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GROUND INVESTIGATION & BASEMENT IMPACT ASSESSMENT REPORT

46 COMPAYNE GARDENS

HAMPSTEAD

NW6 3RY

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EXECUTIVE SUMMARY

David Katz ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to undertake a geotechnical ground investigation and prepare a Basement Impact Assessment at 46 Compayne Gardens, Hampstead, NW6 3RY.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Ground Investigation	
Current Site Description	The site currently comprises a three-storey semi-detached residential property with a small existing basement/cellar room. There is a large rear garden with small brick-paved area. There is also a brick-paved driveway at the front of property.
Proposed Site Description	No proposed development plans have been provided to Jomas, but it is understood that it is proposed to form a basement under the entire footprint of the existing building and projecting beyond the rear façade. Lightwells will also be formed to the front of the building.
Summary of Stage 1 & 2 BIA (Screening & Scoping)	A Stage 1 & 2 BIA (Screening & Scoping) Report has been produced for the site and issued separately (Jomas, June 2022). A brief overview of the findings is presented below. Reference should be made to the full report for detailed information. On the earliest available maps (dated 1870s), the site is shown as part of a large field with a footpath running through it. By the maps dated 1890s, the existing development appears to have been constructed - a semi-detached property with garden. No significant changes appear to have occurred to the site until the most recent map dated 2022. Historically, the surrounding area has comprised fields until the late 19th Century, when the area become dominated by residential housing. The only feature identified is a railway approximately 150m north of site. Evidence of possible WWII bomb damage is shown on maps from the early 1950s, in a large area 100m north/north-east of site and also plots 80m west and 100m south-east of the site. The British Geological Survey indicates that the site is directly underlain by solid deposits of the London Clay Formation, identified as an unproductive stratum. There are no water networks or surface water features reported within 250m of the site. The site is located within an EA Flood Zone 1 and the site is not within an area with a RoFRaS rating.

Ground Investigation	
	Groundsure states that the site is at negligible risk of both surface water and groundwater flooding. A moderate risk of shrink swell clays was identified due to the underlying London Clay Formation. A geotechnical ground investigation was recommended to inform foundation design. The screening and scoping assessments concluded the following: • A ground investigation was recommended to confirm the ground conditions including groundwater levels (if any) beneath the site. The presence of Made Ground and/or clay should be established, with Atterberg Limits undertaken to assess shrink/swell potential of the soils. • A site-specific Flood Risk Assessment and drainage strategy/SUDS assessment report was recommended, as the site is located within a Camden Local Flood Risk Zone (LFRZ) (Goldhurst). • A finalised proposed development plan should be produced and used to inform a drainage strategy/SUDS report. Infiltration SUDS are unlikely to be feasible given the anticipated presence of highly impermeable London Clay Formation. • Existing foundations should be established. • A Ground Movement Assessment was recommended.
Intrusive Investigation	The ground investigation was undertaken and 23 June 2022, and consisted of the following: • 2No. restricted access windowless sampler boreholes, drilled up to 8.0m below ground level (bgl), with associated in-situ testing and sampling; • 2No. trial pits to inspect existing foundations, excavated by hand to a maximum depth of 0.8mbgl; • 2No. groundwater monitoring wells installed up to 6.0m bgl; • Laboratory analysis for chemical and geotechnical purposes; • 1No. return visit to monitor groundwater levels.
Ground Conditions	The ground conditions encountered broadly consistent with those anticipated, comprising Made Ground to depths of up to 1.1m, underlain by firm to stiff clay of the London Clay Formation to the base of the boreholes (maximum depth of 8.0m). During the intrusive investigation, a groundwater seepage was encountered within WS2 at a depth of 7.0mbgl, although all other exploratory holes were reported as dry to their terminal depths.

Ground Investigation	
	During return monitoring, groundwater was encountered at a depth of 1.32mbgl within WS2, but WS1 was reported as dry to its base at 4.15mbgl.
Geotechnical Considerations	Based on the ground and groundwater conditions encountered, it is considered that a cast in-situ cantilever retaining wall formed at approximately 3.0m bgl could be designed with an allowable bearing capacity of 100kPa. Total and differential settlements should be contained within tolerable limits. If a cantilever retaining wall is utilised, then a ground bearing floor slab could be used. In this case, formations of the structures should be inspected by a competent person. Any loose or soft material should be removed and replaced with well-graded, properly compacted granular fill or lean mix concrete. The formation should be blinded if left exposed for more than a few hours or if inclement weather is experienced. Buried concrete for foundations should be designed to Class DS-3 (AC-2s). Temporary excavations are unlikely to remain stable and some form of temporary support or battering back to a safe angle and dewatering are likely to be required. Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.

Basement Impact Assessment – Conclusions and Recommendations	
Impact Assessment	The overall assessment of the site is that the creation of a basement for the existing development should not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction. The proposed basement excavation will be within 5m of a public pavement. It is also laterally within 5m of neighbouring properties. Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground and any associated services. During the construction phase careful and regular monitoring will need to be undertaken to ensure that the property above, is not adversely affected. This may mean that the property needs to be suitably propped and supported.
Recommended Further Work	The following should be produced to support this assessment: • Proposed development plans. • A Ground Movement Assessment. • A site-specific flood risk assessment and drainage strategy/SUDS.

Basement Impact Assessment – Conclusions and Recommendations	
	It should also be noted that the following items are required as part of Camden Planning Guidance Basements (January 2021): • Plans and sections to show foundation details of adjacent structures. • Programme for enabling works, construction and restoration. • Construction Sequence Methodology. • Proposals for monitoring during construction. • Evidence of consultation with neighbours. • Ground Movement Assessment (GMA). • Drainage assessment.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 David Katz ("The Client") has commissioned Jomas Associates Ltd ("Jomas"), to undertake an investigation of the geotechnical factors pertaining to the proposed development at a site referred to as 46 Compayne Gardens, Hampstead NW6 3RY, and to prepare a Basement Impact Assessment.

1.1.2 To this end a Stage 1 & 2 Basement Impact Assessment (Screening & Scoping) Report been produced for the site and issued separately, as detailed in Table 1.1 below, followed by an intrusive investigation (detailed in this report).

Table 1.1: Previous Reports - Jomas

Title	Author	Reference	Date
Stage 1 & 2 Basement Impact Assessment (Screening & Scoping) for 46 Compayne Gardens, Hampstead NW6 3RY	Jomas Associates Ltd	P4094J2580/SC	16 June 2022

1.1.3 Jomas' work has been undertaken in accordance with the proposal dated 23 November 2022.

1.2 Proposed Development

1.2.1 No proposed development plans have been provided to Jomas, but it is understood that it is proposed to form a basement under the entire footprint of the existing building and projecting beyond the rear façade. Lightwells will also be formed to the front of the building.

1.2.2 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation were as follows:

- To conduct an intrusive investigation, to assess ground conditions and obtain geotechnical parameters to inform preliminary foundation design;
- To undertake a Basement Impact Assessment to assess the potential impacts that the proposal may have on ground stability, the hydrogeology and hydrology on the site and its environs.

1.4 Scope of Works

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

- An intrusive investigation to assess the underlying ground conditions;

- Return groundwater monitoring;
- Undertaking of laboratory geotechnical testing upon recovered samples;
- Carrying out a Basement Impact Assessment;
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Scope of Basement Impact Assessment

1.5.1 As the site lies within the purview of the London Borough of Camden, their document "Camden Planning Guidance Basements" (CPGB) (January 2021) has been used to form the methodology utilised in undertaking this BIA.

1.5.2 Jomas' BIA covers most items required under CPGB, with the exception of;

- Plans and sections to show foundation details of adjacent structures.
- Programme for enabling works, construction and restoration.
- Evidence of consultation with neighbours.
- Ground Movement Assessment (GMA), to include assessment of significant adverse impacts and specific mitigation measures required, as well as confirmatory and reasoned statement identifying likely damage to nearby properties according to the Burland Scale.
- Construction Sequence Methodology.
- Proposals for monitoring during construction.
- Drainage assessment.

1.5.3 This Jomas BIA also takes into account the Campbell Reith pro forma BIA produced on behalf of and published by the London Borough of Camden as guidance for applicants to ensure that all of the required information is provided.

1.5.4 A number of the requirements set out in the London Borough of Camden document CPGB will need to be addressed in a construction management plan, this stage is not within the scope of work that Jomas Associates have been commissioned.

1.6 Supplied Documentation

1.6.1 Jomas Associates have not been supplied with any previously produced reports at the time of writing this report.

1.7 Limitations

1.7.1 Jomas Associates Ltd ('Jomas') has prepared this report for the sole use of David Katz in accordance with the generally accepted consulting practices and for the intended

purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

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

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

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report as Figure 1.

Table 2.1: Site Information

Name of Site	-
Address of Site	46 Compayne Gardens Hampstead NW6 3RY
Approx. National Grid Ref.	525915 184501
Site Area (Approx)	0.06 hectares
Site Occupation	Residential
Local Authority	London Borough of Camden
Proposed Site Use	Residential with a basement located within the footprint of the building

2.2 Summary of Stage 1 & 2 BIA (Screening & Scoping) Report

2.2.1 As referenced in Table 1.1, a report has been produced for the site and issued separately (Jomas Associates Ltd – June 2022). A brief overview of the findings is presented below. Reference should be made to the full report for detailed information.

Site Setting

2.2.2 On the earliest available maps (dated 1870s), the site is shown as part of a large field with a footpath running through it. By the maps dated 1890s, the existing development appears to have been constructed - a semi-detached property with garden. No significant changes appear to have occurred to the site until the most recent map dated 2022.

2.2.3 Historically, the surrounding area has comprised fields until the late 19th Century, when the area become dominated by residential housing. The only feature identified is a railway approximately 150m north of site. Evidence of possible WWII bomb damage is shown on maps from the early 1950s, in a large area 100m north/north-east of site and also plots 80m west and 100m south-east of the site.

2.2.4 The British Geological Survey indicates that the site is directly underlain by solid deposits of the London Clay Formation, identified as an unproductive stratum.

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

2.2.6 The site is located within an EA Flood Zone 1 and the site is not within an area with a RoFRaS rating.

2.2.7 Groundsure states that the site is at negligible risk of both surface water and groundwater flooding.

2.2.8 A moderate risk of shrink swell clays was identified due to the underlying London Clay Formation.

2.2.9 A geotechnical ground investigation was recommended to inform foundation design.

Screening and Scoping

2.2.10 Screening identifies the areas that require further (usually intrusive) investigation whilst Scoping is the activity of defining in further detail the matters to be investigated as part of the BIA process. Scoping comprises of the definition of the required investigation needed in order to determine in detail the nature and significance of the potential impacts identified during screening.

2.2.11 These issues are summarised below:

- A ground investigation was recommended to confirm the ground conditions including groundwater levels (if any) beneath the site. The presence of Made Ground and/or clay should be established, with Atterberg Limits undertaken to assess shrink/swell potential of the soils.
- A site-specific Flood Risk Assessment and drainage strategy/SUDS assessment report was recommended, as the site is located within a Camden Local Flood Risk Zone (LFRZ) (Goldhurst).
- A finalised proposed development plan should be produced and used to inform a drainage strategy/SUDS report. Infiltration SUDS are unlikely to be feasible given the anticipated presence of highly impermeable London Clay Formation.
- Existing foundations should be established.
- A Ground Movement Assessment was recommended.

