The analytical results (from testing discussed within Section 4.1.3) have been assessed using this tool for potential off-site disposal of materials in the future.

Two representative samples of the made ground BH1A (1.50) and TP2A (0.50) from within the depth of the proposed basement development region were analysed against the testing regime of a hazardous waste suite (including Metal, Asbestos, TPH and PAH presence).

None of the samples were classified as hazardous waste. Therefore to determine whether waste might be classified as inert or non-hazardous WAC testing has been undertaken on a sample of Made Ground from TP2A (0.50).

The results obtained are marginally above the leaching limit values for inert waste in regards to lead, and therefore the made ground is unlikely to be suitable for disposal within an inert landfill and should be disposed of at a landfill licensed to take non-hazardous waste.

7.2 Landfill tax

Waste producers disposing of material to landfill are required to pay landfill tax by HM Revenue and Customs.

The tax is chargeable by weight (tonnage) and two rates apply, either standard or lower rate. The lower rate only applies to those less polluting wastes as set out in the Landfill Tax (Qualifying Material) Order 2011, which include naturally occurring rock and soil, concrete, some minerals, some furnace slags and ash, and some low-activity organic compounds. Evidence confirming that the waste qualifies for the lower rate will be required, and standard rate tax will apply for the whole waste load for any loads of mixed waste.

Currently (since 1 April 2017), standard rate landfill tax is £86.10 per tonne.

The lower rate of landfill tax applicable to less polluting wastes (i.e. ‘inert’ wastes) remains at £2.70 per tonne.

Material disposed of at a soil treatment centre will not be subject to landfill tax.

7.3 Recommendations

RSK recommends that consideration as to how potentially waste soils will be dealt with as part of this development/remediation is given as early in the project planning process as possible. Such planning can lead to cost savings where potentially waste soils are viewed as a resource and retained on-site as part of the development. We also recommend, where off-site disposal is being considered, that appropriate facilities are identified and discussions initiated to confirm suitability of the facility to take the material. Potentially, these may include soil treatment facilities as well as landfills.

RSK can provide specialist advice to assist in this process, which can be complex and subject to regular regulatory change.

8 CONCLUSIONS AND RECOMMENDATIONS

The site investigation has confirmed the site to be underlain typically by some 2.50m thickness of made ground, over high to very high strength, silty clay (London Clay Formation) proven to the terminal depth of investigation at 6.45mbgl. Groundwater was encountered in BH1A at 3.70mbgl, with reasing level at 1.90mbgl.

The formation level of the new basement is estimated to lie at around 4.00m below existing ground level, within the London Clay Formation and below the current groundwater level.

Underpinning and a reinforced concrete basement slab are considered to be preferred foundation solution.

Given the presence of a claystone band at 3.70mbgl within the London Clay Formation, it is recommended that allowance be made for excavation support systems during the groundwork stage of the development.

Temporary groundwater control will be necessary to allow construction of the basement, and allowance should be made in the design and construction for the hydrostatic pressures expected to act behind retaining structures and underneath the slabs.

The basement structure will need to incorporate suitable waterproofing measures and reference should be made to BS 8102:2009 ‘Code of practice for protection of below ground structures against water from the ground’ for further guidance.

Should the ground conditions will not be significantly disturbed during the construction phase of construction, and the concrete is not into contact with the London Clay soils, the Design Sulphate Class for the site DS-4 with an Aggressive Chemical Environment for Concrete classification of AC-4 can be adopted for the proposed development.

Most of the material underlying the lower ground floor and proposed basement (including both made ground and natural soils) will be removed off-site as part of the new basement construction.

The Waste Acceptance Criteria (WAC) testing result indicates that the made ground is not suitable for disposal at an inert landfill, and should be disposed of at a landfill licensed to take non-hazardous waste.

Natural soils (i.e. the London Clay Formation) will be classified as Inert Waste under the EA’s ‘Technical Guidance WM3’ (2015).

BIBLIOGRAPHY

British Geological Survey (2006), Sheet Number 256 Solid and Drift, 1:50,000 Scale.

British Standards Institution (BSI) (1990), 'BS 1377:1990. Methods of test for soils for civil engineering purposes'.

British Standards Institution (2015), 'BS 5930:2015. Code of practice for ground investigations'.

British Standard Institution (BSI) (2015), 'BS 8485:2015. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings '.

British Standards Institution (2011), 'BS 10175:2011 + A2:2017. Investigation of potentially contaminated sites: Code of practice'.

Building Research Establishment (2005), *BRE Special Digest 1: Concrete in aggressive ground* (London: BRE).

Environment Agency (2015), 'Technical Guidance WM3. Guidance on the classification of and assessment of waste. 1st Edition.

Environment Agency (2004), *Model Procedures for the Management of Contaminated Land. Contaminated Land Report Number 11 (CLR11),* September (Bristol: Environment Agency).

Environment Agency (2010), 'GPLC1 – Guiding Principles of Land Contamination', 'GPLC2 – Frequently Asked Questions, Technical Information, Detailed Advice and References', and 'GPLC3 – Reporting Checklists', all March.

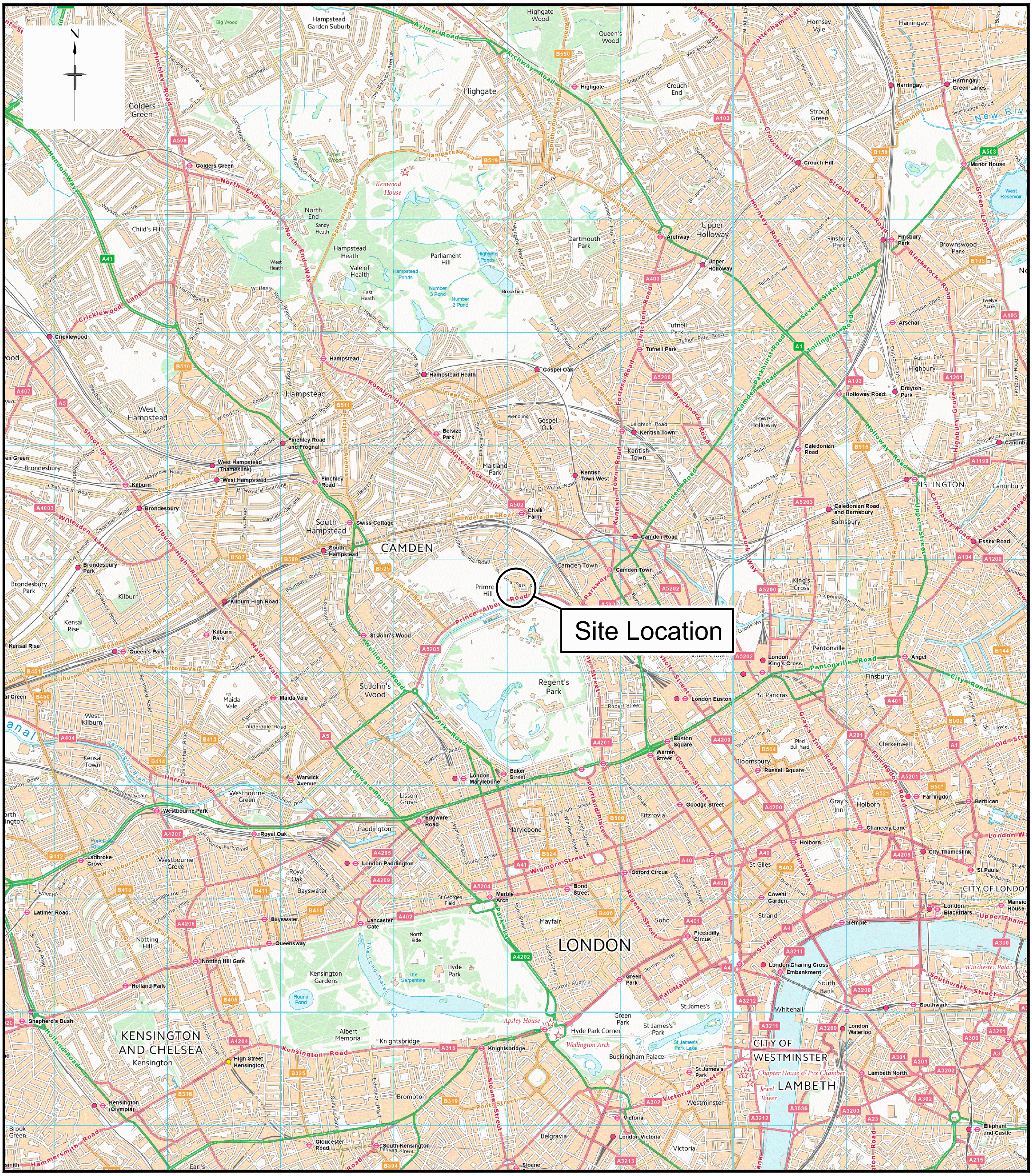
Environment Agency www.environment-agency.gov.uk/.

Landmark Information Group (2017), 'Envirocheck report reference 116181125_1, dated March 2017.

Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001), *CIRIA C552. Contaminated Land Risk Assessment: A Guide to Good Practice* (London: CIRIA).

Simpson, G., Blower, T., Craig, R. N. and Wilkinson, W. B. (1989), *CIRIA Special Publication 69. The engineering implications of rising groundwater levels in the deep aquifer beneath London* (London: CIRIA).

