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GROUND INVESTIGATION & BASEMENT IMPACT ASSESSMENT REPORT

26 AMYAND PARK ROAD
TWICKENHAM
TW1 3HE

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V1.1	11/12/24	HAH	*Updated recommended further works.*
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APPENDICES

EXECUTIVE SUMMARY

05 Group Ltd commissioned Jomas Associates Ltd to prepare a Geotechnical Ground Investigation and Basement Impact Assessment at the site located at 26 Amyand Park Road, Twickenham, TW1 3HE .

The principal objectives of the study were as follows:

- To establish the geotechnical conditions pertaining to the site;
- To assess the data from the investigation to inform preliminary design advice with respect to foundation design, concrete specification and excavation stability.
- To undertake a Basement Impact Assessment (BIA) based on the methodologies outlined in London Borough of Richmond on Thames "Planning Advice Note: Good Practice Guide on Basement Developments" (2015) and "Basement Assessment User Guide" (2021), with additional reference to the guidance given in the London Borough of Camden document "Camden Planning Guidance Basements" (CPGB) (January 2021).

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.

Site Information	
Current Site Use	Two-storey residential property undergoing refurbishment
Proposed Site Use	The proposed development for this site is understood to comprise the creation of a basement beneath the entire building footprint and extending partially beneath the front garden.
Summary of Stage 1 & 2 BIA	A Stage 1 & 2 Basement Impact Assessment report has been produced for the site and issued separately (Jomas, June 2024). A brief overview of the findings is presented below. Reference should be made to the full report for detailed information. On the earliest available map (1865), the site is shown as largely vacant except for a small building shown to be extending into the site from the north-west. By the map dated 1912, the site is shown to be situated within a row of terraced housing. No observational changes then occur to the site until the most recent map dated 2024. Historically, the surrounding area has comprised mainly residential properties, with the only significant land use identified as a railway 80m north of site and the River Crane beyond at approximately 176m from site. The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Langley Silt Member. Superficial deposits of the Kempton Park Gravel Member are anticipated to underlie the Langley Silt Member. These superficial deposits overlie solid deposits of the London Clay Formation. The underlying Langley Silt Member and the London Clay Formation are identified as Unproductive. The Kempton Park Gravel Member is reported (off-site) as a Principal Aquifer. A review of the EnviroInsight Report indicates that there are no Environment Agency Zone 2 or Zone 3 flood zones within 250m of the site.

Site Information	
	The River Crane is reported 176m north-west. The screening and scoping assessments concluded the following: • A ground investigation was recommended to confirm the ground conditions and groundwater levels (if any) beneath the site. • The ground investigation should also determine the presence of Made Ground and/or clay. Atterberg Limits of the underlying clay should be determined by the ground investigation to establish shrink/swell potential. • The proposed basement will underlie the existing building footprint/ hardstanding; there will be no significant change in surface water run-off.
Ground Investigation	
Scope of Works	The ground investigation was undertaken on 10 October 2024, and consisted of the following: • 1No cable percussive borehole, drilled to a depth of 10m below ground level (mbgl), with associated in-situ testing and sampling • 1No groundwater monitoring well, installed to 7.5mbgl • Laboratory analysis for chemical and geotechnical purposes • 1No return visits to monitor groundwater levels has been carried out, and 1No further visit is due to be completed in February 2025
Ground Conditions	The results of the ground investigation revealed a ground profile comprising Made Ground to a depth of 1.9mbgl, underlain by granular deposits of the Kempton Park Gravel Member to 7.4mbgl, underlain by cohesive deposits of the London Clay Formation to a depth in excess of 10mbgl. During the investigation, groundwater was reported within the borehole at a depth of 6.2mbgl, and by the time the drilling had concluded, was sat at a level of 6.45mbgl. During return monitoring, groundwater was reported at 6.53mbgl. A second visit is due to take place in February 2025 and this report will be updated.
Foundations	Based upon the information obtained to date, it is considered that a cast in-situ cantilever retaining wall formed at least 3.5m below the existing ground level within the Kempton Park Gravel Member could be designed with an allowable bearing capacity of 200kPa. Total and differential settlements should be contained within tolerable limits. It is unlikely that the foundations would need to be deepened further due to NHBC building near trees requirements.
Sulphates	Based on the results of chemical testing, for foundations formed with the Kempton Park Gravel Member, the required concrete class for the site is DS-1 assuming an Aggressive Chemical Environment for Concrete classification of AC-1 in accordance with the procedures outlined in BRE Special Digest 1. If foundations are to be formed within the London Clay Formation, higher concrete classes are considered necessary, as detailed in Section 6.4.