2.2.12 It should be noted that the following items are required as part of Camden Planning Guidance Basements (January 2021):

- Plans and sections to show foundation details of adjacent structures.
- Programme for enabling works, construction and restoration.
- Construction Sequence Methodology.
- Proposals for monitoring during construction.
- Evidence of consultation with neighbours.
- Ground Movement Assessment (GMA).
- Drainage assessment.

3 GROUND INVESTIGATION

3.1 Rationale

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

3.1.2 The sampling proposal was designed in order to gather data representative of the site conditions. To investigate the identified potential sources and pathways as well as to provide information relevant to the assessment of risk posed to the proposed basement identified during the Screening and Scoping stage of the BIA.

3.2 Scope of Works

3.2.1 The ground investigation was undertaken on 23 June 2022.

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

Table 3.1: Scope of Intrusive Investigation

Investigation Type	No. of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved (m BGL)	Justification
Windowless Sampler Boreholes (Restricted Access Equipment)	2	WS1 & WS2	Up to 8m bgl	To obtain soil samples for laboratory geotechnical testing. To allow in-situ geotechnical testing.
Monitoring Wells	2	WS1 & WS2	Up to 6m bgl	To allow groundwater monitoring.
Hand Excavated Trial Pits	5	TP1 & TP2	Up to 0.8m bgl	To allow the inspection of the existing structure foundations.

3.2.3 Monitoring wells were installed in WS1 and WS2. TP1 and TP2 were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated with brick paving.

3.3 Geotechnical Testing

<u>In-situ</u>

3.3.1 In-situ geotechnical testing included Standard Penetration Tests. The determined 'N' values have been used to determine the relative density of granular materials and have been used with standard correlations to infer various other derived geotechnical

parameters including the undrained shear strength of the cohesive strata. The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

Laboratory

3.3.2 Soil samples were obtained and submitted to the UKAS Accredited laboratory of i2 Analytical Ltd. for a series of analyses.

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

3.3.4 The following laboratory geotechnical testing was carried out:

Table 3.2 Laboratory Geotechnical Analysis

Methodology	Test Description	Number of tests
BS1377:1990	Moisture Content Determination	6
BS1377:1990	Liquid and Plastic Limit Determination (Atterberg Limits)	6

3.3.5 In addition, 4No. soil samples were analysed for a modified BRE Special Digest 1 suite (acid and water-soluble sulphate, total sulphur and pH) to assist with the ACEC classification for buried concrete.

4 ENCOUNTERED CONDITIONS

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

4.1.2 For further details of the ground conditions, reference should be made to the exploratory hole location plan presented in Appendix 1, exploratory hole logs presented in Appendix 2, and the laboratory testing results in Appendix 3.

4.2 Ground Conditions

4.2.1 The ground conditions encountered were broadly consistent with those anticipated, i.e. a thickness of Made Ground overlying the London Clay Formation, and are summarised in Table 4.1 below.

Table 4.1 : Ground Conditions Encountered

Stratum and Description	Encountered from (mbgl)	Base of strata (mbgl)	Thickness range (m)
Grass or brick paving over brown locally mottled orangish brown slightly sandy very gravelly clay. Sand is coarse. Gravel consists of fine to coarse sub-angular to rounded flint with occasional fine sub-angular brick. (MADE GROUND)	0.0	> 0.8 - 1.1	>0.8 - 1.1
Firm** light brown mottled orangish brown very gravelly CLAY. Gravel consists of medium to coarse sub-rounded flint. (LONDON CLAY FORMATION) *Encountered in WS2 only.*	1.1	1.7	0.6
Firm to stiff** orangish-brown to greyish brown becoming grey silty CLAY with occasional selenite crystals. (LONDON CLAY FORMATION)	1.1 – 1.7	>8.0 [Base not proven]	>6.9 [Thickness not proven]

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

4.2.2 No visual or olfactory evidence of potential contamination was identified within the investigation positions.

4.3 Existing Foundations

4.3.1 Details of the observed foundations as exposed by the inspection pits are summarised in Table 4.2 overleaf.

Table 4.2: Foundation Inspection Pit Summary

Hole	Location	Total Step Out (m)	Assumed Width (m)	Proven Depth (mbgl)	Apparent Founding Strata
TP1	Southern wall of house (external)	0.35	1.00	0.66	Made Ground
	Western boundary wall	0.08	0.46	0.78	Made Ground
TP2	Eastern boundary wall	0.09	0.48	0.51	Made Ground

4.3.2 The following has been assumed:

- Walls were constructed symmetrically and centrally on the strip footing to prevent overturning and eccentric loading.
- Where the width of the wall is not known, it is assumed to be 0.30m wide to take into account the walls and any cavity.

4.4 Groundwater

4.4.1 During drilling a groundwater seepage was noted in WS2 at 7.0m bgl. No groundwater was reported in WS1, TP1 or TP2.

4.4.2 1No. return groundwater monitoring visit was undertaken on 04 July 2022, the results are presented in Appendix 4 and are summarised below.

Table 4.3: Groundwater Monitoring Summary

Exploratory Hole ID	Depth Encountered (m bgl)	Depth to Base of Well (m bgl)	Stratum
WS1	Dry	4.15	N/A
WS2	1.32	6.26	London Clay Formation

4.4.3 The groundwater reported in WS2 is not considered to represent a true groundwater body as the London Clay Formation is an unproductive stratum. This is corroborated by the absence of groundwater in WS1 and is therefore considered to be perched water.

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

4.5 Limitations

4.5.1 During the intrusive ground investigation, no impenetrable obstructions were encountered. However, the possible presence of natural and/or manmade obstructions on site cannot be discounted.

5 DERIVATION OF GEOTECHNICAL PARAMETERS

5.1 Geotechnical Testing Results

5.1.1 Standard Penetration Tests (SPT) were undertaken in the borehole locations to a maximum depth of 8m bgl. SPT 'N' values ranged between N=9 and N=22 within the cohesive soils of the London Clay Formation. This corresponded with a medium to high strength in the cohesive soils (based on correlations postulated by Stroud & Butler, 1975 and Stroud, 1989). The blow counts showed a general trend of increasing with depth.

5.1.2 The results of the geotechnical laboratory testing are summarised in Table 5.1.

Table 5.1: Summary of Geotechnical Test Results

Parameter	Made Ground	London Clay Formation
Moisture Content (%)	-	21 – 34
Liquid Limit (%)	-	68 – 87
Plastic Limit (%)	-	28 – 34
Plasticity Index (%)	-	40 – 54
Modified Plasticity Index (%)	-	23.8 – 44
Volume Change Potential [NHBC and BRE]	-	Medium to High
pH	7.1 – 8.1	7.7 – 8.2
Water soluble sulphate (g/l)	0.013 – 0.063	0.05 – 2.3
Total Sulphate as SO_4 (%)	0.029 – 0.074	0.031 – 0.514
Total Sulphur (%)	0.017 – 0.051	0.017 – 0.172
SPT (N) values	-	9 – 22

5.1.3 It should be noted that the engineering characteristics of Made Ground are variable and unpredictable. Therefore, Made Ground has not been assessed further as part of the geotechnical assessment, except where specified otherwise.

5.2 Summary of Derived General Properties

5.2.1 Based on the analysis of the ground investigation data and past experience with similar deposits, the following derived general parameters are given in Table 5.2.

Table 5.2: Derived General Parameters

Property*	London Clay Formation
Unit Weight[1)]	19
Drained Friction, φ' (◦)[2)]	20 – 21
Drained Cohesion, c' (kPa)	0
SPT 'N' Value	9 – 22
Undrained Young's Modulus, E_u (MPa)[3)]	10.8 – 26.4
Drained Young's Modulus E' (MPa) [4)]	6.3 – 15.4
Undrained Shear Strength, c_u (kPa)[5)]	40 – 99
Plasticity Index (%)	40 – 54
Modified Plasticity Index (%)	23.8 – 44
Volume Change Potential [NHBC]	Medium to High
Modulus of Volume Compressibility, m_v (m^2/MN)[6)]	0.101 – 0.247

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

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

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

[4)] Calculated from E' = 0.7MPa, based on the guidance given in CIRIA Report 143

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

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

6 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

6.1 General

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

6.2 Proposed Foundations

General

6.2.1 No proposed drawings have been provided to Jomas, but it is assumed that a standard sized basement will be formed at approximately 3.0m bgl and underneath the existing building footprint.

6.2.2 The Made Ground is not considered to provide a suitable bearing stratum due to its variability and the unacceptable risk of total and differential settlement.

6.2.3 All foundations should be deepened beneath these deposits, soft clay, root or desiccated zones, or disturbed ground, and founded within underlying competent strata.

6.2.4 As soils of high-volume change potential are present, heave precautions will be required against the side of foundations and ground beams in accordance with the requirements set out in NHBC Standards Chapter 4.2.

Conventional Foundations

6.2.5 Based on the ground and groundwater conditions encountered, it is considered that a cast in-situ cantilever retaining wall formed at approximately 3.0m bgl could be designed with an allowable bearing capacity of 100kPa. Total and differential settlements should be contained within tolerable limits.

6.2.6 This depth, however, does not take into account the depth of Made Ground or the distance to and species of any previous, existing and proposed trees, and foundations may need to be deepened further accordingly, in accordance with NHBC requirements, for soils of high volume change potential.

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

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

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

6.3 Retaining Walls

6.3.1 It is anticipated that retaining structure(s) will be required.

6.3.2 Based on the analysis of the available site investigation data and past experience with similar deposits the parameters in Table 6.1 are considered appropriate for the potential retaining structure(s).

Table 6.1: Geotechnical Parameters for Retaining Wall Design

	London Clay Formation
Critical state angle of shearing resistance (ϕ')°	21
Effective Cohesion kN/m^2	0
Saturated Bulk Weight (γ_{sat}) kN/m^3	19

6.3.3 In addition, the specialist contractor should ensure the stability of the cut-face during the temporary works.

6.4 Sulphates

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

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

Table 6.2: Concrete in the Ground Characteristic Value Determination

No Samples in the dataset	Method for determining the sulphate characteristic value
1-4	Highest value
5-9	Mean of the top 2No highest results
10 or greater	Mean of the top 20% highest results

6.4.3 Table 6.3 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 6.3: Concrete in the Ground Classes

Stratum	No Samples	pH range	Characteristic WS Sulphate (mg/l)	Characteristic Total Potential Sulphate (mg/l)[1)]	Design Sulphate Class	ACEC Class
Made Ground	2	7.1 – 8.1	63	N/A	DS-1	AC-1s
London Clay Formation	2	7.7 – 8.2	2320	N/A	DS-3	AC-2s

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

6.4.4 Analysis of the results indicates that the underlying soils do not contain appreciable concentrations of oxidisable sulphates and therefore the Design Class is dependent on the water-soluble sulphate content and pH only.

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

6.5 Floor Slabs

6.5.1 It is anticipated that finished floor level of the proposed basement will be approximately 3.0m below the existing ground floor level.