FIGURES



Contains Ordnance Survey data © Crown copyright and database right 2013

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client: MR. MARK GOLINSKY

Project Title: 6 ALBERT TERRACE MEWS, PRIMROSE HILL, LONDON

Drawing Title: SITE LOCATION PLAN

Rev	Drawn	Date	Checked	Date	Approved	Date
01	AP	26.03.18	CJB	26.03.18	CJB	26.03.18

Dimensions	Scale	Original Size
m	1:50,000	A4

Project Number	Drawing File	Drawing Number
29841 - R01 (00)	29841 - SLP.dwg	FIGURE 1

LEGEND

- Borehole location
- Trial pit location

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
P1	19.03.18	FIRST ISSUE	AP	JG	JG

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

MR. MARK GOLINSKY

Project Title

6 ALBERT TERRACE MEWS

Drawing Title

EXPLORATORY HOLE
LOCATION PLAN
ALBERT TERRACE MEWS

Drawn	Date	Checked	Date	Approved	Date
AP	19.03.18	JG	19.03.18	JG	19.03.18

Scale	Orig Size	Dimensions
1:100	A3	m

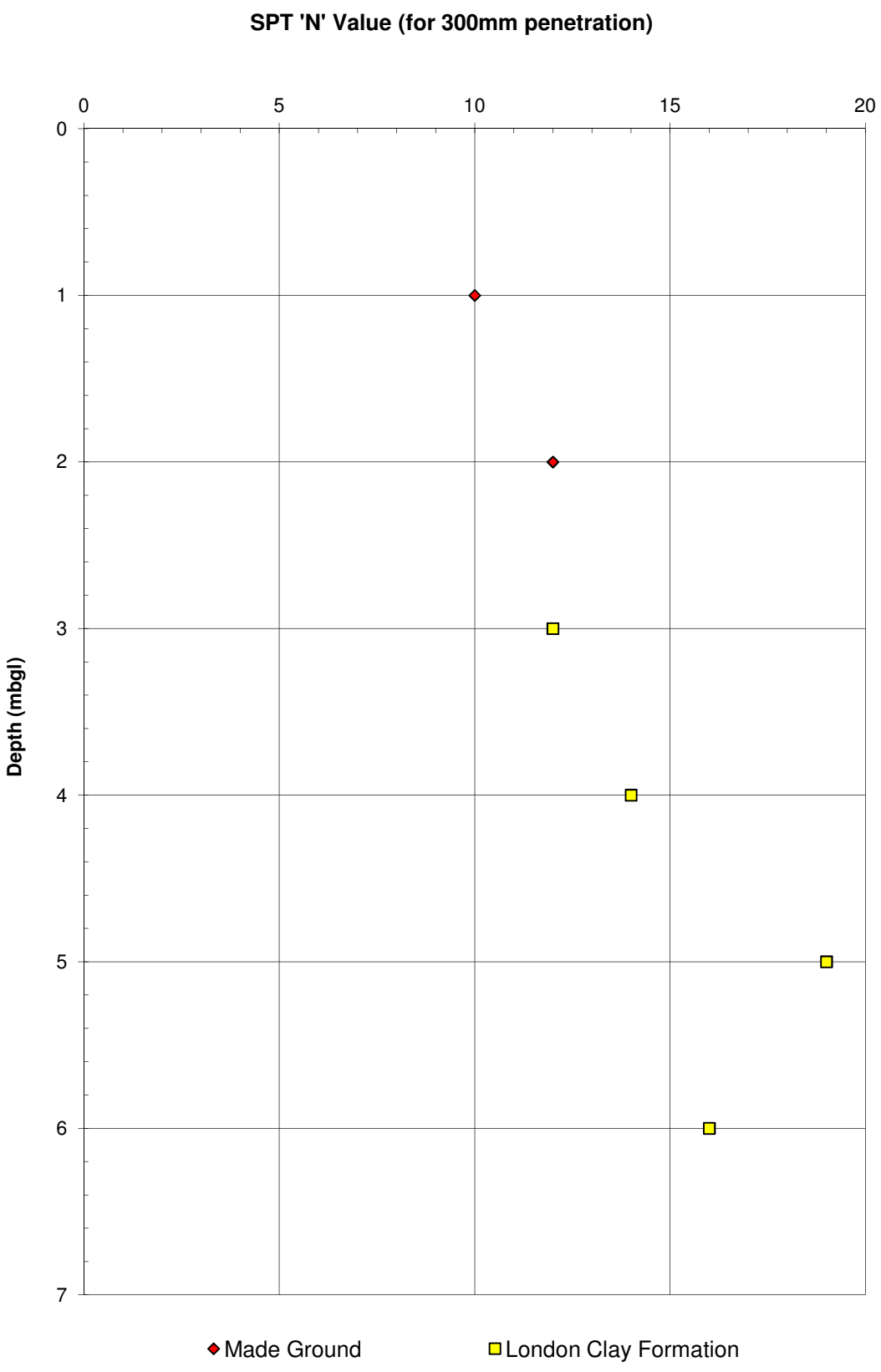
Project No.	Drawing File
29841 - R01(01)	29841 - (R01-00) Fig 2.dwg

Drawing No.	Rev.
FIGURE 2	P1

Scale

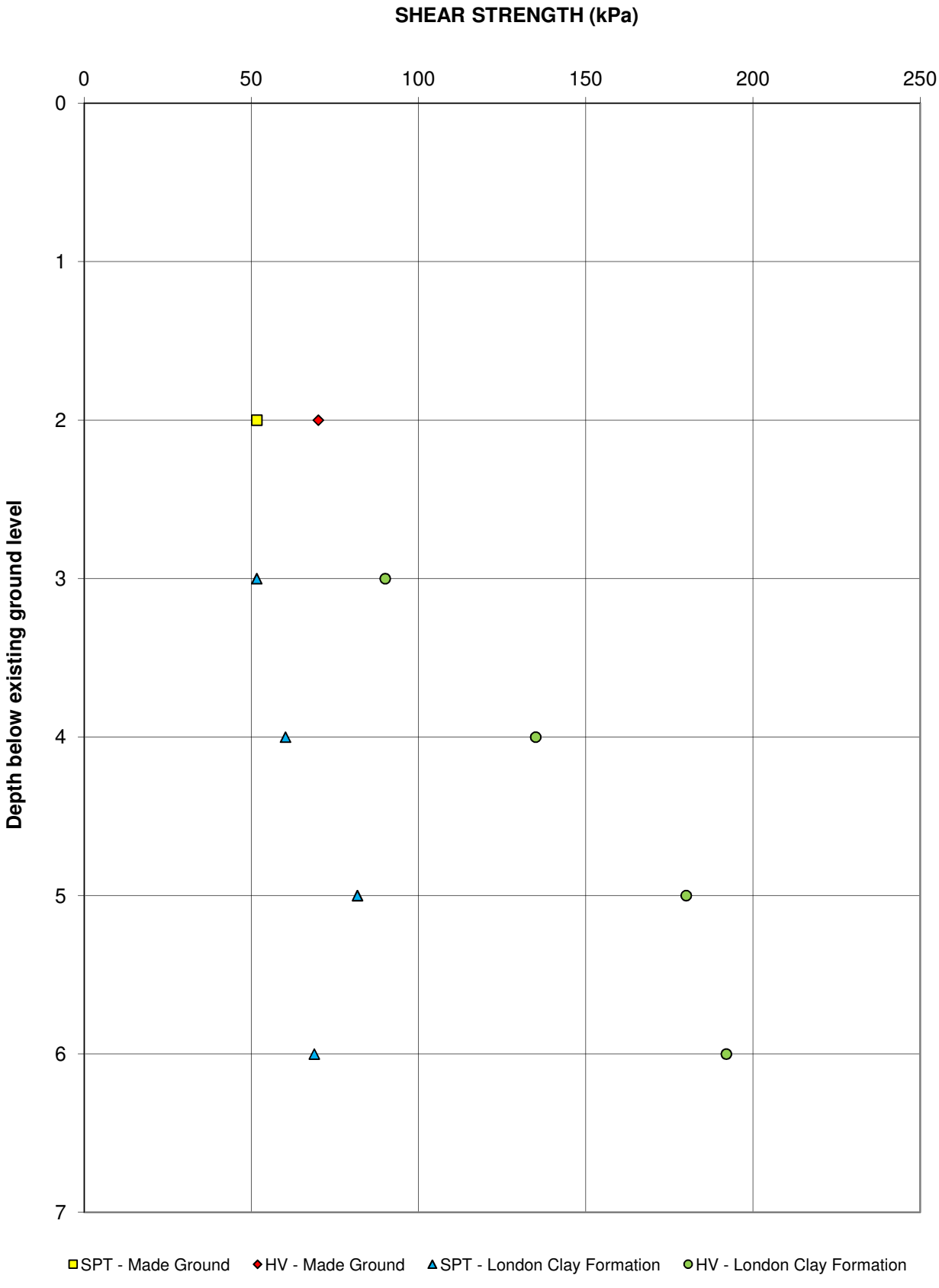
0 1 2 3 4 5m

RSK	SPT 'N' VALUES vs DEPTH		
Site: 6 Albert Terrace Mews	**Client:** Mr. Mark Golinsky	**Job Number:**	29841
		Figure:	3



SHEAR STRENGTH vs DEPTH

Site:	Client:	Job Number:	29841
6 Albert Terrace Mews	Mr. Mark Golinsky	Figure:	4



APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Mr. Mark Golinsky (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
PROPOSED DEVELOPMENT PLANS

Scale 1 : 125

0 1 2 3 4 5 6 7 8 9 10m

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom
Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Drawn	Date	Checked	Date	Approved	Date
ASC	29.06.18	ST	29.06.18	ST	29.06.18