Site Information	
Ground Floor Slabs	If a cantilever retaining wall is utilised, then a ground bearing floor slab could be used. If a piled option is utilised then suspended floor slabs will be required.
Excavations	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	The overall assessment of the site is that the creation of a basement for the proposed 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 neighbouring properties are not adversely affected. This may mean that structures will need to be suitably propped and supported.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 05 Group Ltd ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to undertake an investigation of the geotechnical factors pertaining to the proposed redevelopment and to prepare a Basement Impact Assessment at a site referred to as 26 Amyand Park Road, Twickenham, TW1 3HE .

1.1.2 To this end a Stage 1 & 2 (Screening and Scoping) Basement Impact Assessment has been produced for the site and issued separately (Jomas, June 2024), followed by an intrusive investigation (detailed in this report).

1.1.3 Details of the previous report are provided below in Table 1.1:

Table 1.1: Previous Reports - Jomas

Title	Author	Reference	Date
Stage 1 & 2 Basement Impact Assessment (Screening and Scoping) for 26 Amyand Park Road, Twickenham, TW1 3HE	Jomas Associates Ltd	P5802J3027/HAH	20 June 2024

1.1.4 The intrusive investigation was undertaken in accordance with Jomas' proposal dated 17 September 2024.

1.2 Proposed Development

1.2.1 The proposed development for this site is understood to the creation of a basement beneath the entire building footprint and extending partially beneath the front garden.

1.2.2 Plans of the proposed development are included in Appendix 1.

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

1.3 Objectives

1.3.1 An intrusive investigation is proposed to establish geotechnical conditions pertaining to the site.

1.3.2 The data from the geotechnical investigation is to form the basis of preliminary design advice with respect to foundation design, concrete specification and excavation stability.

1.3.3 A Basement Impact Assessment will 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;
- Undertaking of laboratory chemical and geotechnical testing upon samples obtained;
- Return groundwater monitoring;
- Carrying out a Basement Impact Assessment (BIA);
- 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 The site lies within the remit of the London Borough of Richmond upon Thames. The council has published the documents "Planning Advice Note: Good Practice Guide on Basement Developments" (2015) and "Basement Assessment User Guide" (2021). These documents provide detail on the issues relevant to basements within London Borough of Richmond upon Thames and describe how these issues should be assessed.

1.5.2 Jomas has also used the guidance given in the London Borough of Camden document "Camden Planning Guidance Basements" (CPGB) (January 2021) as this is generally accepted as the best available guidance on the practicalities regarding how to undertake a BIA.

1.5.3 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 a confirmatory and reasoned statement identifying likely damage to nearby properties according to Burland Scale
- Construction Sequence Methodology
- Proposals for monitoring during construction.
- Drainage assessment

1.5.4 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.

1.5.5 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 05 Group Ltd, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.7.2 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.

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

2 EXISTING INFORMATION

2.1 Site Information

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

Table 2.1: Site Information

Name of Site	-
Address of Site	26 Amyand Park Road, Twickenham, Richmond upon Thames, TW1 3HE
Approx. National Grid Ref.	516307 173599
Site Area (Approx.)	0.01 hectares
Site Occupation	Residential
Local Authority	London Borough of Richmond upon Thames

2.2 Summary of Stage 1 & 2 Basement Impact Assessment

2.2.1 As detailed in Table 1.1, a report has been produced for the site by Jomas dated 20 June 2024, and issued separately. 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 map (1865), the site is shown as largely vacant except for a small building shown to be extending into the site from the north-west. By the map dated 1912, the site is shown to be situated within a row of terraced housing. No observational changes then occur to the site until the most recent map dated 2024.

2.2.3 Historically, the surrounding area has comprised mainly residential properties, with the only significant land use identified as a railway 80m north of site and the River Crane beyond at approximately 176m from site.

2.2.4 The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Langley Silt Member. Superficial deposits of the Kempton Park Gravel Member are anticipated to underlie the Langley Silt Member. These superficial deposits overlie solid deposits of the London Clay Formation.

2.2.5 The underlying Langley Silt Member and the London Clay Formation are identified as Unproductive. The Kempton Park Gravel Member is reported (off-site) as a Principal Aquifer.