6.5.2 If a cantilever retaining wall is utilised, then a ground bearing floor slab could be used. In this case, formations of the structures should be inspected by a competent person. Any loose or soft material should be removed and replaced with well-graded, properly compacted granular fill or lean mix concrete. The formation should be blinded if left exposed for more than a few hours or if inclement weather is experienced.

6.5.3 All floor slabs would also need to be suitably reinforced, not only to distribute the structural loading but also to ensure that the floor slab can prop the retaining walls and does not buckle from the lateral pressures imposed by the cantilever retaining walls.

6.5.4 The floor slab (and basement walls) would need to be constructed to conform to BS: 8102 (2009).

6.6 Excavations

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

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

6.6.3 Ground works should always be designed in such a manner to avoid entry into excavations by construction or maintenance personnel. However, in the event that

such works cannot be avoided or designed out, they should only be undertaken in accordance with a safe system of work, following an appropriate risk assessment and in accordance with any legislative requirements, e.g. Confined Spaces Regulations.

6.6.4 Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.

7 BASEMENT IMPACT ASSESSMENT

7.1 Proposed Changes to Areas of External Hardstanding

7.1.1 Existing areas of hardstanding include the existing building on site and brick paved areas to the front and rear of property. The proposed development is understood to comprise a basement within the existing footprint of the building but projecting beyond the rear façade. Lightwells will also be formed to the front of the building.

7.1.2 The extent to which the basement will extend is currently unknown. However, noting that there is hardstanding to the front and rear of the property, and that the underlying London Clay Formation is relatively impermeable, it is unlikely to significantly alter the volume of impermeable area at the site.

7.2 Past Flooding

7.2.1 The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow.

7.2.2 When assessing the site-specific flood risk and the potential for historic flooding to reoccur, the above guidance recommends that historic flooding records and any other relevant and available information including flood datasets (e.g. flood levels, depths and/or velocities), and any other relevant data which can be acquired, are assessed.

7.2.3 The nearest EA groundwater flood incident is shown 100m north-west of site and the nearest LBC groundwater flood incident is shown approximately 100m south of site, with 8No. properties affected.

7.2.4 Fairhazel Gardens (~60m east of site) was affected by surface water flooding in 2002, and 2No. properties are shown to have been affected by historic surface water flooding 340m east of site.

7.2.5 For the postcode “NW6 3--” where the site is situated, 8No. properties has been impacted by internal sewer flooding and 18No. properties have been affected by exterior sewer flooding. Both figures are the highest within the borough.

7.2.6 There are no historical flood events reported by Groundsure within 250m of the site.

7.2.7 A site-specific flood risk assessment is recommended.

7.3 Geological Impact

7.3.1 The published geological maps indicate that the London Clay Formation underlies the site. The ground investigation proved these deposits to be present to at least 8m bgl and therefore the proposed basement will be founded within the London Clay Formation.

7.3.2 Laboratory testing indicates the London Clay Formation is of high volume change potential. Heave precautions will be required in accordance with the guidance set out in NHBC Standards.

7.4 Hydrology and Hydrogeology Impact

7.4.1 Based on all the information available at the time of writing, the risk of flooding from groundwater is considered to be low. The proposed basement is unlikely to have a detectable impact on the local groundwater regime. Appropriate water proofing measures should be included within the whole of the proposed basement wall/floor design as a precaution.

7.4.2 During drilling and return monitoring, perched water was encountered in WS2, but not in WS1. The London Clay Formation is classed as an unproductive stratum and so the creation of the basement is considered unlikely to have any significant impact upon the hydrogeology of the area.

7.4.3 The proposed development will lie outside of flood risk zones and is therefore assessed as being at a very low probability of fluvial flooding.

7.4.4 There are no water networks or surface water features on or within 250m of the site. It is therefore not anticipated that the site will have an impact upon the hydrology of the area.

7.4.5 The London Borough of Camden SWMP indicates that overall groundwater flooding across the Borough is considered to be a relatively low risk.

7.4.6 The site is situated within Critical Drainage Area Group 3_010 and is therefore within a catchment area which contributes to a flooding hotspot. The site is also within a Local Flood Risk Zone (Goldhurst) and, therefore, a site-specific flood risk assessment is recommended.

7.4.7 The proposed basement construction is considered unlikely to create a reduction of impermeable area in the post development scenario.

7.4.8 No risk of flooding to the site from artificial sources has been identified.

7.5 Impacts of Basement on Adjacent Properties and Pavement

7.5.1 The proposed basement excavation will be within 5m of a public pavement. It is also within 5m from neighbouring properties. Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground and any associated services and structures.

7.5.2 It is recommended that the site is supported by suitably designed temporary support with a basement box construction. This will ensure that the adjacent land is adequately supported in the temporary and permanent construction.

7.5.3 Careful and regular monitoring of the structure will need to be undertaken during the construction phase to ensure that vertical movements do not adversely affect the above and neighbouring property. If necessary, the works may have to be carried out in stages with the above structure suitably propped and supported.

7.5.4 It will be necessary to ensure that the basements are designed in accordance with the NHBC Standards and take due cognisance of the potential impacts highlighted above. This may be achieved by ensuring best practice engineering and design of the proposed scheme by competent persons and in full accordance with the Construction (Design and Management) Regulations. This will include:

- Establishment of the likely ground movements arising from the temporary and permanent works and the mitigation of excessive movements;
- Assessment of the impact on any adjacent structures (including adjacent properties and the adjacent pavement with potential services);
- Determination of the most appropriate methods of construction of the proposed basements;
- Undertake pre-condition surveys of adjacent structures;
- Monitor any movements and pre-existing cracks during construction;
- Establishment of contingencies to deal with adverse performance;
- Ensuring quality of workmanship by competent persons.

7.5.5 Full details of the suitable engineering design of the scheme in addition to an appropriate construction method statement should be submitted by the Developer to the London Borough of Camden.

7.6 Cumulative Impacts

7.6.1 The site is directly underlain by very low permeability London Clay Formation. Such materials prevent both the movement of groundwater and the ingress of surface water into the ground.

7.6.2 SUDS will be required at the site; this will likely comprise an above or below ground attenuation tank before release to the existing drainage network.

7.6.3 The proposed development is therefore unlikely to have an impact on the local hydrology.

7.7 Size of Basement

7.7.1 The London Borough of Camden document "Camden Planning Guidance Basements" (January 2021) outlines how Local Plan Policy A5 on basements limits the size of basement developments.

7.7.2 The table below provides commentary regarding the proposed development and the Policy A5 criteria.

Table 7.1: CPBG Local Plan Policy A5 Commentary

Criterion from LBC Policy A5	Jomas Comments on the Proposed Development in relation to LBC Policy A5
f. not comprise of more than one storey;	The proposed basement is only a single storey.
g. not be built under an existing basement;	The proposed development will comprise the lateral extension of an existing cellar/basement, not beneath an existing basement.
h. not exceed 50% of each garden within the property;	The rear garden is approximately 140m^2 and it is unlikely that the proposed basement would exceed 70m^2. Proposed development plans should be produced to more accurately determine this.
i. be less than 1.5 times the footprint of the host building in area;	The existing building footprint is approximately 184m^2 and it is unlikely that the proposed basement would exceed 276m^2. Proposed development plans should be produced to more accurately determine this.
j. extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;	The proposed basement is understood to protrude slightly from the rear façade of the existing building, but is unlikely to be by more than 9m (depth of host building is 18m). Proposed development plans should be produced to confirm.
k. not extend into or underneath the garden further than 50% of the depth of the garden;	The rear garden is approximately 20m long and it is unlikely that the proposed basement would exceed 10m into the garden. Proposed development plans should be produced to confirm.

Criterion from LBC Policy A5	Jomas Comments on the Proposed Development in relation to LBC Policy A5
l. be set back from neighbouring property boundaries where it extends beyond the footprint of the host building;	The proposed basement is understood to protrude from the rear of the existing building, but it is not known how close to neighbouring boundaries it will be. Proposed development plans should be produced to more accurately determine this.
m. avoid the loss of garden space or trees of townscape or amenity value	The proposed basement is understood to protrude from the rear of the existing building, but it is unlikely to underlie much garden space and is assumed that this would be reinstated over the top of the basement. Proposed development plans should be produced to more accurately determine this.

7.8 Summary and Recommendations

7.8.1 The overall assessment of the site is that the creation of a basement for the existing development should not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction.

7.8.2 However, the following should also be produced to support this assessment:

- Proposed development plans.
- A Ground Movement Assessment.
- A site-specific flood risk assessment and drainage strategy/SUDS.

7.8.3 It should also be noted that the following items are required as part of Camden Planning Guidance Basements (January 2021):

- Plans and sections to show foundation details of adjacent structures.
- Programme for enabling works, construction and restoration.
- Construction Sequence Methodology.
- Proposals for monitoring during construction.
- Evidence of consultation with neighbours.
- Ground Movement Assessment (GMA).
- Drainage assessment.

8 REFERENCES

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British Standards Institution BS 10175:2011+A2:2017 Code of practice for the investigation of potentially contaminated sites. BSI: London

British Standards Institution BS 5930:2015+A1:2020 Code of practice for ground investigations. BSI:London

British Standards Institution BS 8002:2015 Code of practice for earth retaining structures. BSI: London

British Standards Institution BS 8004:2015 Code of practice for foundations. BSI: London

British Standards Institution BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules. BSI: London

Campbell Reith (March 2018) *"Pro Forma Basement Impact Assessment*", London Borough of Camden

CIRIA C760 (2017), Guidance on embedded retaining wall design

CIRIA Report R143 The standard penetration test (SPT): methods and use, 1995: CIRIA: London

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Ministry of Housing, Communities & Local Government: National Planning Policy Framework. February 2019.