Scale	Orig Size	Dimensions
1:125	A3	m

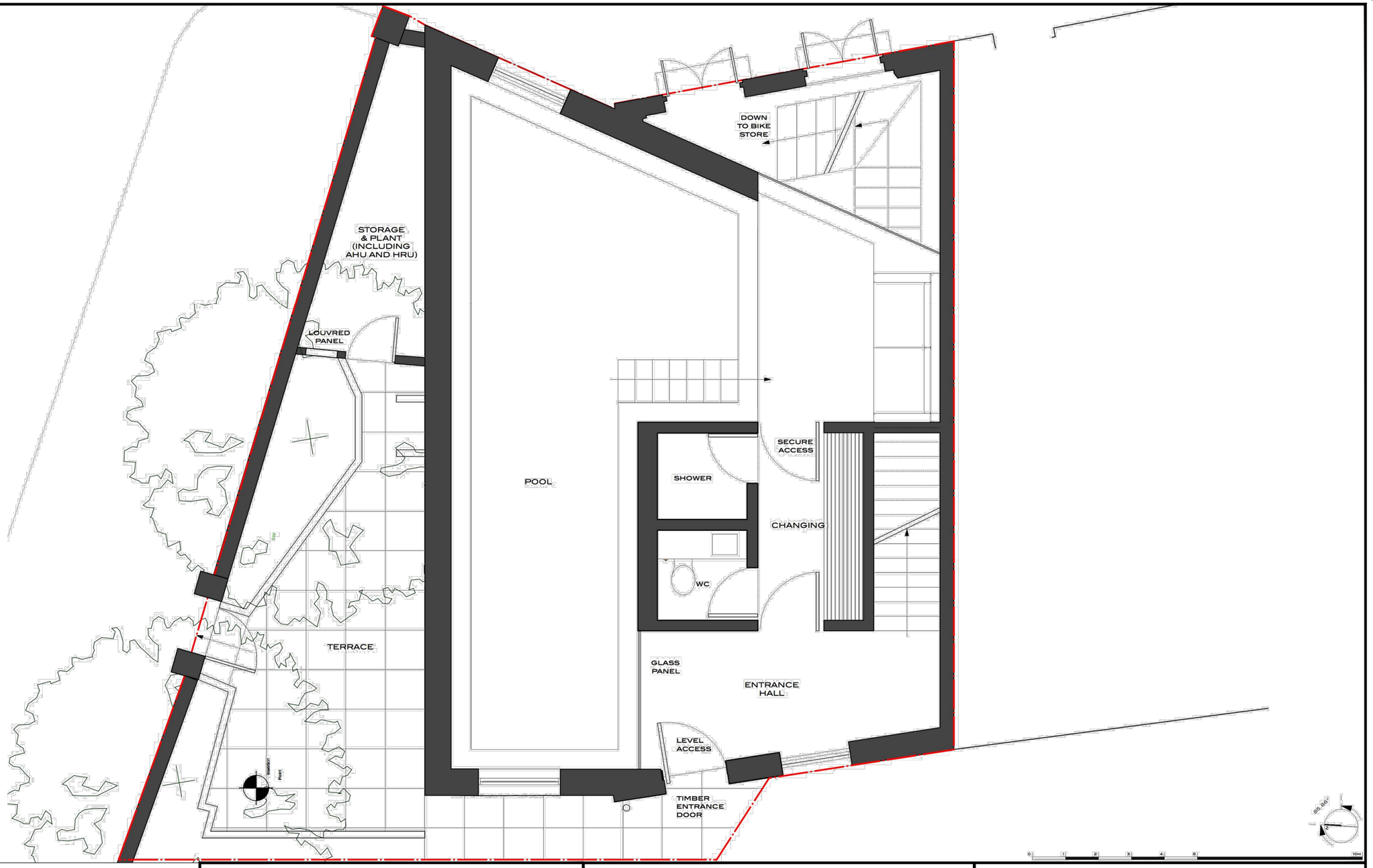
Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS,
PRIMROSE HILL, LONDON

Drawing Title
PROPOSED
BASEMENT PLAN

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) App B.dwg

Drawing No.	Rev.
APPENDIX B.1	P1



Scale 1 : 125

0 1 2 3 4 5 6 7 8 9 10m

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom
Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Drawn	Date	Checked	Date	Approved	Date
RCS	16.05.18	ST	16.05.18	ST	16.05.18

Scale	Orig Size	Dimensions
1:125	A3	m

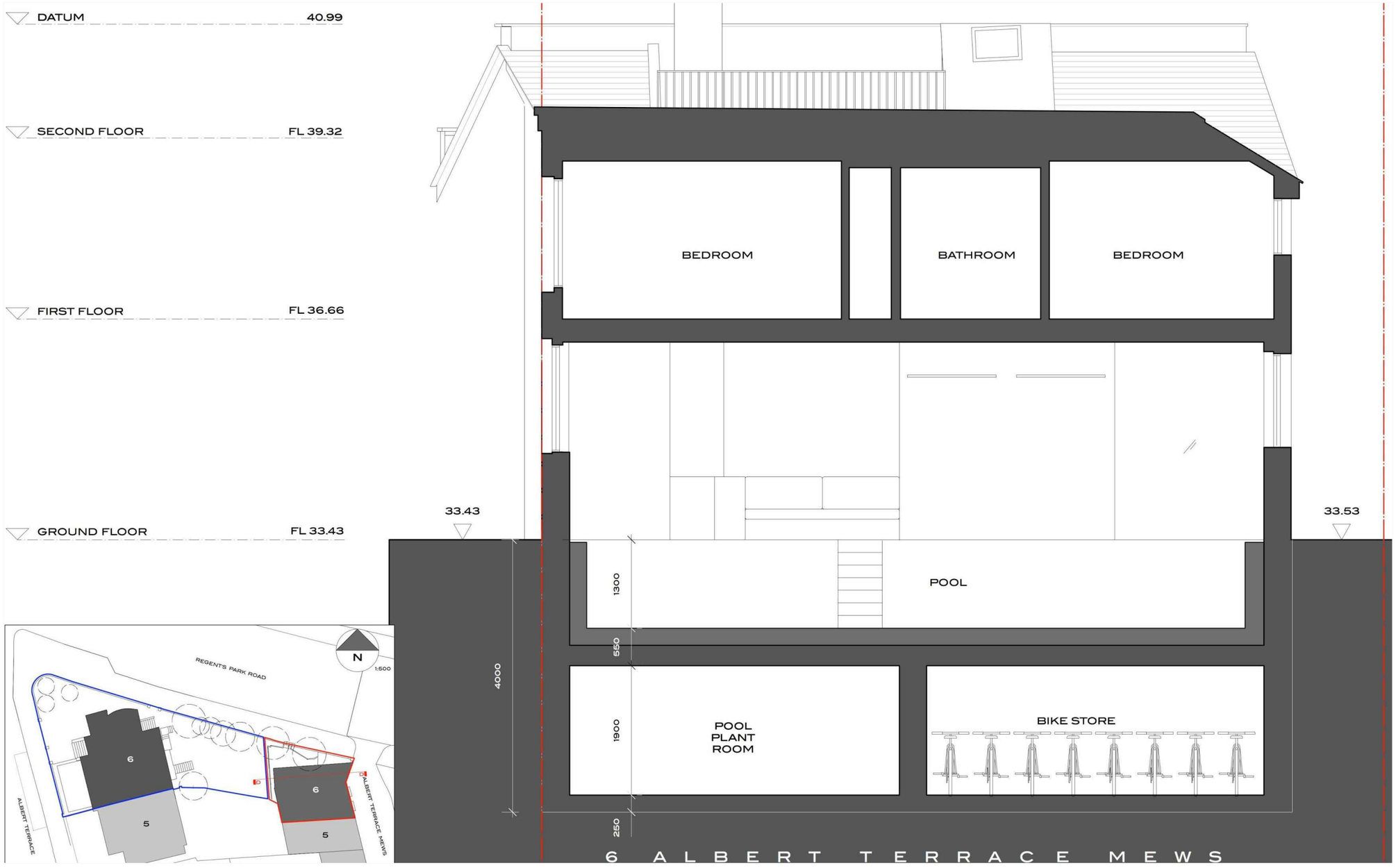
Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS,
PRIMROSE HILL, LONDON

Drawing Title
PROPOSED
GROUND FLOOR PLAN

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) App B.dwg

Drawing No.	Rev.
APPENDIX B.2	P1



Scale 1 : 125

0 1 2 3 4 5 6 7 8 9 10m

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Drawn	Date	Checked	Date	Approved	Date
ASC	29.06.18	ST	29.06.18	ST	29.06.18

Scale	Orig Size	Dimensions
1:125	A3	m

Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS,
PRIMROSE HILL, LONDON

Drawing Title
PROPOSED
SECTION D-D

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) App B.dwg

Drawing No.	Rev.
APPENDIX B.3	P1

DATUM 40.99

SECOND FLOOR FL 39.32

FIRST FLOOR FL 36.66

GROUND FLOOR FL 33.43

Scale 1 : 125

0 1 2 3 4 5 6 7 8 9 10m

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Drawn	Date	Checked	Date	Approved	Date
ASC	29.06.18	ST	29.06.18	ST	29.06.18

Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS,
PRIMROSE HILL, LONDON

Drawing Title
PROPOSED
SECTION E-E

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) App B.dwg

Scale	Orig Size	Dimensions
1:125	A3	m

Drawing No.	Rev.
APPENDIX B.4	P1

APPENDIX C
EXPLORATORY HOLE RECORDS AND GROUNDWATER MONITORING RECORDS

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
6 Albert Terrace Mews	**Mr. Mark Golinsky**	**BH1A**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
29841	**12.03.18**	**---**	**---**	**1** of **2**
	End: **12.03.18**			