2.2.6 A review of the EnviroInsight Report indicates that there are no Environment Agency Zone 2 or Zone 3 flood zones within 250m of the site.

2.2.7 The River Crane is reported 176m north-west.

Basement Impact Assessment (Screening and Scoping)

2.2.8 Screening identifies the area 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.

2.2.9 These issues are summarised below:

2.2.10 The site predominantly comprises hardstanding cover which includes the existing building on site, a driveway area and a rear external patio. Areas of gravel and small plants are present adjacent to the building. The proposed plans show that there will be a reduction in hardstanding area to the front of the building through provision of a new garden area, though the majority of this will be underlain by the basement.

2.2.11 The site was considered to be at low risk of flooding based on historic flooding.

2.2.12 No risk of flooding to the site from artificial sources was identified.

2.2.13 The published geological maps indicate that the site is directly underlain by superficial deposits of the Langley Silt Member and the Kempton Park Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation. This should be confirmed by an intrusive investigation. Geotechnical laboratory testing of soils should also be undertaken to establish their shrink/swell properties.

2.2.14 The proposed basement excavation will be within 5m of a public pavement, and within 5m of neighbouring properties.

2.2.15 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, any associated services and structures.

2.2.16 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. Alternatively, the excavation should proceed in a manner that maintains the integrity of the ground on all sides.

2.2.17 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 property and neighbouring structures. If necessary, the works may have to be carried out in stages with the above structure suitably propped and supported.

2.2.18 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 Richmond upon Thames.

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

2.3 Previous Ground Investigations

2.3.1 Jomas is not aware of any previous intrusive investigation works that have been undertaken on the site.

3 GROUND INVESTIGATION

3.1 Scope of Works

3.1.1 A ground investigation was undertaken on the 10 October 2024.

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

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved	Justification
Cable Percussion Borehole	1	BH1	10mbgl	Obtain samples for laboratory geotechnical testing. To allow in-situ geotechnical testing.
Monitoring Well	1	BH1	7.5mbgl	Groundwater monitoring wells.

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

3.1.4 The exploratory hole position is shown on the exploratory hole location plan presented in Figure 2, Appendix 1. The exploratory hole record is included in Appendix 2.

3.2 Geotechnical Testing

In-situ

3.2.1 In-situ geotechnical testing included Standard Penetration Tests (SPTs). 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

3.2.2 Soil samples were obtained and submitted to the UKAS accredited laboratory of K4 Soils Ltd for a series of analyses.

3.2.3 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.

3.2.4 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	2
BS1377:1990	Liquid and Plastic Limit Determination (Atterberg Limits)	2
BS1377:1990	Particle Size Distribution - Sieving	3
BS1377:1990	Determination of the undrained shear strength in triaxial compression with single-stage loading and without measurement of pore pressure	1

3.2.5 The geotechnical laboratory test results are included in Appendix 3.

3.2.6 In addition, 5No soil samples were sent to the UKAS and MCerts accredited laboratory of Derwentside Environmental Testing Services Ltd and 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. The results of this chemical testing are included in Appendix 4.

4 ENCOUNTERED CONDITIONS

4.1 General

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

4.1.2 For further details of the ground conditions, reference should be made to the exploratory hole location plan presented in Appendix 1, exploratory hole log presented in Appendix 2, and the laboratory testing results in Appendix 3 and 4.

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 Langley Silt Member over the Kempton Park Gravel Member over 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)
Concrete over (dark) brown clayey silty gravelly sand. Sand is fine to coarse. Gravel consists of fine to coarse, angular to rounded flint, brick and concrete. (MADE GROUND)	0.0	1.9	1.9
Dense to very dense orangish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel consists of fine to coarse, angular to rounded flint. (KEMPTON PARK GARVEL MEMBER)	1.9	7.4	5.5
Firm to stiff consistency** dark grey CLAY. (LONDON CLAY FORMATION)	7.4	>10.0 [base not proven]	>2.6 [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 Hydrogeology

4.3.1 Groundwater strikes and groundwater monitoring are summarised below.

Table 4.2: Groundwater Strikes During Investigation

Exploratory Hole ID	Depth Encountered (mbgl)	Depth Post-Drilling (mbgl)	Stratum
BH1	6.20	6.45	Kempton Park Gravel Member

4.3.2 1No return groundwater monitoring visit was undertaken on 18 October 2024, the results are presented in Appendix 5 and are summarised below. A second visit is due to take place in February 2025.