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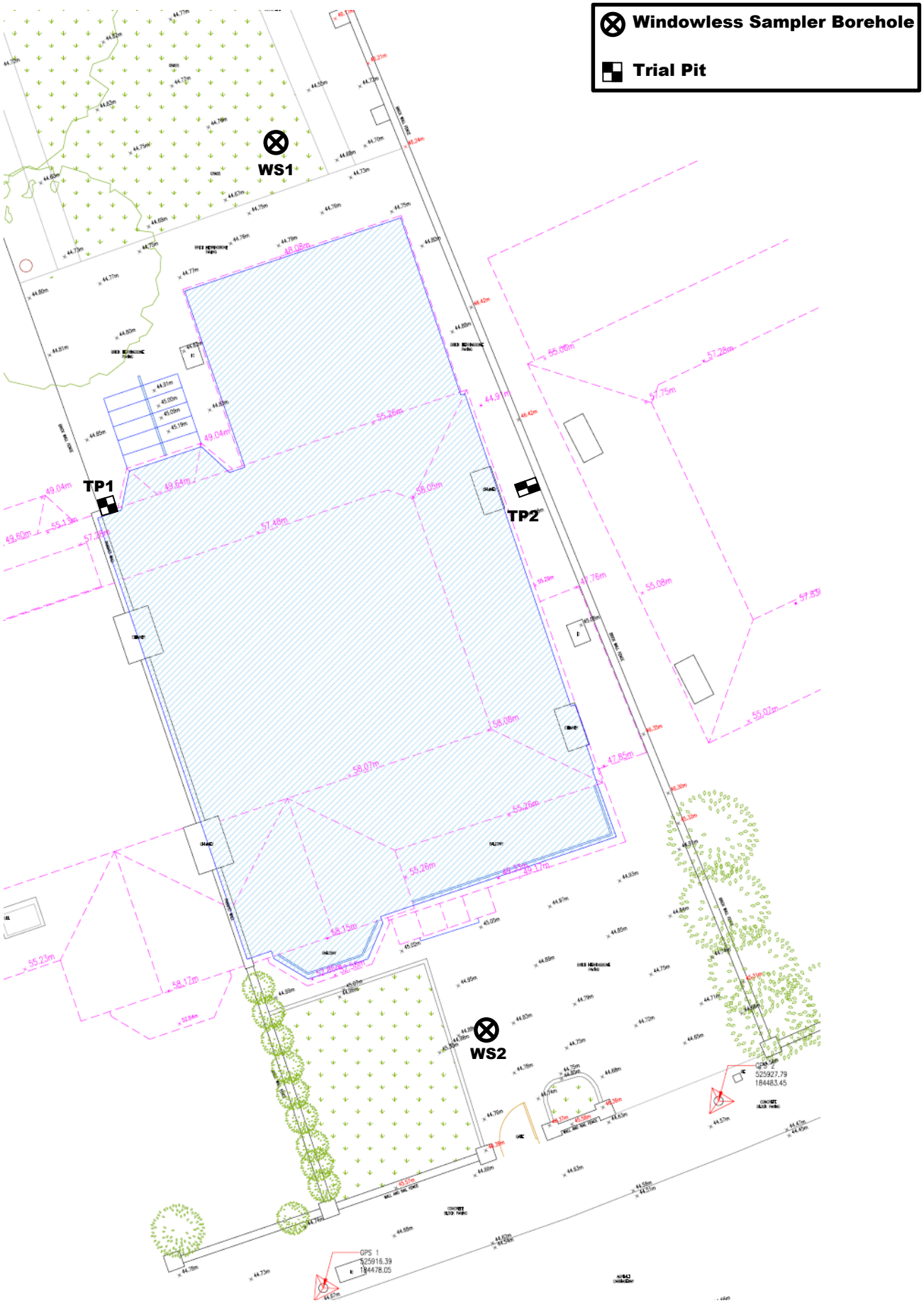
Tomlinson M.J (2001): Foundation Design and Construction 7th Edition. Pearson Prentice Hall: Harlow

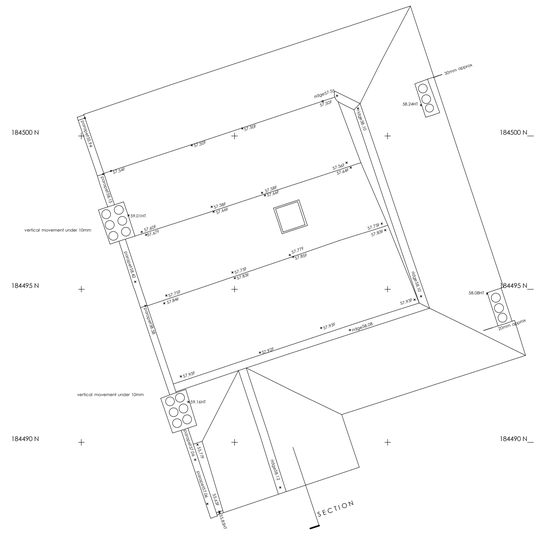
APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME	46 Compayne Gardens, London, NW6 3RY	**CLIENT**	David Katz
TITLE	Site Location Plan	**PROJECT NO.**	P4094J2580
DATE	June 2022	**FIGURE NO.**	1

PROJECT NAME:	46 Compayne Gardens, London, NW6 3RY	**CLIENT:**	David Katz
TITLE:	Completed Ground Investigation Plan	**PROJECT NO.**	P4094J2580
DATE:	June 2022	**FIGURE:**	2

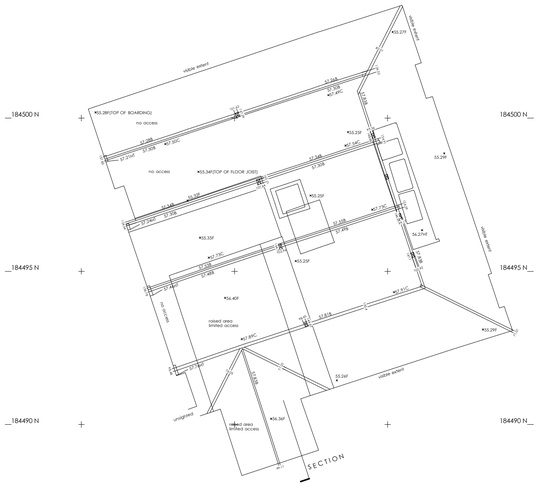




ROOF PLAN

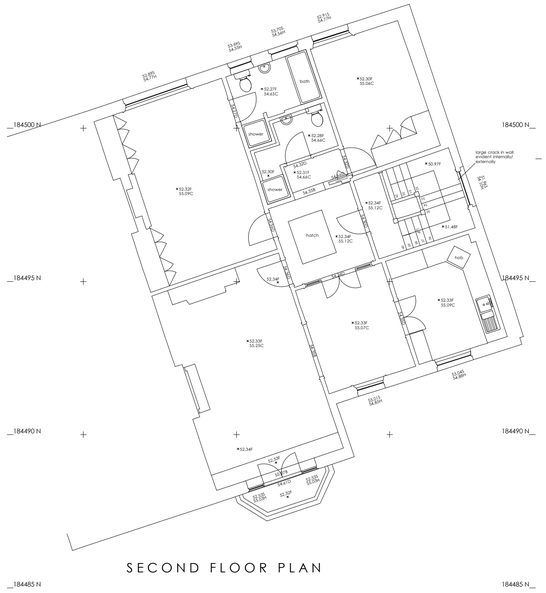
SOUTH ELEVATION

EAST ELEVATION

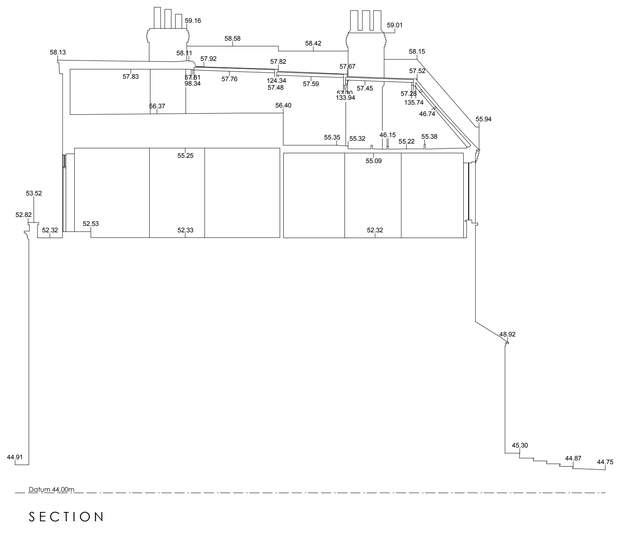


ATTIC (THIRD FLOOR) PLAN

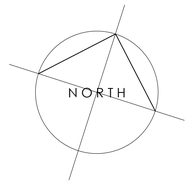
NORTH ELEVATION



SECOND FLOOR PLAN



SECTION



Revisions

A	12.05.15	Section added

Hayward Smart Architects

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studio@hsarchitects.co.uk

Client
46 Compayne Gardens Management Co Ltd

Project
46 Compayne Gardens
London

Drawing
Survey

Plans and Elevations

Date
Feb 2015

Scale
1:100 @ A1

Drawn
***

Job No
15-007

Drawing No
03A

architecture + interiors

APENDIX 2 – EXPLORATORY HOLE RECORDS

WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS1		
Site Address:	46 Compayne Gardens, London, NW6 3RY	Project No:	P4094J2580
Client:	David Katz	Ground Level:	
Logged By:	SEJ	Date Commenced:	23/06/2022
Checked By:	SC	Date Completed:	23/06/2022
Type and diameter of equipment:	Restricted Access Windowless Sampler	Sheet No:	1 Of 2

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

Remarks

1: No groundwater strike recorded

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

3:

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	0.25								0.00				Grass over dark brown sandy gravelly clay with occasional rootlets. Sand is fine to coarse. Gravel consists of fine to coarse angular to sub-rounded brick, flint, occasional ceramics and possible limestone fragments. (MADE GROUND)	
											0.45			
									0.50				Light brown mottled orangish brown slightly sandy very gravelly clay. Sand is coarse. Gravel consists of fine to coarse sub-angular to rounded flint with occasional fine sub-angular brick. (MADE GROUND)	
D	0.75													
D	1.00								1.00					
											1.10			
SPT		1	1	2	2	2	3	9					Firm to stiff** orangish brown mottled grey slightly silty CLAY. Becoming grey with depth. (LONDON CLAY FORMATION)	
									1.50					
D	2.00								2.00					
SPT		2	2	2	2	2	3	9						
									2.50					
D	3.00								3.00					
SPT		3	2	2	2	3	4	11						
									3.50					
D	4.00								4.00					
SPT		2	3	2	3	3	5	13						
									4.50					
D	5.00								5.00					
SPT		3	2	3	3	4	3	13						

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

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS1
Site Address:	46 Compayne Gardens, London, NW6 3RY	Project No:	P4094J2580
Client:	David Katz	Ground Level:	
Logged By:	SEJ	Date Commenced:	23/06/2022
Checked By:	SC	Date Completed:	23/06/2022
Type and diameter of equipment:	Restricted Access Windowless Sampler	Sheet No:	2 Of 2

Water levels recorded during boring, m

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

Remarks

1: No groundwater strike recorded

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

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	5.00								5.00					
SPT		3	2	3	3	4	3	13					Firm to stiff** orangish brown mottled grey slightly silty CLAY. Becoming grey with depth. (LONDON CLAY FORMATION)	
									5.50					
D	6.00								6.00					
SPT		3	3	4	4	3	4	15						
									6.50					
D	7.00								7.00					
SPT		3	3	4	3	4	5	16						
									7.50					
D	8.00								8.00		8.00			
SPT		4	4	5	5	6	6	22						
									8.50					
									9.00					
									9.50					
									10.00					

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

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS2		
Site Address:	46 Compayne Gardens, London, NW6 3RY	Project No:	P4094J2580
Client:	David Katz	Ground Level:	
Logged By:	SEJ	Date Commenced:	23/06/2022
Checked By:	SC	Date Completed:	23/06/2022
Type and diameter of equipment:	Restricted Access Windowless Sampler	Sheet No:	1 Of 2

Water levels recorded during boring, m

Date:	23/06/2022					
Hole depth:	8.00					
Casing depth:						
Level water on strike:	7					
Water Level after 20mins:						

Remarks

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

2:

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00		0.10		Brick paving over sand. (MADE GROUND)	
D	0.25												Light brown mottled orangish brown slightly sandy very gravelly clay. Sand is coarse. Gravel consists of fine to coarse sub-angular to rounded flint with occasional fine sub-angular brick. (MADE GROUND)	
D	0.50								0.50					
D	1.00								1.00		1.10			
SPT		1	1	3	3	3	3	12					Firm** light brown mottled orangish brown very gravelly CLAY. Gravel consists of medium to coarse sub-rounded flint. (LONDON CLAY FORMATION)	
D	1.50								1.50		1.70			
SPT	2.00	2	2	2	3	3	4	12	2.00				Firm to stiff** greyish brown silty CLAY with occasional selenite crystals. (LONDON CLAY FORMATION)	
D	2.50								2.50					
SPT	3.00	1	1	2	3	2	4	11	3.00					
D	3.50								3.50					
SPT	4.00	1	2	3	3	3	4	13	4.00					
D	4.50								4.50					
SPT	5.00	3	3	3	4	4	4	15	5.00					

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

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS2		
Site Address:	46 Compayne Gardens, London, NW6 3RY	Project No:	P4094J2580
Client:	David Katz	Ground Level:	
Logged By:	SEJ	Date Commenced:	23/06/2022
Checked By:	SC	Date Completed:	23/06/2022
Type and diameter of equipment:	Restricted Access Windowless Sampler	Sheet No:	2 Of 2

Water levels recorded during boring, m

Date:	23/06/2022					
Hole depth:	8.00					
Casing depth:						
Level water on strike:	7					
Water Level after 20mins:						

Remarks

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

2:

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
SPT	5.00	3	3	3	4	4	4	15	5.00				Firm to stiff** greyish brown silty CLAY with occasional selenite crystals. (LONDON CLAY FORMATION)	
D	5.50								5.50					
SPT	6.00	2	3	4	4	4	6	18	6.00					
D	6.50								6.50					
SPT	7.00	2	2	4	3	4	5	16	7.00					
D	7.50								7.50					
SPT	8.00	2	3	4	4	5	5	18	8.00		8.00			
									8.50					
									9.00					
									9.50					
									10.00					

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

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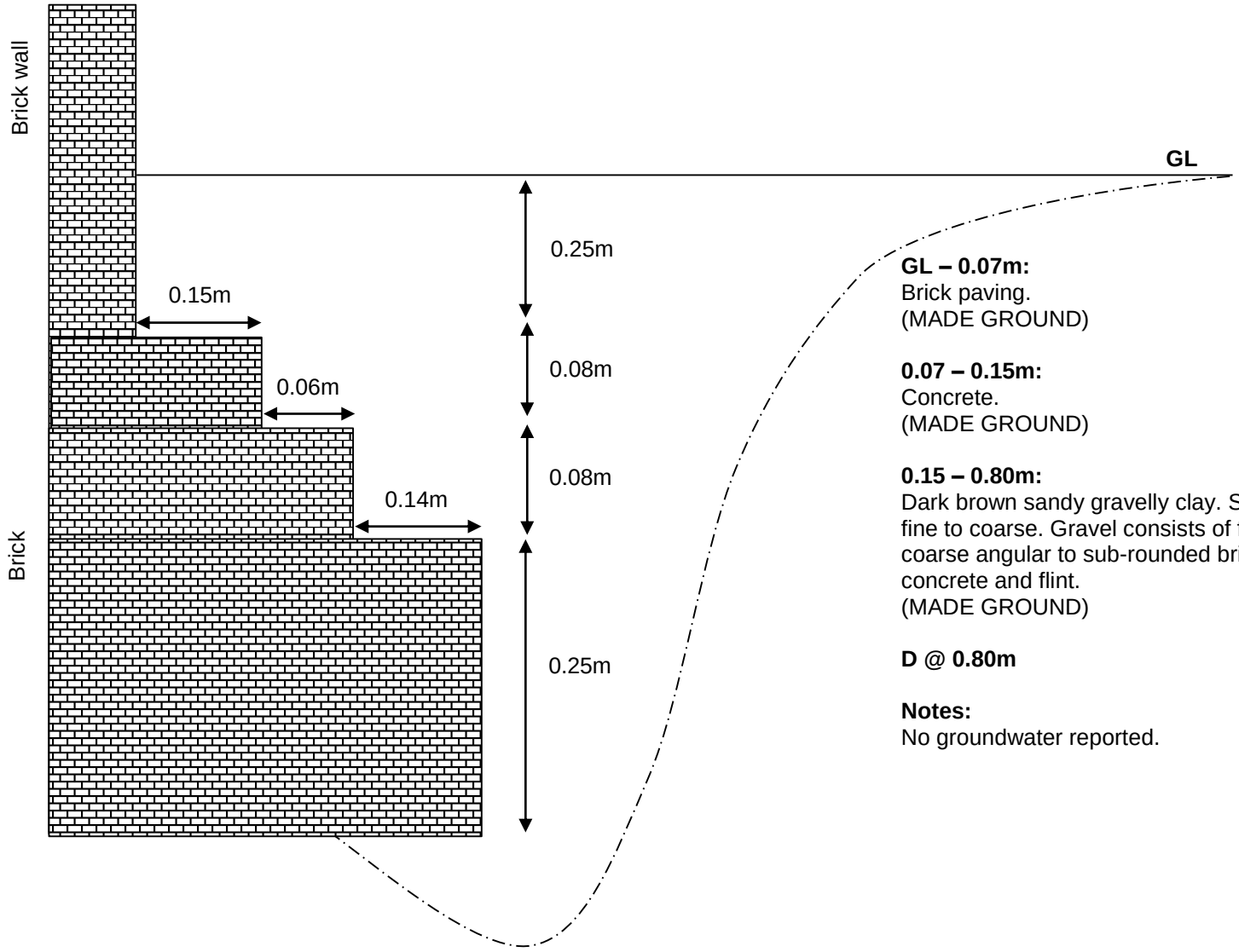
Job No.:	P4094J2580	**Issue Date:**	June 2022
Project:	46 Compayne Gardens, Hampstead NW6 3RY	**Prepared by:**	JRO SC
Subject:	Foundation Inspection Pit Sketches	**Checked by:**	

TP1 – House Wall (South)



GL – 0.07m:
Brick paving.
(MADE GROUND)

0.07 – 0.15m:
Concrete.
(MADE GROUND)

0.15 – 0.80m:
Dark brown sandy gravelly clay. Sand is fine to coarse. Gravel consists of fine to coarse angular to sub-rounded brick, concrete and flint.
(MADE GROUND)

D @ 0.80m

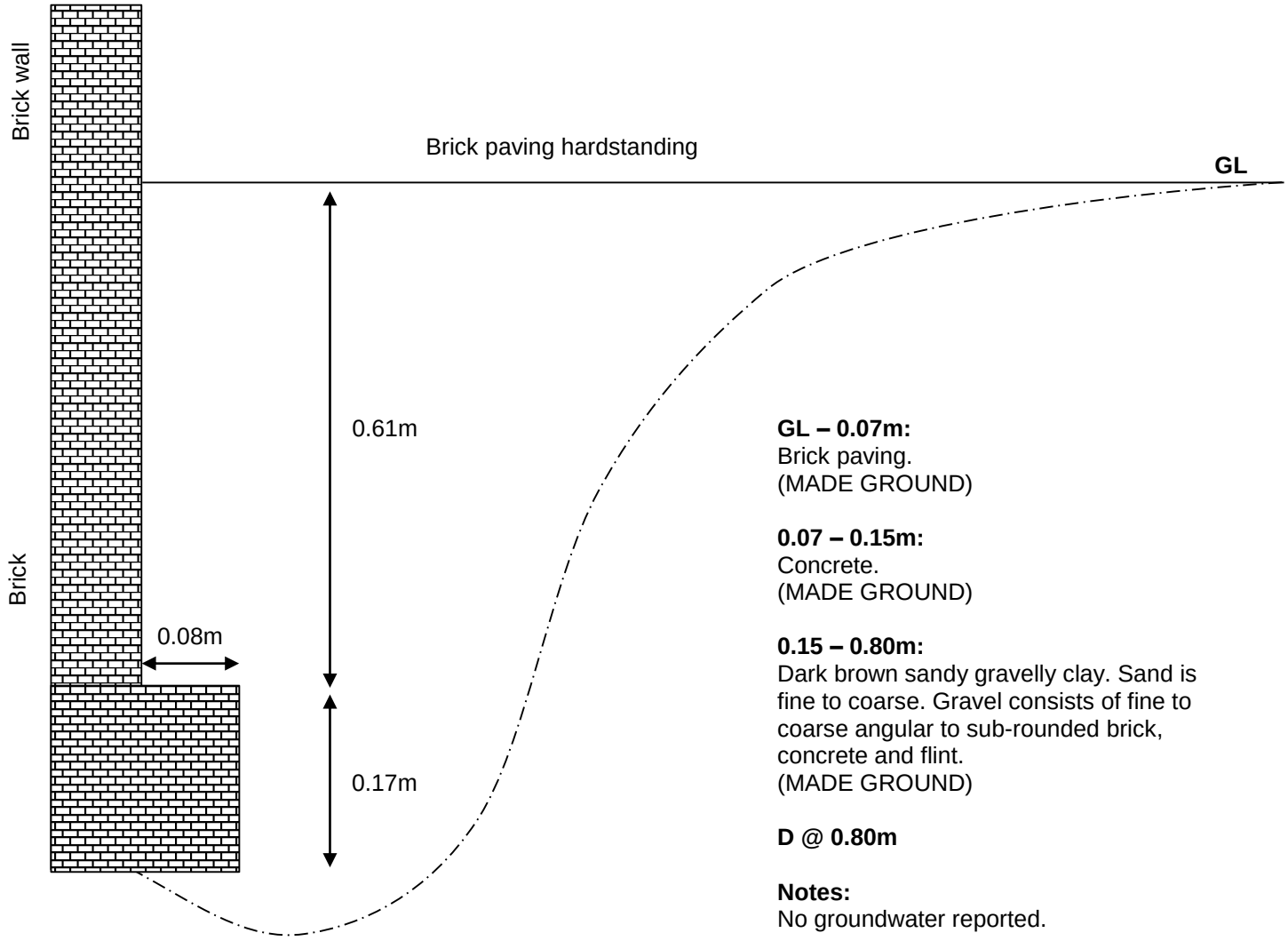
Notes:
No groundwater reported.

Base of foundation proven at 0.66mbgl.