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20	1	ES	1xT1xV1xJ			TOPSOIL: Dark brown slightly sandy CLAY with frequent rootlets and roots (5mm in diameter) and grass cover.	(0.30) 0.30	
							MADE GROUND: Yellowish brown gravelly SAND. Sand is fine to coarse. Gravel is angular fine of flints occasional shell fragments.	0.40	
	0.50-1.00	2	ES	1xT1xJ1xV			MADE GROUND: Dark brown slightly clayey gravelly SAND. Sand is angular to subrounded fine to coarse of brick clinker flint and sandstone with occasional shell fragments.	(0.90)	
	1.00-1.45	1	SPT	N=10			1.00m : at 1.00m occasional cobbles of brick and flint 8-10cm.	1.30	
							MADE GROUND: Light yellow SAND and GRAVEL. Sand is fine to coarse. Gravel is possible concrete screed.	1.40	
	1.50	3	ES	1xT1xV1xJ			MADE GROUND: Stiff mottled grey and black slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of flint brick clinker and occasional granite. Occasional rootlets 1-2mm diameter.	(0.80)	
	2.00 2.00-2.45 2.00	1 2	D SPT V	 N=12 c_u=70				2.20	
	2.30	4	ES				MADE GROUND: Reworked firm to stiff mottled grey and brown silty CLAY with occasional rootlets. (REWORKED LONDON CLAY FORMATION)	(0.30) 2.50	
							Initially firm becoming stiff mottled grey and brown silty CLAY with occasional rootlets. (LONDON CLAY FORMATION)		
	3.00 3.00-3.45 3.00	2 3	D SPT V	 N=12 c_u=90				(1.20) 3.70	
							Bluish grey fine to coarse angular to subrounded CLAYSTONE. (LONDON CLAY FORMATION)	3.80	
	4.00 4.00-4.45 4.00	3 4	D SPT V	 N=14 c_u=135			Stiff to very stiff high to very high strength mottled bluish grey and brown silty CLAY. (LONDON CLAY FORMATION)		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Inspection pit to 1.20m.
2. Borehole remained stable.
3. Groundwater encountered at 3.80m within a claystone band.
4. Borehole terminated at 6.45mbgl.
5. Borehole installed with 3.00m plain, 3.00m slotted 25mm pipe to base.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**GEH**	**JGriffin**	

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
6 Albert Terrace Mews	**Mr. Mark Golinsky**	**BH1A**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
29841	**12.03.18**	**---**	**---**	**2** of **2**
	End: **12.03.18**			

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	5.00 5.00-5.45 5.00	4 5	D SPT V	N=19 c_u=180			Stiff to very stiff high to very high strength mottled bluish grey and brown silty CLAY. (LONDON CLAY FORMATION) *(stratum copied from 3.80m from previous sheet)* 4.80m : at 4.80m gypsum crystals present.	(2.65)	
	6.00 6.00-6.45 6.00	5 6	D SPT V	N=16 c_u=192					
							Window sample hole terminated at 6.45m depth.	6.45	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Archway Competitor**	**GEH**	**JGriffin**	

TRIAL PIT LOG

Contract:	Client:	Trial Pit:
6 Albert Terrace Mews	**Mr. Mark Golinsky**	**TP1A**

Contract Ref:	Start: **12.03.18** End: **13.03.18**	Ground Level:	Co-ordinates:	Sheet:
29841		**---**	**---**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Concrete screed.	0.05	
						MADE GROUND: Dark brown very clayey SAND and GRAVEL. Gravel is of brick concrete and flints with medium cobble content of brick and concrete.	(0.95)	
							1.00	
						Trial pit terminated at 1.00m depth due to a concrete slab. Slab broken out and determined to a depth of 1.18mbgl.		

General Remarks

1. Trial pit remained dry and stable.
2. Trial pit terminated at 1.00mbgl on concrete slab. This was broken out and proven to extend to 1.18mbgl using a road pin.
3. Trial pit backfilled with arisings.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**CJBall**	

TRIAL PIT LOG

Contract:	Client:	Trial Pit:
6 Albert Terrace Mews	**Mr. Mark Golinsky**	**TP2A**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
29841	**12.03.18**	**---**	**---**	**1** of **1**
	End: **12.03.18**			

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Brick cobbles.	0.08	
						MADE GROUND: Orange medium to coarse SAND (sub-base).	0.10	
0.50	1	ES	1xT1xV1xJ			MADE GROUND: Light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick and flints with frequent roots and rootlets throughout. Occasional cobble of brick (15cm). 0.41m : at 0.41m very large cobble of brick 10cm in diameter. 0.54m : at 0.54m very large root 5cm in diameter.	(0.80)	
						Trial pit terminated at 0.90m depth.	0.90	

General Remarks

1. Trial pit remained dry and stable.
2. Trial pit terminated at 0.90mbgl.
3. Trial pit backfilled with arisings and finished in brick paving.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**JGriffin**	

TRIAL PIT LOG

Contract:	Client:	Trial Pit:
6 Albert Terrace Mews	**Mr. Mark Golinsky**	**TP3A**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
29841	**12.03.18**	**---**	**---**	**1** of **1**
	End: **12.03.18**			

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Concrete.	0.08	
						MADE GROUND: Dark brown very clayey SAND and GRAVEL. Sand is fine to coarse. Gravel is fine of brick concrete and ceramic.	(0.72)	
							0.80	
						Orange SAND and GRAVEL. Sand is medium to coarse. Gravel is fine to coarse flints. 0.80m : at 0.80m layers of concrete 300/400/600mm	1.00	
						Trial pit terminated at 1.00m depth.		

General Remarks

1. Trial pit remained dry and stable.
2. Trial pit terminated at 1.00mbgl.
3. Trial pit backfilled with arisings and finished with concrete.

All dimensions in metres | Scale: **1:25**

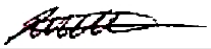
Method Used:	Plant Used:	Logged By:	Checked By:
Hand dug	**Hand tools**	**CJBall**	

IN-SITU WATER MONITORING RESULTS

	Weather	Ground Conditions	Wind Conditions	Air Temperature (°C)	Equipment Used & Remarks
Round 1	Sunny	Dry	Light	20	Dipmeter

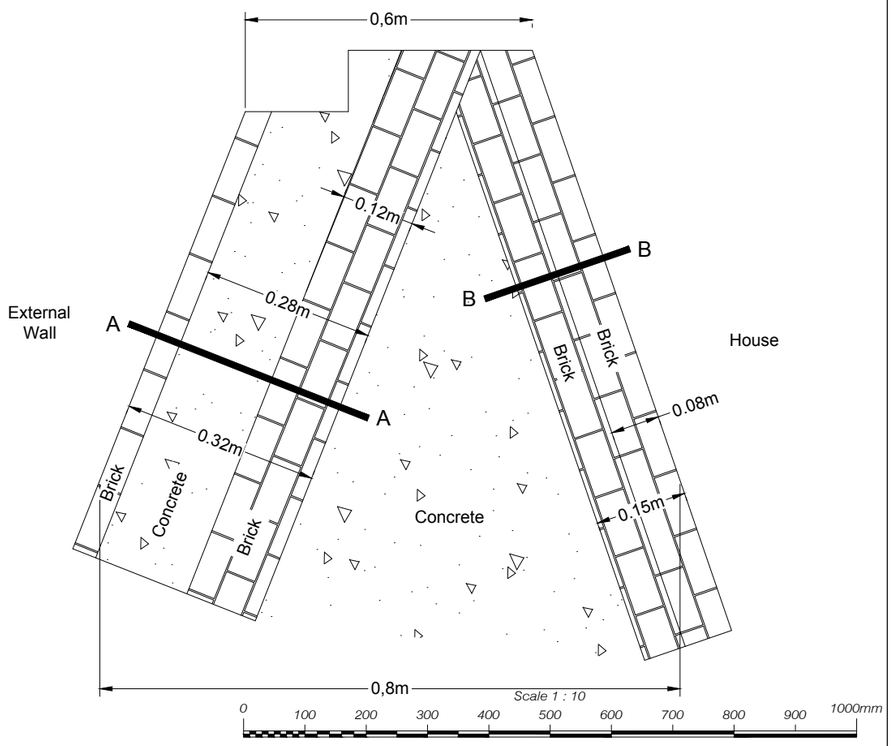
Exploratory Position ID	Pipe Ref	Pipe Diameter	Monitoring Round / Test Number	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring	Water Depth (mbgl)	Remarks
BH1A	1	25	1 / 1	6.00	6.20	3.00 to 6.00	04/05/2018	1.90	

Key: NDA denotes 'no data available'.