Table 4.3: Groundwater Monitoring Summary

Exploratory Hole ID	Depth Encountered (mbgl)	Well response zone as installed (mbgl)	Depth base of well (mbgl)	Stratum targeted by response zone
BH1	6.53	1.00 – 7.50	8.02	Made Ground and Kempton Park Gravel Member

4.3.3 While the monitoring well is understood to have been installed to 7.5mbgl, the depth to the base of the well measured during the return monitoring visit was 8.02mbgl. This is potentially due to an error when measuring the pipe for installation, and/or the top of the monitoring well being located below ground level.

4.3.4 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.

4.4 Limitations

4.4.1 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 Introduction

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

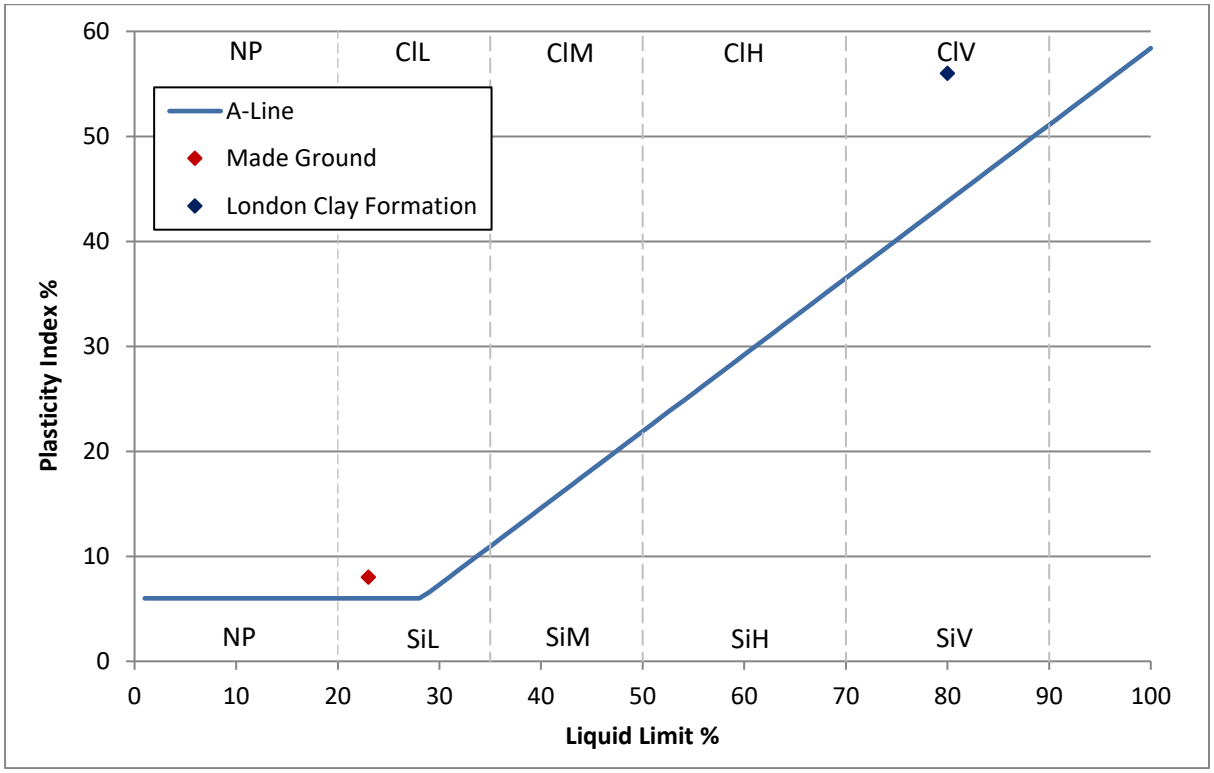
5.2 Plasticity of Cohesive Materials

5.2.1 Atterberg Limit determination was undertaken on 1No sample of Made Ground at a depth of 1.7mbgl, and 1No sample of the London Clay Formation at a depth of 9.5mbgl.

5.2.2 Within the Made Ground, the plasticity index value was 8% and was indicative of low plasticity, as illustrated in Figure 5.1 below. The modified plasticity index value was 4.96%, indicating that these soils are non-shrinkable.