Not to scale

Job No.:	P4094J2580	**Issue Date:**	June 2022
Project:	46 Compayne Gardens, Hampstead NW6 3RY	**Prepared by:**	JRO SC
Subject:	Foundation Inspection Pit Sketches	**Checked by:**	

TP1 – Garden Wall (West)



GL – 0.07m:
Brick paving.
(MADE GROUND)

0.07 – 0.15m:
Concrete.
(MADE GROUND)

0.15 – 0.80m:
Dark brown sandy gravelly clay. Sand is fine to coarse. Gravel consists of fine to coarse angular to sub-rounded brick, concrete and flint.
(MADE GROUND)

D @ 0.80m

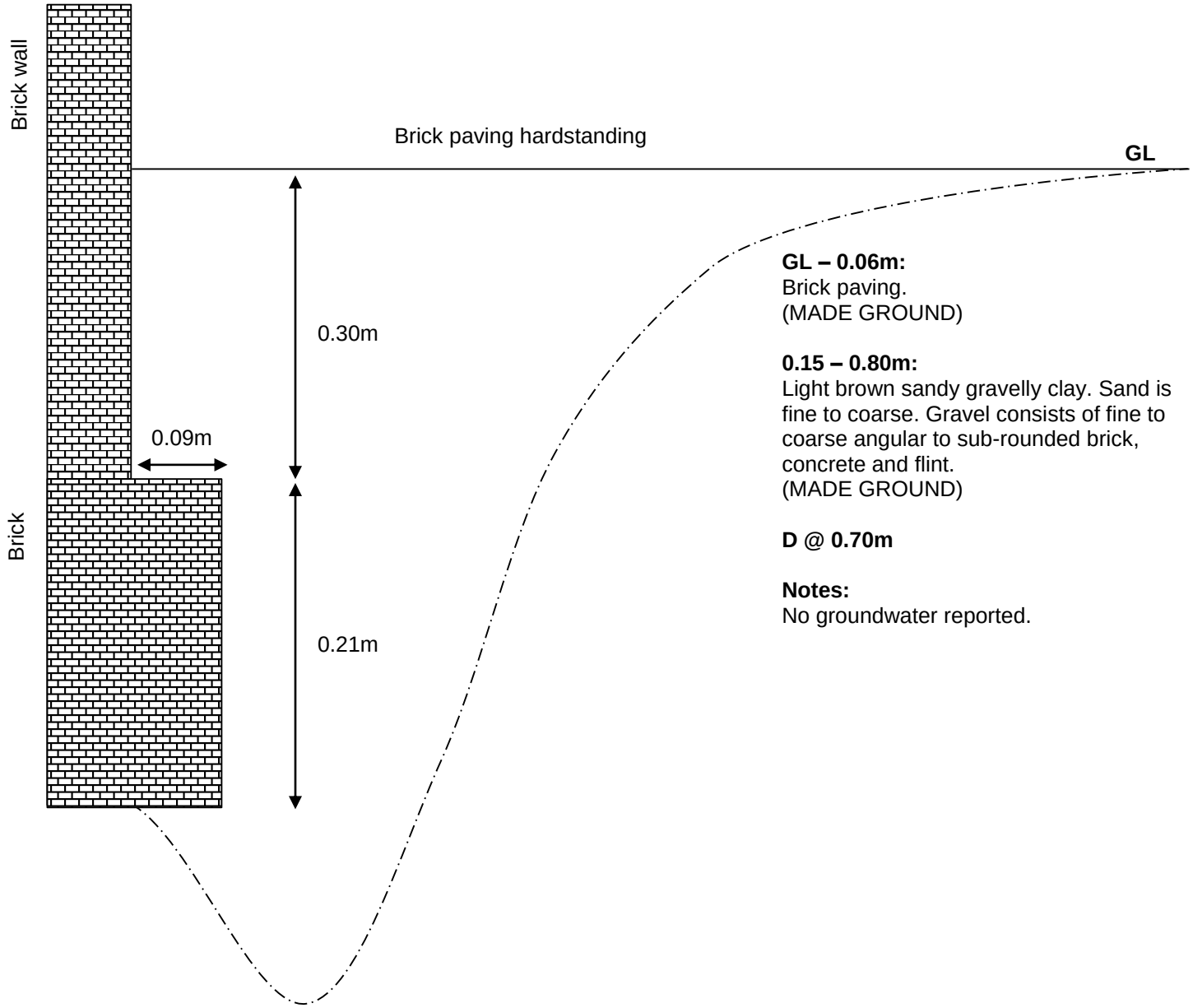
Notes:
No groundwater reported.

Base of foundation proven at 0.78mbgl.

Not to scale

Job No.:	P4094J2580	**Issue Date:**	June 2022
Project:	46 Compayne Gardens, Hampstead NW6 3RY	**Prepared by:**	JRO SC
Subject:	Foundation Inspection Pit Sketches	**Checked by:**	

TP2 – Garden Wall (East)



GL – 0.06m:
Brick paving.
(MADE GROUND)

0.15 – 0.80m:
Light brown sandy gravelly clay. Sand is fine to coarse. Gravel consists of fine to coarse angular to sub-rounded brick, concrete and flint.
(MADE GROUND)

D @ 0.70m

Notes:
No groundwater reported.

Base of foundation proven at 0.51mbgl.

Not to scale

APPENDIX 3 – LABORATORY TEST RESULTS

TEST CERTIFICATE

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	06/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

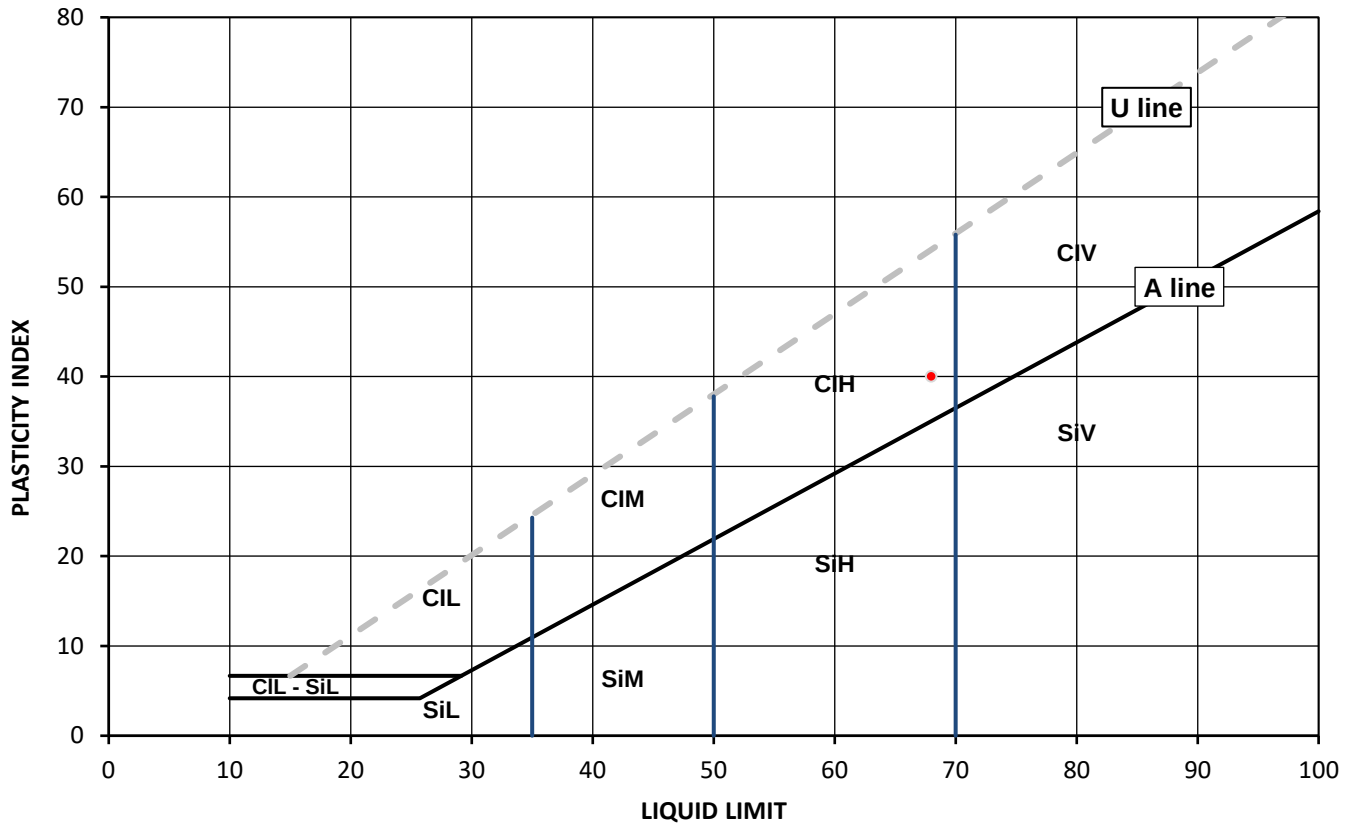
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327063	Depth Top [m]:	2.00
Hole No.:	WS1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly CLAY		

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
30	68	28	40	98



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

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

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

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

TEST CERTIFICATE

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	11/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

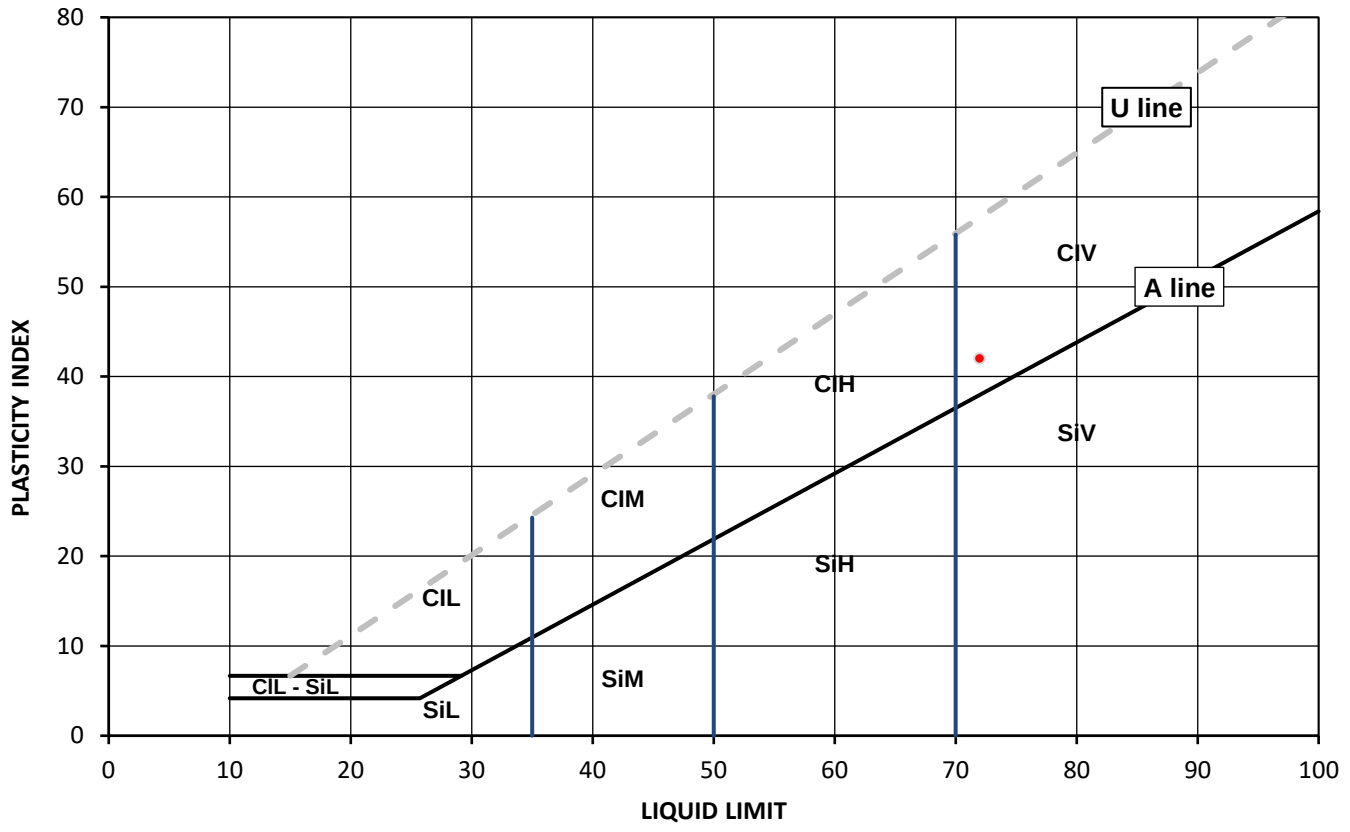
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327064	Depth Top [m]:	3.00
Hole No.:	WS1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
33	72	30	42	100