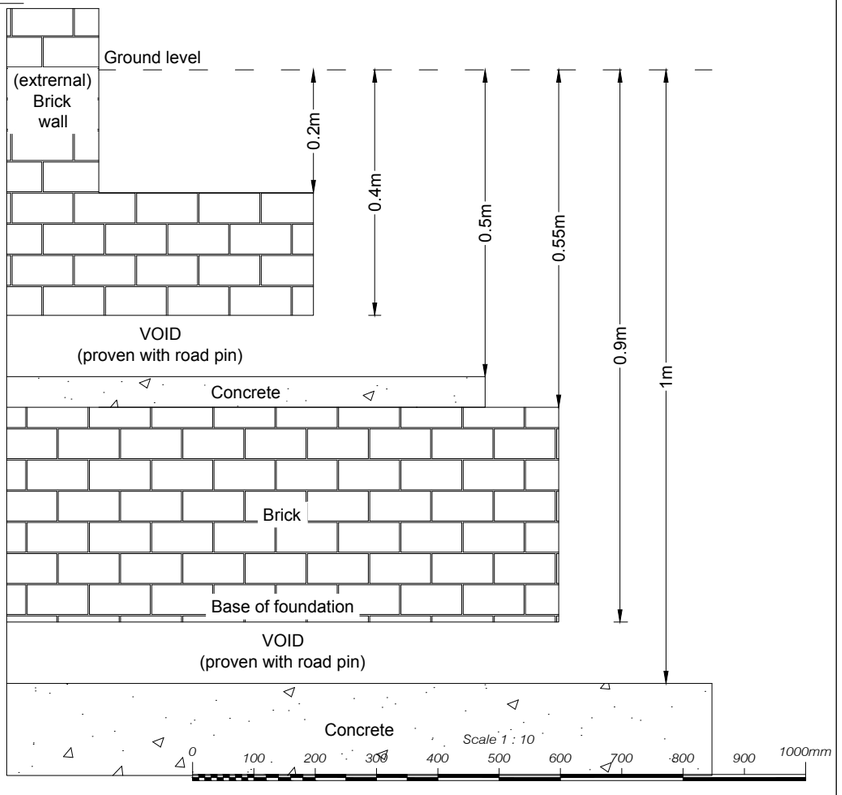
Compiled By	Date	Checked By	Date	Contract Ref:
	**16/05/18**			**29841**
Contract: **6 Albert Terrace Mews**				Page: **1** of **1**

APPENDIX D
TRIAL PIT FOUNDATION RECORDS

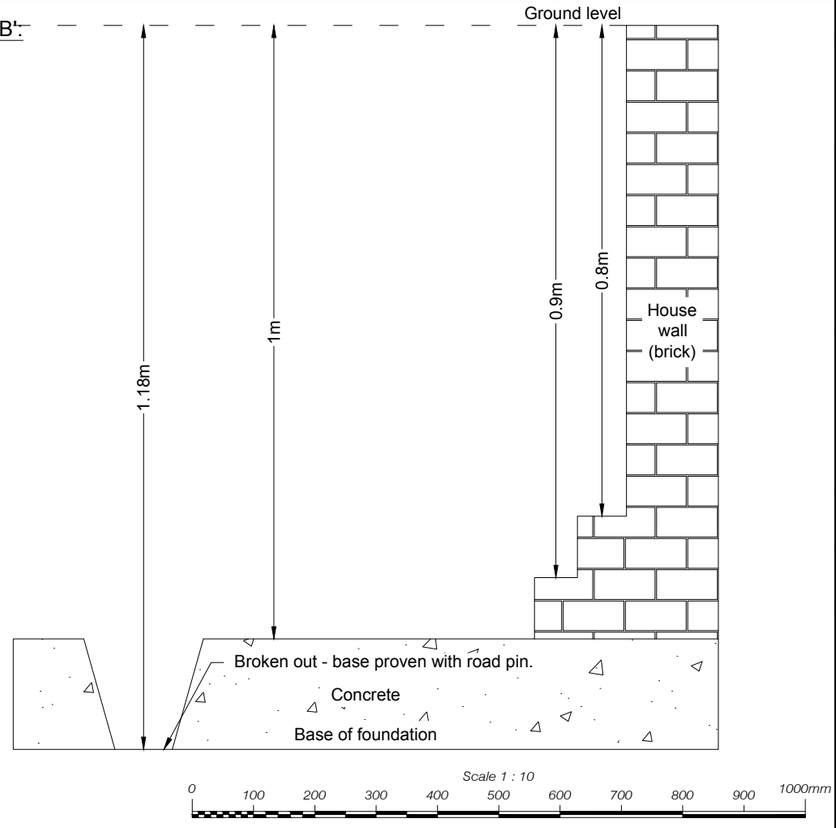
Plan view:
(1:10)



Section A-A':
(1:10)



Section B-B':
(1:10)



LEGEND

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom
Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS

Drawing Title
FOUNDATION INSPECTION PIT TP1A

Drawn	Date	Checked	Date	Approved	Date
AP	19.03.18	JG	19.03.18	JG	19.03.18

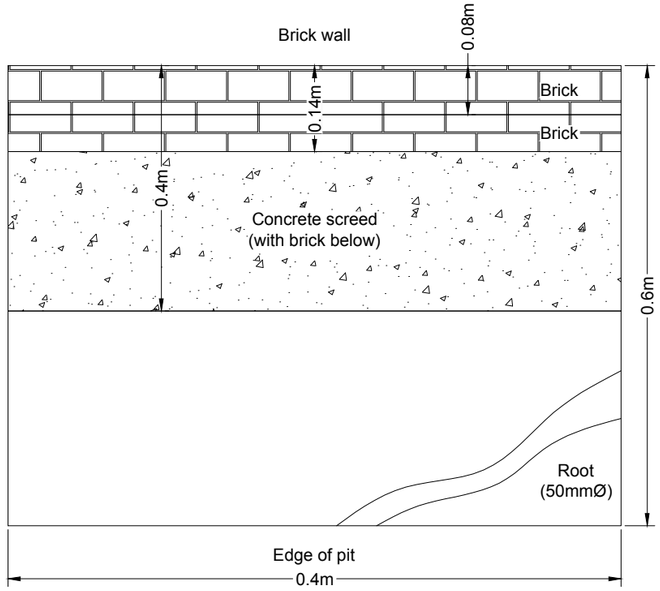
Scale	Orig Size	Dimensions
AS SHOWN	A3	m

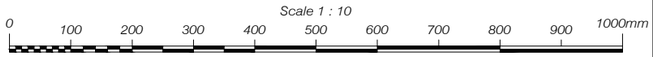
Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) TP.dwg

Drawing No.	Rev.
FIGURE TP1A	P1

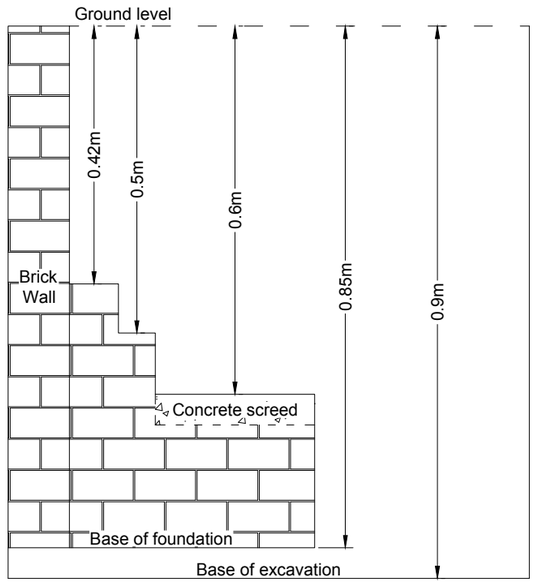
Scale 1 : 10
0 0.1 0.2 0.3 0.4 0.5m

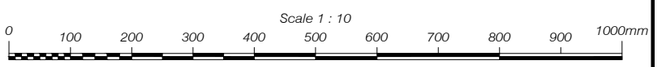
Plan view:
(1:10)





Section A-A':
(1:10)





LEGEND

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

MR. MARK GOLINSKY

Project Title

6 ALBERT TERRACE MEWS

Drawing Title

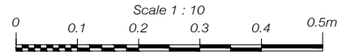
FOUNDATION INSPECTION PIT TP2A

Drawn	Date	Checked	Date	Approved	Date
AP	19.03.18	JG	19.03.18	JG	19.03.18

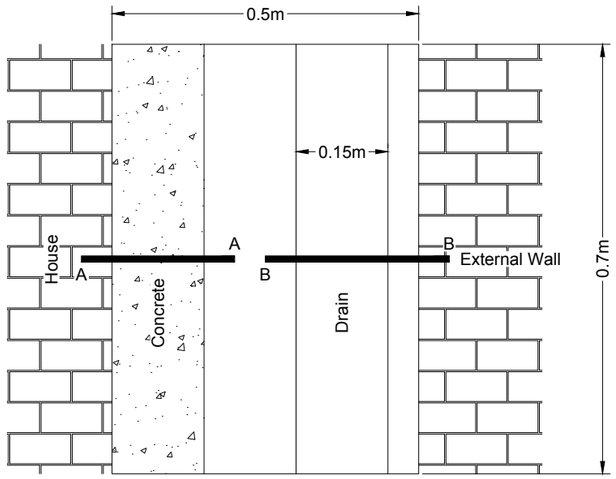
Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) TP.dwg