5.2.3 The plasticity index value within the London Clay Formation was 56% and was indicative of very high plasticity. The modified plasticity index value was 53.2%, indicating soils with high volume change potential.

Figure 5.1: Plasticity Chart

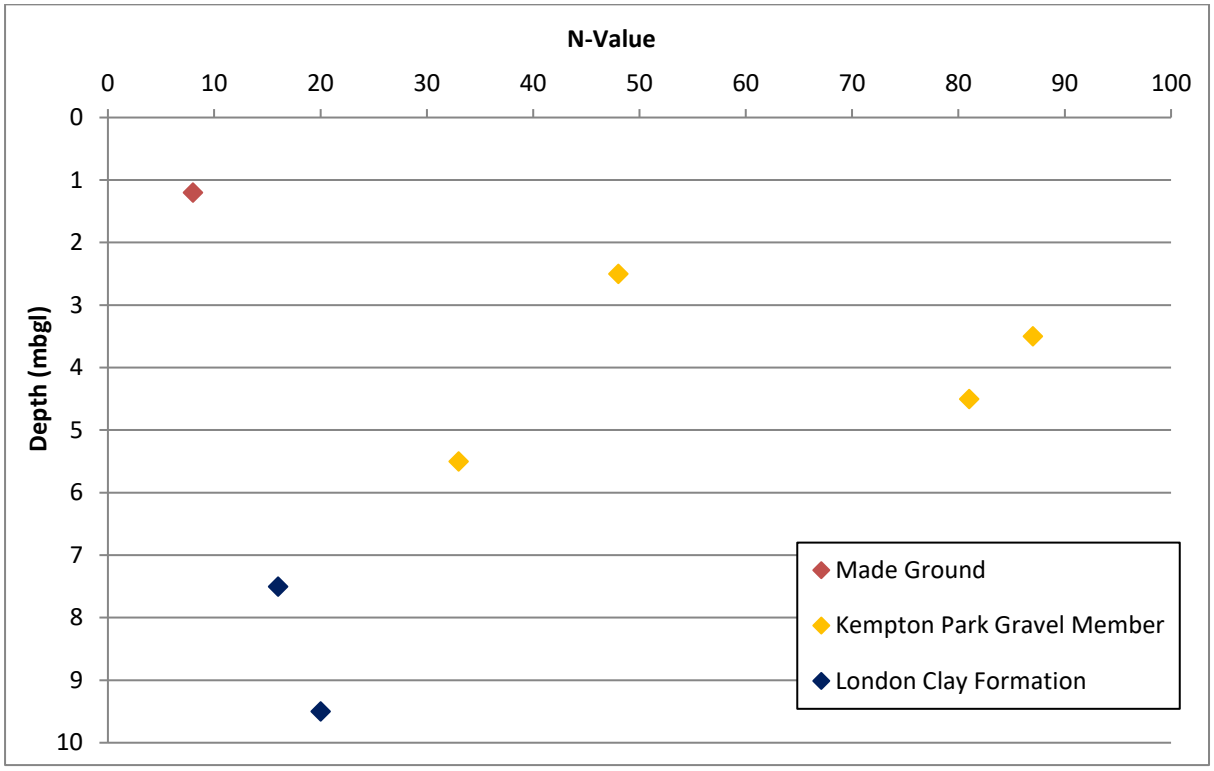


5.3 Standard Penetration Tests

5.3.1 Standard Penetration Tests were undertaken at regular intervals throughout the cable percussive borehole. The results of the SPTs are plotted against depth in Figure 5.2 below.

5.3.2 N_{equi} results have been calculated where the full 300mm of penetration could not be achieved for 50 or more blows

Figure 5.2: SPT N-Value v Depth



5.4 Undrained Shear Strength

5.4.1 As discussed above, the N values recorded in the clay vary with depth, this infers that the undrained shear strength of the clay similarly varies. Figure 5.3 below shows the undrained shear strength inferred by the correlation suggested by Stroud (1974);