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

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

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

Remarks:

Signed:
Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	06/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

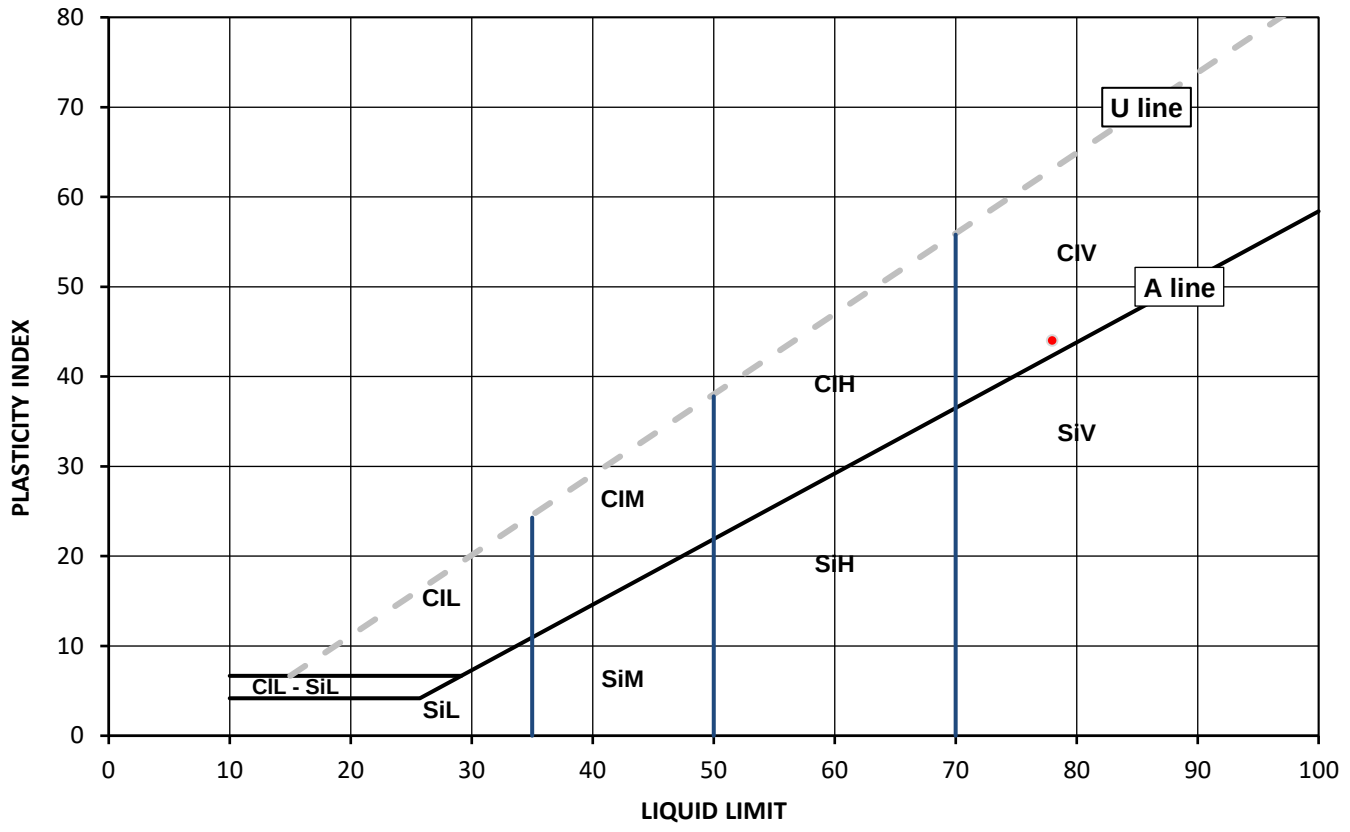
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327065	Depth Top [m]:	5.00
Hole No.:	WS1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
34	78	34	44	100



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

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

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

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

TEST CERTIFICATE

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	06/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

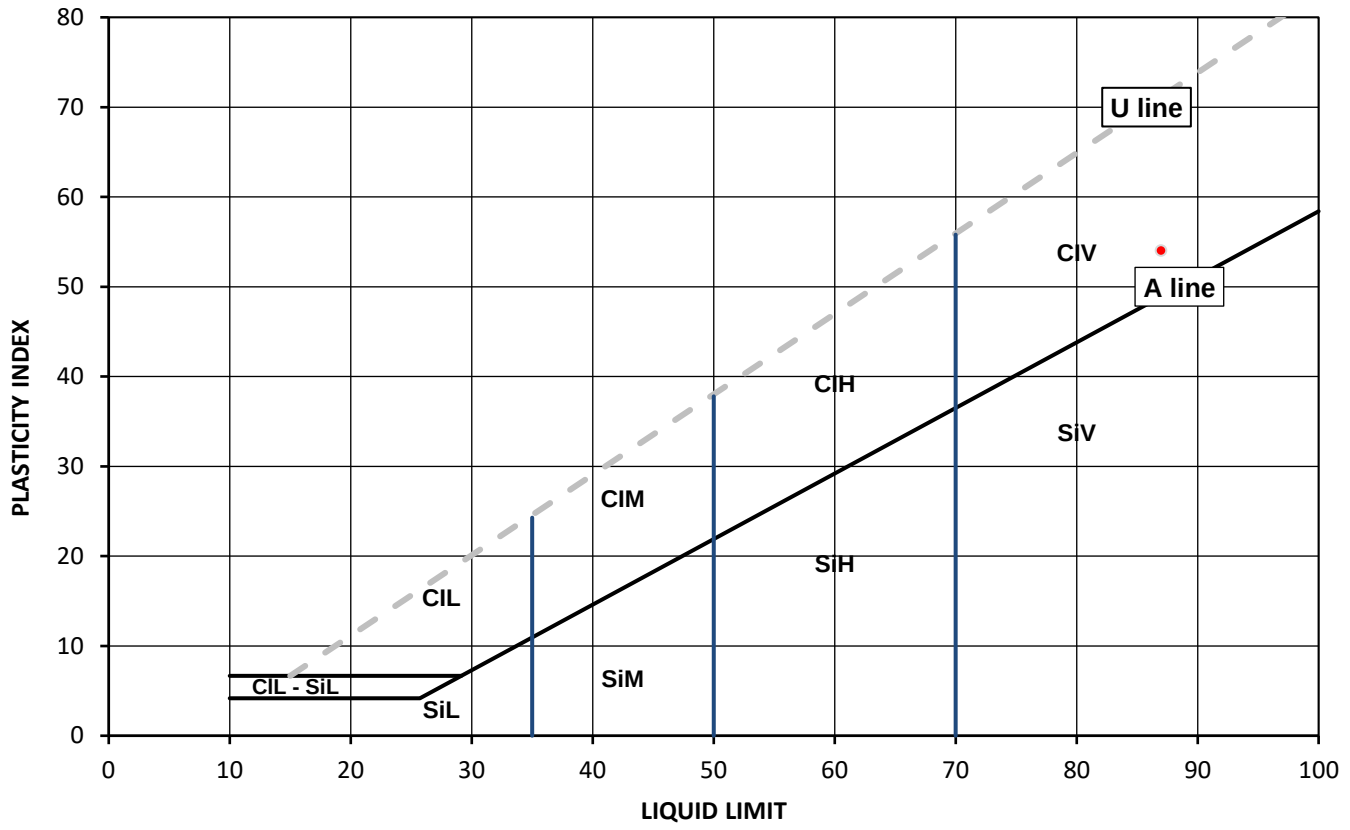
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327066	Depth Top [m]:	1.50
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown gravelly CLAY		

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	87	33	54	44



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

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

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

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	06/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

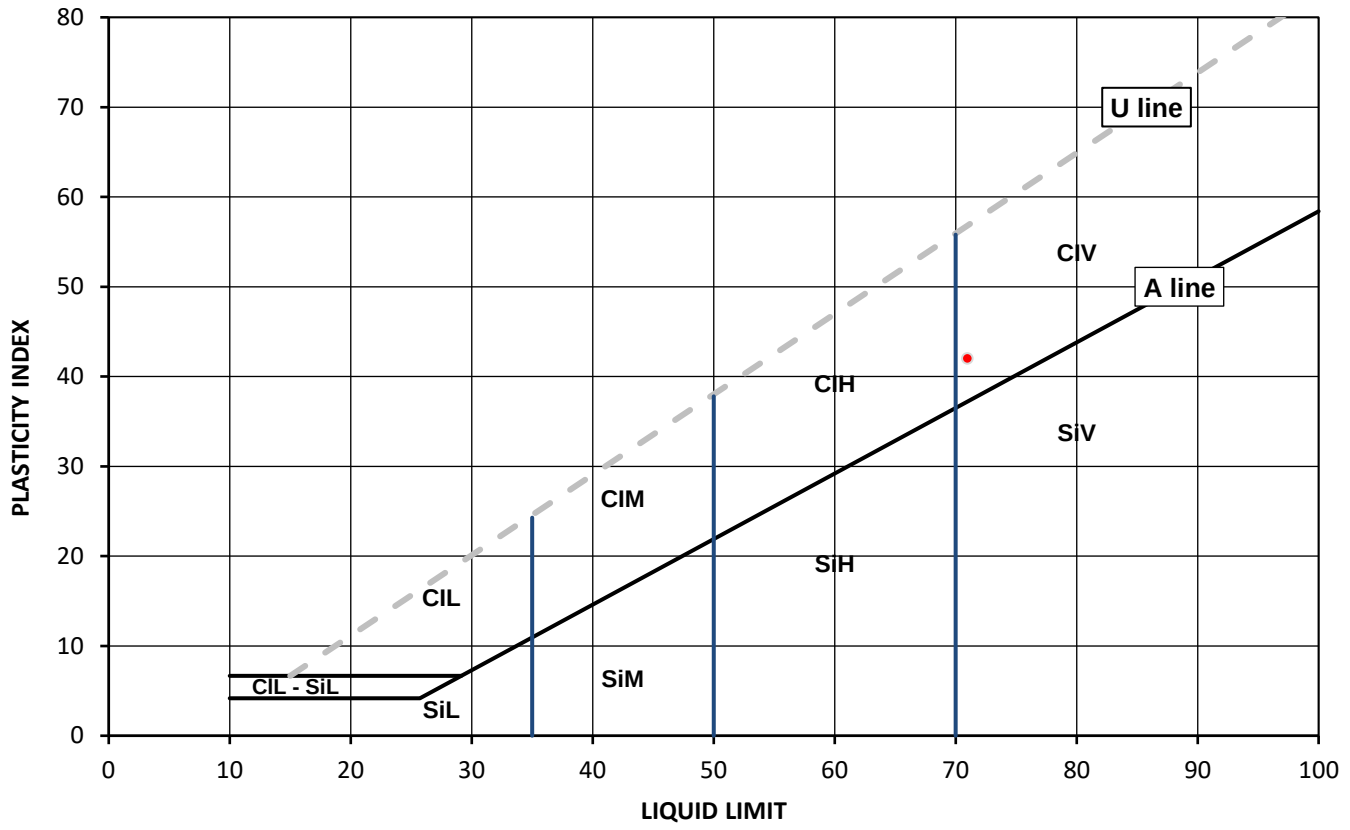
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327067	Depth Top [m]:	3.50
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
30	71	29	42	100