Drawing No.	Rev.
FIGURE TP2A	P1

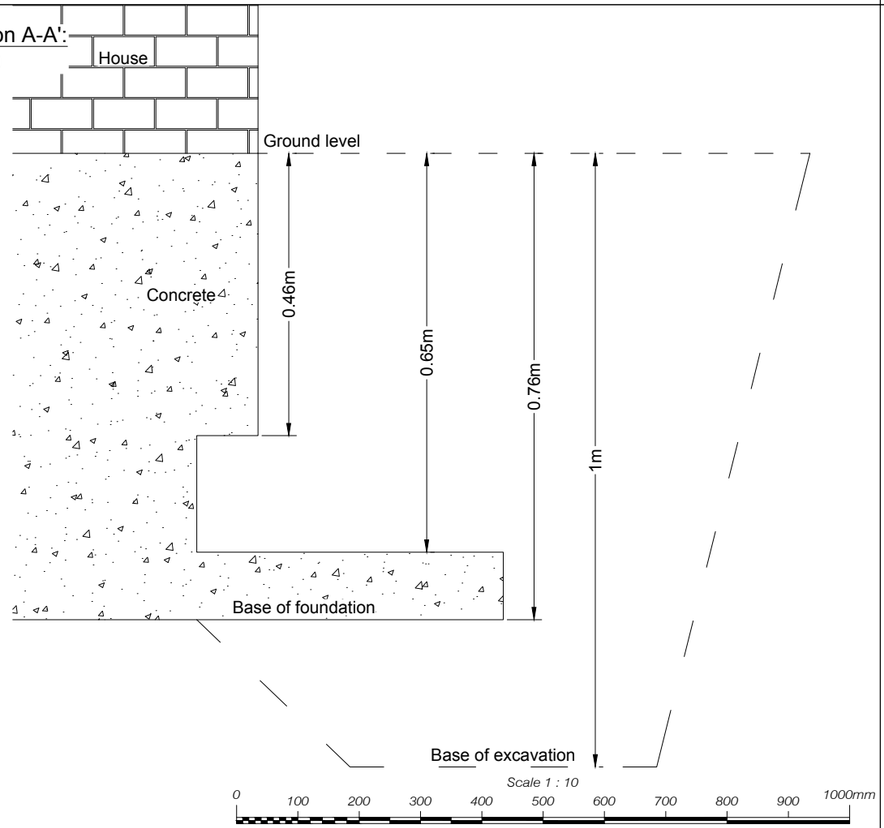


Plan view:
(1:10)



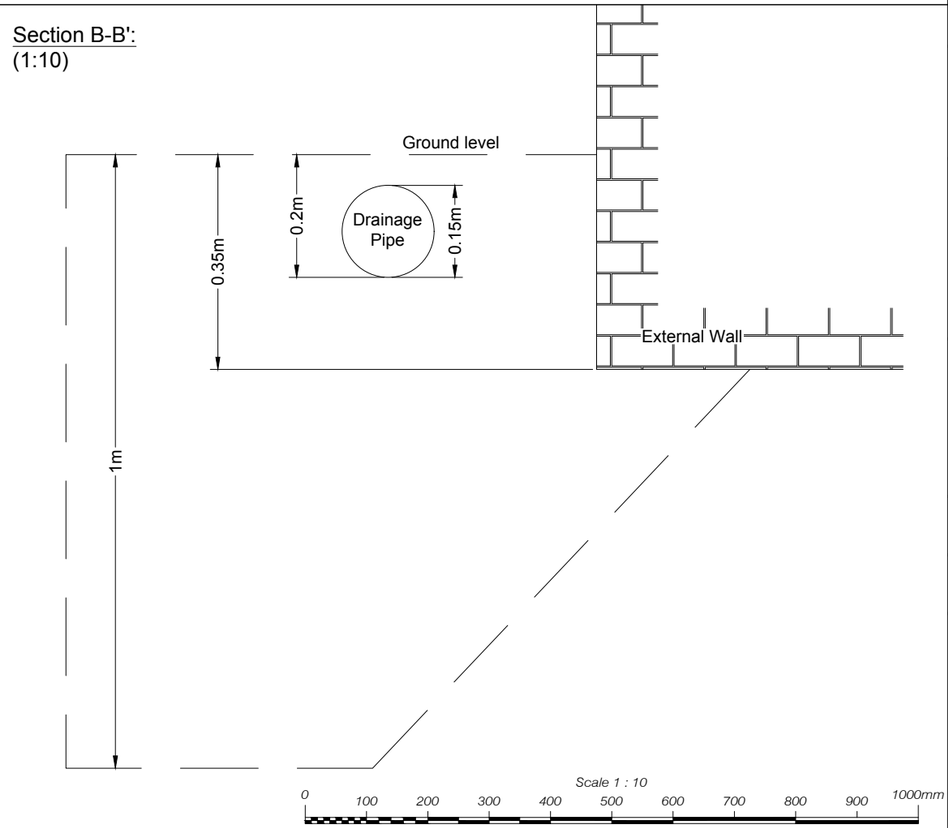
Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

Section A-A':
(1:10)



Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

Section B-B':
(1:10)



Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

LEGEND

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom
Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client
MR. MARK GOLINSKY

Project Title
6 ALBERT TERRACE MEWS

Drawing Title
FOUNDATION INSPECTION PIT TP3A

Drawn	Date	Checked	Date	Approved	Date
AP	19.03.18	JG	19.03.18	JG	19.03.18

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
29841 - R01(00)	29841 - (R01-00) TP.dwg

Drawing No.	Rev.
FIGURE TP3A	P1

Scale 1 : 10
0 0.1 0.2 0.3 0.4 0.5m

APPENDIX E
LABORATORY CERTIFICATES OF GEOTECHNICAL ANALYSIS

TESTING VERIFICATION CERTIFICATE

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **22/03/2018 19:03:00**.

Testing reported after this date is not covered by this Verification Certificate.

Dimitris Xirouchakis

Approved Signatory
Dimitris Xirouchakis (Director of Laboratories)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

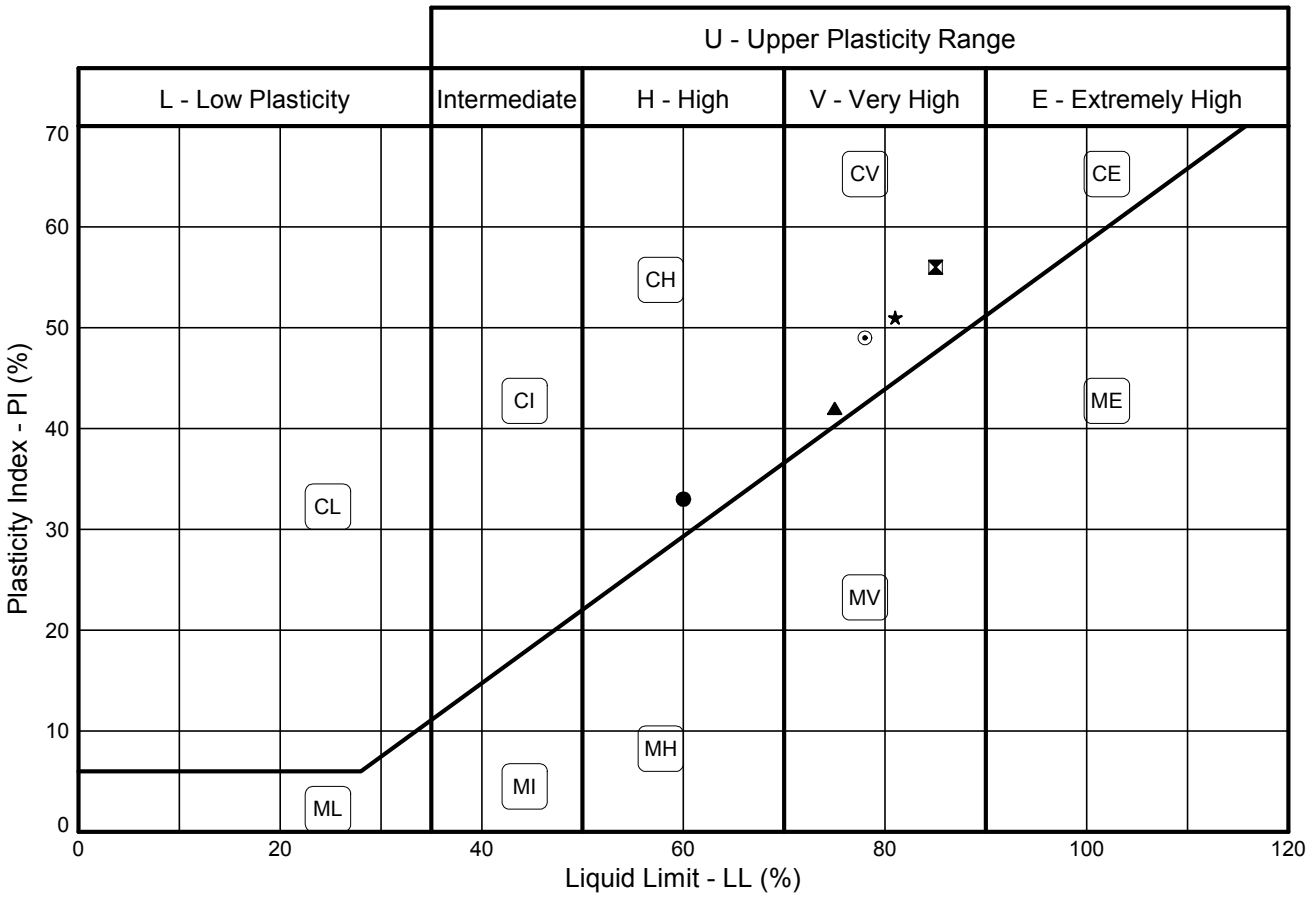
Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

STRUCTURAL SOILS LTD	Contract: **6 Albert Terrace Mews**	Job No: **747958**

PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location	
	Exploratory Position ID	Sample	Depth (m)									
●	BH1A	D	2.00	3.2/4.4/5.3/5.4	4.2.4	22	60	27	33	78	T	
⧓	BH1A	D	3.00	3.2/4.4/5.3/5.4	4.2.4	36	85	29	56	100	T	
▲	BH1A	D	4.00	3.2/4.4/5.3/5.4	4.2.4	31	75	33	42	96	T	
★	BH1A	D	5.00	3.2/4.4/5.3/5.4	4.2.4	35	81	30	51	100	T	
⊙	BH1A	D	6.00	3.2/4.4/5.3/5.4	4.2.4	35	78	29	49	90	T	