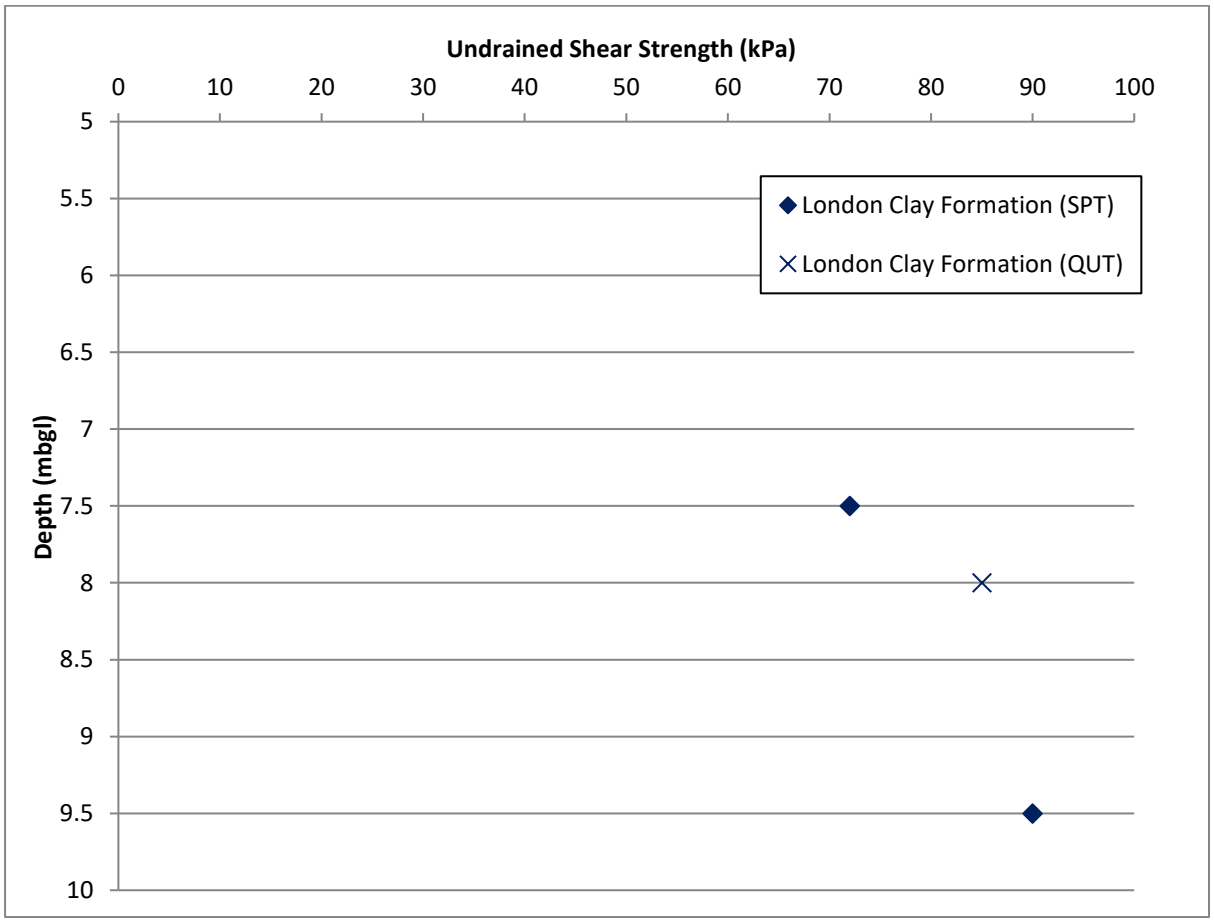
$c_u = f_1 \times N$ can be applied,

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

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

5.4.3 The graph below shows the shear strength profile of the encountered cohesive materials at the site, based on the SPT to shear strength correlation described above, as well as the results of quick undrained triaxial (QUT) testing on undisturbed samples taken from the borehole.

Figure 5.3: Undrained Shear Strength v Depth



5.4.4 As shown above, a general trend of increasing undrained shear strength with depth can be seen within the limited results from the London Clay Formation.