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

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

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

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

TEST CERTIFICATE

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2580
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	22-67252
		Date Sampled:	23/06/2022
		Date Received:	24/06/2022
Contact:	Shaw Carter	Date Tested:	06/07/2022
Site Address:	46 Compayne Gardens, Hampstead NW6 3RY	Sampled By:	Not Given

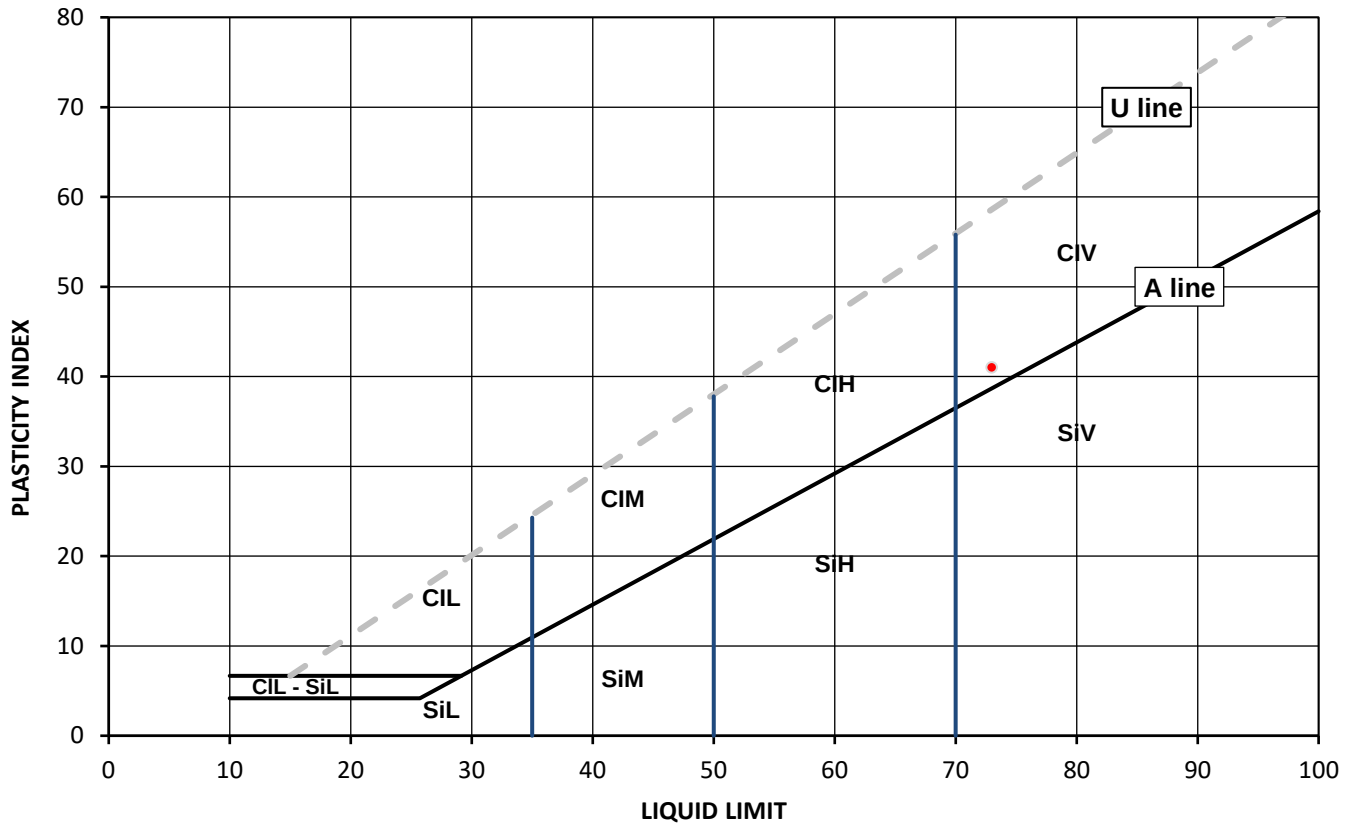
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2327068	Depth Top [m]:	4.50
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
33	73	32	41	100



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

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

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

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 236.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

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

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Contact: Shaw Carter

Site Address: 46 Compayne Gardens, Hampstead NW6 3RY

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: JJ2580
Job Number: 22-67252
Date Sampled: 23/06/2022
Date Received: 24/06/2022
Date Tested: 06/07 - 11/07/2022
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2327063	WS1	Not Given	2.00	Not Given	D	Brown slightly gravelly CLAY	Atterberg 4 Point	30		98	68	28	40						
2327064	WS1	Not Given	3.00	Not Given	D	Brown CLAY	Atterberg 4 Point	33		100	72	30	42						
2327065	WS1	Not Given	5.00	Not Given	D	Brown CLAY	Atterberg 4 Point	34		100	78	34	44						
2327066	WS2	Not Given	1.50	Not Given	D	Brown gravelly CLAY	Atterberg 4 Point	21		44	87	33	54						
2327067	WS2	Not Given	3.50	Not Given	D	Brown CLAY	Atterberg 4 Point	30		100	71	29	42						
2327068	WS2	Not Given	4.50	Not Given	D	Brown CLAY	Atterberg 4 Point	33		100	73	32	41						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

GF 238.14

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way,
Stockley Park, UB11 1BD

Contact: Shaw Carter

Site Address: 46 Compayne Gardens, Hampstead NW6 3RY

Client Reference: JJ2580
Job Number: 22-67252
Date Sampled: 23/06/2022
Date Received: 24/06/2022
Date Tested: 06/07 - 11/07/2022
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2327063	WS1	Not Given	2.00	Not Given	D	Brown slightly gravelly CLAY		30	Sample was quartered, oven dried at 106.2 °C			
2327064	WS1	Not Given	3.00	Not Given	D	Brown CLAY		33	Sample was quartered, oven dried at 109.0 °C			
2327065	WS1	Not Given	5.00	Not Given	D	Brown CLAY		34	Sample was quartered, oven dried at 106.2 °C			
2327066	WS2	Not Given	1.50	Not Given	D	Brown gravelly CLAY		21	Sample was quartered, oven dried at 106.2 °C			
2327067	WS2	Not Given	3.50	Not Given	D	Brown CLAY		30	Sample was quartered, oven dried at 106.2 °C			
2327068	WS2	Not Given	4.50	Not Given	D	Brown CLAY		33	Sample was quartered, oven dried at 106.2 °C			

Comments:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 13/07/2022

Shaw Carter
Jomas Associates Ltd
Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

e: Jomas Associates -

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

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

Analytical Report Number : 22-67251

Project / Site name:	46 Compayne Gardens, Hampstead NW6 3RY	**Samples received on:**	24/06/2022
Your job number:	JJ2580	**Samples instructed on/ Analysis started on:**	24/06/2022
Your order number:	P4094JJ2580.5	**Analysis completed by:**	01/07/2022
Report Issue Number:	1	**Report issued on:**	01/07/2022
Samples Analysed:	3 soil samples		

Martyna Langer

Signed:

Martyna Langer
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-67251
Project / Site name: 46 Compayne Gardens, Hampstead NW6 3RY
Your Order No: P4094JJ2580.5

Lab Sample Number				2327057	2327058	2327059
Sample Reference				WS1	WS1	WS2
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.25	3.00	2.50
Date Sampled				23/06/2022	23/06/2022	23/06/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	20	16
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.1	7.7	8.2
Total Sulphate as SO4	mg/kg	50	MCERTS	740	5100	310
Total Sulphate as SO4	%	0.005	MCERTS	0.074	0.514	0.031
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.063	2.3	0.05
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	63	2320	49.9
Total Sulphur	mg/kg	50	MCERTS	510	1700	170
Total Sulphur	%	0.005	MCERTS	0.051	0.172	0.017

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

Analytical Report Number : 22-67251
Project / Site name: 46 Compayne Gardens, Hampstead NW6 3RY

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2327057	WS1	None Supplied	0.25	Brown clay and loam with gravel and vegetation.
2327058	WS1	None Supplied	3	Brown clay.
2327059	WS2	None Supplied	2.5	Brown clay.

Analytical Report Number : 22-67251
Project / Site name: 46 Compayne Gardens, Hampstead NW6 3RY

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

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

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

Shaw Carter
Jomas Associates Ltd
Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

e: Jomas Associates -

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

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

Analytical Report Number : 22-67570

Project / Site name:	46 Compayne Gardens, Hampstead NW6 3RY	**Samples received on:**	24/06/2022
Your job number:	JJ2580	**Samples instructed on/ Analysis started on:**	27/06/2022
Your order number:	P4094JJ2580.5	**Analysis completed by:**	04/07/2022
Report Issue Number:	1	**Report issued on:**	04/07/2022
Samples Analysed:	1 soil sample		

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-67570
Project / Site name: 46 Compayne Gardens, Hampstead NW6 3RY
Your Order No: P4094JJ2580.5

Lab Sample Number				2328583
Sample Reference				WS2
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	16
Total mass of sample received	kg	0.001	NONE	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1
Total Sulphate as SO4	mg/kg	50	MCERTS	290
Total Sulphate as SO4	%	0.005	MCERTS	0.029
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.013
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	13.4
Total Sulphur	mg/kg	50	MCERTS	170
Total Sulphur	%	0.005	MCERTS	0.017

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

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2328583	WS2	None Supplied	0.5	Light brown clay and sand with gravel.

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

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

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

Sample Deviation Report

Analytical Report Number : 22-67570
Project / Site name: 46 Compayne Gardens, Hampstead NW6 3RY

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

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS2	None Supplied	S	2328583	a	None Supplied	None Supplied	None Supplied

APPENDIX 4 – GROUNDWATER MONITORING RECORDS

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: 46 Compayne Gardens	**Operative(s):** JAR	**Date:** 04/07/2022	**Time:** 10:00	**Round:** 1	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G505801	01/10/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions: Dry**	**Temperature**: 20 °C
Barometric Pressure (mbar): 1016	**Barometric Pressure Trend (24hr):** Up	**Ambient Concentration:** 0.1 %CH_4, 0.1 % CO_2, 20.7 %O_2

Monitoring Point Location	Depth to water (mbgl)	Depth to base of well (mbgl)
WS1	Dry	4.15
WS2	1.32	6.26

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