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS
Anerley Court
Half Moon Lane
Hildenborough
Tonbridge TN11 9HU

Compiled By		Date
MDStrowger	MICHAEL STROWGER	22/03/18

Contract	Contract Ref:
6 Albert Terrace Mews	747958

AGS

SUMMARY OF CHEMICAL ANALYSES

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Acid Soluble Sulphate (% SO_4)	Aqueous Extract Sulphate (mg/l SO_4)	pH	Total Sulphur (%)	Description
BH1A		D	2.00	0.05	72	7.84	0.04	Brown mottled orange and grey slightly sandy slightly gravelly CLAY
BH1A		D	3.00	0.21	966	7.80	0.07	Brown mottled orange and grey slightly sandy CLAY
BH1A		D	4.00	0.20	2610	7.75	0.37	Brown mottled orange and grey slightly sandy slightly gravelly CLAY
BH1A		D	5.00	0.21	933	8.44	0.06	Brown mottled orange and grey slightly sandy CLAY
BH1A		D	6.00	1.10	2810	7.86	0.59	Brown mottled orange slightly sandy slightly gravelly CLAY

NOTES:- Chemical tests were undertaken by Envirolab

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By		Date	Contract Ref:
MDStrowger	**MICHAEL STROWGER**	**22.03.18**	**747958**
Contract: **6 Albert Terrace Mews**			

APPENDIX F
LABORATORY CERTIFICATES FOR SOIL ANALYSIS AND WASTE ACCEPTANCE CRITERIA

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/01899
Issue Number: 1 **Date:** 21 March, 2018

Client: RSK Environment Ltd Tonbridge
Anerley Court, Half Moon Lane, Hildenborough
Tonbridge
Kent
TN11 9HU

Project Manager: Chris Ball
Project Name: Albert Terrace Mews
Project Ref: 29841
Order No: N/A
Date Samples Received: 15/03/18
Date Instructions Received: 15/03/18
Date Analysis Completed: 21/03/18

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 18/01899

Client Project Name: Albert Terrace Mews

Client Project Ref: 29841

Lab Sample ID	18/01899/1	18/01899/2							Units	Method ref
Client Sample No										
Client Sample ID	BH1A	TP2A								
Depth to Top	1.50	0.50								
Depth To Bottom										
Date Sampled	12-Mar-18	12-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	6A								
% Moisture at <40C$_A$	10.5	18.9							% w/w	A-T-044
% Stones >10mm$_A$	42.3	5.1							% w/w	A-T-044
pH$_D$	8.01	8.05							pH	A-T-031s
Arsenic$_D^{M\#}$	3	8							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	0.7							mg/kg	A-T-024s
Copper$_D^{M\#}$	9	17							mg/kg	A-T-024s
Chromium$_D^{M\#}$	16	34							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D^{M\#}$	27	47							mg/kg	A-T-024s
Mercury$_D$	0.24	0.53							mg/kg	A-T-024s
Nickel$_D^{M\#}$	11	21							mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	2							mg/kg	A-T-024s
Zinc$_D^{M\#}$	28	56							mg/kg	A-T-024s

Envirolab Job Number: 18/01899

Client Project Name: Albert Terrace Mews

Client Project Ref: 29841

Lab Sample ID	18/01899/1	18/01899/2							Units	Method ref
Client Sample No										
Client Sample ID	BH1A	TP2A								
Depth to Top	1.50	0.50								
Depth To Bottom										
Date Sampled	12-Mar-18	12-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	6A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/01899

Client Project Name: Albert Terrace Mews

Client Project Ref: 29841

Lab Sample ID	18/01899/1	18/01899/2							Units	Method ref
Client Sample No										
Client Sample ID	BH1A	TP2A								
Depth to Top	1.50	0.50								
Depth To Bottom										
Date Sampled	12-Mar-18	12-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	6A								
PAH-16MS plus Coronene										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06							mg/kg	A-T-019s
Coronene$_A$	<0.01	<0.01							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
PAH (total 17)$_A$	<0.08	<0.08							mg/kg	A-T-019s
TPH Total with ID + GC Trace										
TPH total (>C6-C40)$_A$	20	14							mg/kg	A-T-007s
TPH FID Chromatogram$_A$	Appended	Appended								A-T-007s
TPH ID (for FID characterisations)$_A$	Unknown profile	Unknown profile								A-T-007s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

envirolab
Units 7 & 8, Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

Final Test Report

Envirolab Job Number:	18/01899		
Issue Number:	1	Date:	21-Mar-18

Client: RSK Environment Ltd Tonbridge
Anerley Court, Half Moon Lane, Hildenborough
Tonbridge
Kent
TN11 9HU

Project Manager:	Chris Ball
Project Name:	Albert Terrace Mews
Project Ref:	29841
Order No:	N/A
Date Samples Received:	15-Mar-18
Date Instructions Received:	15-Mar-18
Date Analysis Completed:	21-Mar-18

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

UKAS TESTING
No. 1247

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

envirolab

Landfill WAC analysis must not be used for hazardous waste classification purposes. This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	18/01899/2				
Client Sample Number								
Client Sample ID				TP2A				
Depth to Top				0.5				
Depth to Bottom								
Date Sampled				12/03/2018				
Sample Type				Soil - ES				
Sample Matrix Code				6A				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	Y	Y	**8.05**		-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**<0.01**		-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**<0.01**		-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**4.7**		-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**0.1**		3	5	6
PAH Sum of 17 (mg/kg)$_A$	A-T-019	N	N	**<0.08**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**<10**		500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1**	**10:1**	**Limit values for compliance leaching test using**		
				mg/l	**mg/kg**	**BS EN 12457-2 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	Y	N	0.004	**0.040**	0.5	2	25
Barium	A-T-025	Y	N	0.028	**0.280**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	**<0.01**	0.5	10	70
Copper	A-T-025	Y	N	0.005	**0.050**	2	50	100
Mercury	A-T-025	Y	N	<0.0005	**<0.005**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.007	**0.070**	0.5	10	30
Nickel	A-T-025	Y	N	<0.001	**<0.01**	0.4	10	40
Lead	A-T-025	Y	N	0.057	**0.570**	0.5	10	50
Antimony	A-T-025	Y	N	0.001	**0.010**	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	**<0.01**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.007	**0.070**	4	50	200
Chloride	A-T-026	Y	N	2	**17**	800	15000	25000
Fluoride	A-T-026	Y	N	0.9	**9.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	7	**67**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	56	**560**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<0.2	**<200**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	Y	6.8				
Conductivity (µS/cm)	A-T-037	N	N	113				
Mass Sample (kg)				0.215				
Dry Matter (%)	A-T-044	N	N	81.1				

Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation

APPENDIX G
HASWASTE ASSESSMENT

envirolab

Haswaste, developed by Dr. Iain Haslock.

Albert Terrace Mews / 29841

TP/WS/BH			BH1A	TP2A							
Depth (m)			1.50	0.50							
Envirolab reference			18/01899/1	18/01899/2							
% Moisture		%	10.5	18.9							
pH (soil)			8.01	8.05							
pH (leachate)											
Arsenic		mg/kg	3	8							
Cadmium	updated v5.4ei	mg/kg	0.5	0.7							
Copper		mg/kg	9	17							
CrVI or Chromium		mg/kg	16	34							
Lead		mg/kg	27	47							
Mercury		mg/kg	0.24	0.53							
Nickel		mg/kg	11	21							
Selenium		mg/kg	1	2							
Zinc	updated v5.4ei	mg/kg	28	56							
Barium		mg/kg									
Beryllium		mg/kg									
Vanadium		mg/kg									
Cobalt	updated v5.4ei	mg/kg									
Manganese	updated v5.4ei	mg/kg									
Molybdenum		mg/kg									
Antimony		mg/kg									
Aluminium		mg/kg									
Bismuth		mg/kg									
CrIII		mg/kg									
Iron	updated v5.4ei	mg/kg									
Strontium		mg/kg									
Tellurium		mg/kg									
Thallium		mg/kg									
Titanium		mg/kg									
Tungsten		mg/kg									
Ammoniacal N		mg/kg									
ws Boron		mg/kg									
PAH (Input Total PAH **OR** individual PAH results)											
Acenaphthene		mg/kg	0.01	0.01							
Acenaphthylene		mg/kg	0.01	0.01							
Anthracene		mg/kg	0.02	0.02							
Benzo(a)anthracene		mg/kg	0.04	0.04							
Benzo(a)pyrene		mg/kg	0.04	0.04							
Benzo(b)fluoranthene		mg/kg	0.05	0.05							
Benzo(ghi)perylene		mg/kg	0.05	0.05							
Benzo(k)fluoranthene		mg/kg	0.07	0.07							
Chrysene		mg/kg	0.06	0.06							
Dibenzo(ah)anthracene		mg/kg	0.04	0.04							
Fluoranthene		mg/kg	0.08	0.08							
Fluorene		mg/kg	0.01	0.01							
Indeno(123cd)pyrene		mg/kg	0.03	0.03							
Naphthalene		mg/kg	0.03	0.03							
Phenanthrene		mg/kg	0.03	0.03							
Pyrene		mg/kg	0.07	0.07							
Coronene		mg/kg	0.01	0.01							
Total PAHs (16 or 17)		mg/kg									
TPH											
Petrol		mg/kg									
Diesel		mg/kg									
Lube Oil		mg/kg									
Crude Oil											
White Spirit / Kerosene		mg/kg									
Creosote		mg/kg									
Unknown TPH with ID		mg/kg									
Unknown TPHCWG		mg/kg	20.0	14.0							
Total Sulphide		mg/kg									
Complex Cyanide		mg/kg									
Free (or Total) Cyanide		mg/kg									
Thiocyanate		mg/kg									
Elemental/Free Sulphur		mg/kg									
Phenols Input Total Phenols HPLC **OR** individual Phenol results.											
Phenol		mg/kg									
Cresols		mg/kg									
Xylenols		mg/kg									
Resourcinol		mg/kg									
Phenols Total by HPLC		mg/kg									
BTEX Input Total BTEX **OR** individual BTEX results.											
Benzene		mg/kg									
Toluene		mg/kg									
Ethylbenzene		mg/kg									
Xylenes		mg/kg									
Total BTEX		mg/kg									
PCBs (POPs)											
PCBs Total (eg EC7/WHO12)		mg/kg									
PBBs (POPs)											
Hexabromobiphenyl (Total or PBB153; 2,2',4,4',5,5'- if only available)		mg/kg									

envirolab

Haswaste, developed by Dr. Iain Haslock.