5.5 Coefficient of Compressibility

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

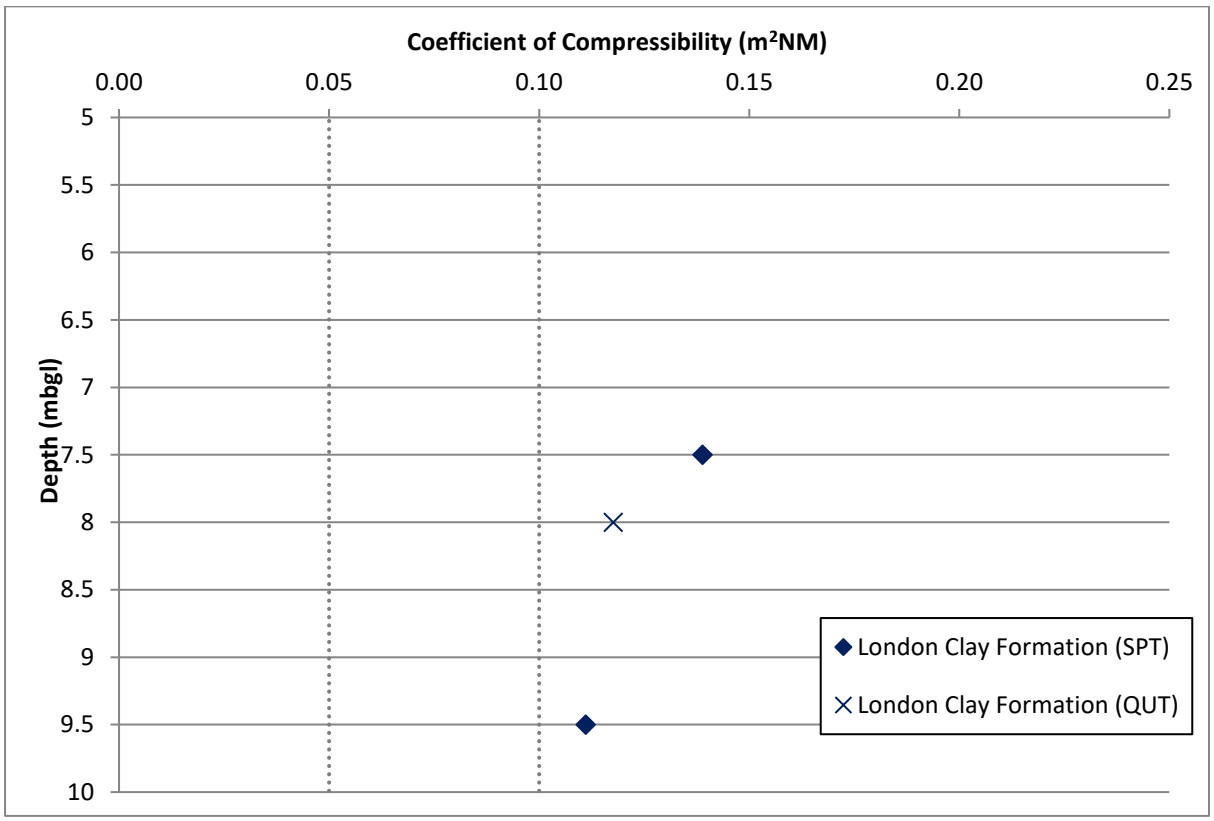
$m_v = 1/ f_2 \times N$ can be applied,

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

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

5.5.3 Where the undrained shear strength of the clays was measured using the quick undrained triaxial methodology, the m_v value was calculated by rearranging the equations for f_1 and f_2 and substituting in the measured undrained shear strength.

Figure 5.4: Coefficient of Volume Compressibility (mv) v Depth



5.5.4 As shown above, the results from the London Clay Formation are of "medium compressibility".

5.6 Density

5.6.1 In order to calculate the undrained shear strength using the quick undrained triaxial methodology, the bulk density of the materials has to be calculated, which are provided on the testing certificates in Appendix 4. These values can be converted to a unit weight value in kN/m^3.

5.6.2 In the absence of geotechnical laboratory test results, the correlations and suggested unit weight values for both cohesive and granular materials given in BS8004:2015 have been used.

5.6.3 The derived unit weights are summarised below in Table 5.1.

Table 5.1: Derived Unit Weights

Strata	Unit Weight (kN/m³)
Made Ground	17
Kempton Park Gravel Member	20
London Clay Formation	19.5

5.7 Effective Angle of Shearing Resistance / Angle of Friction

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

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

Where PI = Plasticity Index.

5.7.2 Values have been calculated for all available Plasticity Index results and are presented in Table 5.2.

Table 5.2: Derived Angles of Shearing Resistance

Sample	Stratum	Derived Angle of Shearing Resistance (°)
BH1 – 1.7m	Made Ground	30.7
BH1 – 9.5m	London Clay Formation	20.1

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

5.8 Stiffness Moduli

5.8.1 In cohesive soils of the London Clay Formation, the undrained stiffness modulus (Young's Modulus) can be derived using the correlation with undrained shear strength as postulated by Jardine et al. (1985):

$$\underline{Eu = 400 * Cu(kPa)}$$

5.8.2 The drained Young's Modulus for the London Clay Formation can then be derived from E_u, as follows:

$$\underline{E' = 0.6 * Eu}$$

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

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

5.9 Summary of Derived General Properties

5.9.1 Based on the analysis of the ground investigation data and past experience with similar deposits, the following derived general parameters are given in Table 5.3.