Albert Terrace Mews / 29841

TP/WS/BH	BH1A	TP2A							
Depth (m)	1.50	0.50							
Envirolab reference	18/01899/1	18/01899/2							
POPs Dioxins and Furans Input Total Dioxins and Furans **OR** individual Dioxin and Furan results.									
2,3,7,8-TeCDD	mg/kg								
1,2,3,7,8-PeCDD	mg/kg								
1,2,3,4,7,8-HxCDD	mg/kg								
1,2,3,6,7,8-HxCDD	mg/kg								
1,2,3,7,8,9-HxCDD	mg/kg								
1,2,3,4,6,7,8-HpCDD	mg/kg								
OCDD	mg/kg								
2,3,7,8-TeCDF	mg/kg								
1,2,3,7,8-PeCDF	mg/kg								
2,3,4,7,8-PeCDF	mg/kg								
1,2,3,4,7,8-HxCDF	mg/kg								
1,2,3,6,7,8-HxCDF	mg/kg								
2,3,4,6,7,8-HxCDF	mg/kg								
1,2,3,7,8,9-HxCDF	mg/kg								
1,2,3,4,6,7,8-HpCDF	mg/kg								
1,2,3,4,7,8,9-HpCDF	mg/kg								
OCDF	mg/kg								
Total Dioxins and Furans	mg/kg								
Some Pesticides (POPs unless otherwise stated)									
Aldrin	mg/kg								
α Hexachlorocyclohexane (alpha-HCH) *(leave empty if total HCH results used)*	mg/kg								
β Hexachlorocyclohexane (beta-HCH) *(leave empty if total HCH results used)*	mg/kg								
α Cis-Chlordane (alpha) ***OR*** *Total Chlordane*	mg/kg								
δ Hexachlorocyclohexane (delta-HCH) *(leave empty if total HCH results used)*	mg/kg								
Dieldrin	updated v5.4ei mg/kg								
Endrin	mg/kg								
χ Hexachlorocyclohexane (gamma-HCH) (lindane) ***OR*** *Total HCH*	updated v5.4ei mg/kg								
Heptachlor	mg/kg								
Hexachlorobenzene	mg/kg								
o,p'-DDT *(leave empty if total DDT results used)*	mg/kg								
p,p'-DDT ***OR*** *Total DDT*	updated v5.4ei mg/kg								
χ Trans-Chlordane (gamma) *(leave empty if total Chlordane results used)*	mg/kg								
Chlordecone (kepone)	mg/kg								
Pentachlorobenzene	mg/kg								
Mirex	mg/kg								
Toxaphene (camphechlor)	mg/kg								
Tin									
Tin *(leave empty if Organotin and Tin excl Organotin results used)*	mg/kg								
Organotin									
Dibutyltin; DiBT	mg/kg								
Tributyltin; TriBT	mg/kg								
Triphenyltin; TriPT	mg/kg								
Tetrabutyltin; TeBT	mg/kg								
Tin excluding Organotin									
Tin excl Organotin	mg/kg								

envirolab

Haswaste, developed by Dr. Iain Haslock.

Albert Terrace Mews / 29841

TP/WS/BH		BH1A	TP2A						
Depth (m)		1.50	0.50						
Envirolab reference		18/01899/1	18/01899/2						
Asbestos in Soil	Thresholds								
Asbestos detected in Soil (enter Y or N)	Y	N	N						

Asbestos in Soil above is "Y", the soil is Hazardous Waste HP5 and HP7

Asbestos % Composition in Soil (Matrix Loose Fibres or Microscopic Identifiable Pieces only)	see "Carc HP7 % Asbestos in Soil (Fibres)" below	%							
Carcinogenic HP7 % Asbestos in Soil (fibres or micro pieces)	≥0.1%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

If Asbestos in Soil above is "Y", but Asbestos % above is "<0.1%", the soil is Non Hazardous Waste. You can only use Asbestos % results where loose fibres or micro pieces are only present. You cannot use Asbestos % results when visual identifiable pieces are present.

Asbestos Identifiable Pieces visible with the naked eye detected in the Soil (enter Y or N)	Y	N	N						

If visual identifiable pieces of asbestos are present, you cannot use Asbestos % results and the whole soil sample is Hazardous Waste HP5 and HP7 Construction material containing Asbestos 17 06 05. Therefore, if Asbestos in Soil above is "Y", the Asbestos % above is "<0.1%", but the Asbestos Identifiable Pieces visible with the naked eye is "Y", the soil is Hazardous Waste.

Identifiable Pieces are Cement, Fragments, Board, Rope etc. ie anything ACM that is not Loose Fibres.

All visual asbestos pieces need to be removed leaving only fibres (or micro pieces) with an Asbestos % Composition in Soil result of <0.1% for the soil to become non-hazardous waste.

Hazardous Property	Thresholds	Cut Off Value								
Corrosive HP8	≥5%	<1%	0.00310	0.00615	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Irritant HP4	≥10%	<1%	0.00126	0.00241	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Irritant HP4	≥20%	<1%	0.00291	0.00501	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥1%		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥20%		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥1%		0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥10%		0.00242	0.00381	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Aspiration Toxicity HP5	≥10%		0.00179	0.00114	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.1%	<0.1%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.25%	<0.1%	0.00038	0.00090	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥5%	<0.1%	0.00288	0.00552	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥25%	<1%	0.00537	0.00888	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.25%	<0.1%	0.00002	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥2.5%	<0.1%	0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥15%	<0.1%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥55%	<1%	0.00004	0.00006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.1%	<0.1%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.5%	<0.1%	0.00282	0.00539	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥3.5%	<0.1%	0.00013	0.00023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥22.5%	<1%	0.00532	0.00881	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Carcinogenic HP7	≥0.1%		0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Carcinogenic HP7	≥0.1%		0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
Carcinogenic HP7	≥1%		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Carcinogenic HP7 Unknown TPH with ID	≥1,000mg/kg		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carcinogenic HP7 b(a)p marker test (Unknown TPH with ID only)	≥0.01%		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
pH Corrosive HP8 pH (soil or leachate)	H8 ≥11.5		8.01	8.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
pH Corrosive HP8 pH (soil or leachate)	H8 ≤2		8.01	8.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toxic for Reproduction HP10	≥0.3%		0.00242	0.00381	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Toxic for Reproduction HP10	≥3%		0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Mutagenic HP11	≥0.1%		0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Mutagenic HP11 Unknown TPH with ID	≥1,000mg/kg		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mutagenic HP11 b(a)p marker test (Unknown TPH with ID only)	≥0.01%		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Mutagenic HP11	≥1%		0.00199	0.00344	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Produces Toxic Gases HP12 Sulphide	≥1,400mg/kg		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Produces Toxic Gases HP12 Cyanide	≥1,200mg/kg		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Produces Toxic Gases HP12 Thiocyanate	≥2,600mg/kg		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HP13 Sensitising	≥10%		0.00275	0.00529	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Ecotoxic HP14	≥1.0	<0.1% (except CompCN + Thiocyanate + Xylene + BTEX 1%).	0.04790	0.08450	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Ecotoxic HP14	≥25%	<0.1%	0.01180	0.02101	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Ecotoxic HP14	≥25%	<0.1% (except CompCN + Thiocyanate + Xylene + BTEX 1%).	0.01359	0.02215	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Table 3.1 of the CLP, CL Inventory, ATPs, IARC, Concawe, MSDSs, REACH + Pesticide Properties databases. Worst case REACH + MSDS's used for "*" STOT + Acute Toxicity.

Haswaste, developed by Dr. Iain Haslock.

Albert Terrace Mews / 29841

TP/WS/BH		BH1A	TP2A						
Depth (m)		1.50	0.50						
Envirolab reference		18/01899/1	18/01899/2						
Ecotoxic HP14 individual substance specific thresholds (Benzo(a)anthracene, Dibenz(ah)anthracene (or Total PAH if only used), Sn, TriPT)	≥0.0025%	0.000004	0.000003	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ecotoxic HP14 individual substance specific thresholds (Co, γ-HCH, DiBT, TriBT)	≥0.025%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Persistent Organic Pollutant (PCB, PBB or POP Pesticides)	>0.005%	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000
Persistent Organic Pollutant (Total Dioxins+Furans)	>0.0000015%	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000
Persistent Organic Pollutant (Individual Dioxins+Furans)	>0.0000015%	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000

If other contaminants need adding to Haswaste, please contact Envirolab.