Table 5.3: Derived General Parameters

Property	Made Ground	Kempton Park Gravel Member	London Clay Formation
Unit Weight	17[1)]	20[1)]	19.5[2)]
Drained Friction, φ' (◦)	30.7[3)]	36[4)]	20.1[3)]
Drained Cohesion, c' (kPa)	0	-	0
SPT N-value	8	31 – 87	16 – 20
Undrained Young's Modulus, E_u (MPa)[5)]	-	-	28.8 – 36
Drained Young's Modulus E' (MPa)	-	31.0 – 87.0[6)]	17.3 – 21.6[7)]
Undrained Shear Strength, c_u (kPa)[8)]	-	-	72 – 90
Undrained Shear Strength, c_u (kPa)[9)]	-	-	85
Plasticity Index (%)	8	-	56
Modified Plasticity Index (%)	5	-	53.2
Volume Change Potential [NHBC]	Non-shrinkable	-	High
Modulus of Volume Compressibility, m_v (m^2/MN)[10)]	-	-	0.111 – 0.139

[1)] Derived from Figures 1 and 2 of BS8004:2015
[2)] Calculated from bulk density, measured during quick undrained triaxial (QUT) testing
[3)] Calculated from: $\varphi' = (42° - 12.5\log 10 I_p)$ for $5\% \leq I_p \leq 100\%$ Where, I_p is the soil's plasticity index (BS8004:2015)
[4)] Calculated from Table 1 of BS8004:2015
[5)] Calculated from $E_u = 0.4 \times c_u$ MPa, based on the guidance given in Jardine et al 1985
[6)] Calculated from: E' = 1.0 x N MPa, based on the guidance given in CIRIA Report 143
[7)] Calculated from E' = 0.6 x Eu MPa, based on the guidance given in Jardine et al 1985
[8)] The undrained shear strength (c_u) of the cohesive soils was correlated to the SPT N-values using Stroud (1974), where $c_u = f_1 N$ 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)
[9)] These values have been determined from the unconsolidated undrained triaxial compression testing in accordance with BS1377: Part 7: 1990, Clause 8
[10)] 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 All topsoil is to be stripped from beneath proposed structures ahead of development.

6.2.2 The Made Ground is not considered to provide suitable bearing strata 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.

Conventional Foundations

6.2.4 Based on drawings provided, it is anticipated that the finished floor level of the basement would be approximately 3m below existing ground level and therefore formation level is anticipated to be ~3.5mbgl.

6.2.5 Based upon the information obtained to date, it is considered that a cast in-situ cantilever retaining wall formed at approximately 3.5m below the existing ground level within the Kempton Park Gravel Member could be designed with an allowable bearing capacity of 200kPa. Total and differential settlements should be contained within tolerable limits.

6.2.6 It is unlikely that the foundations would need to be deepened further due to NHBC building near trees requirements.

6.2.7 Where foundations need to change levels, 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 If foundations span different strata, e.g. sand and clay, they should either be deepened to terminate in a single soil stratum, or suitable reinforcement included (to be detailed by the Structural Engineer).

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

6.2.10 It is recommended that excavations to form the foundations should be undertaken using a toothless bucket to reduce the potential for disturbance of the underlying Kempton Park Gravel Member.

6.2.11 Foundations should not be formed in the granular materials until the granular materials have been proof compacted. Given the depth and likely size of these foundations, it is considered that this could be undertaken using a hydraulic "elephants foot" or if the whole basement founding layer is compacted at the same time a vibrating roller or "whacker plate" if the machinery can be easily taken into the excavation and the stability of the excavation/safety of any workers entering the excavation can be assured.

6.2.12 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

	Kempton Park Gravel Member	London Clay Formation
Critical state angle of shearing resistance (ϕ')°	36	20
Effective Cohesion kN/m^2	-	0
Saturated Bulk Weight (γ_{sat}) kN/m^3	21	19.5

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

6.3.4 As an alternative to cantilever retaining walls, fully embedded retaining walls comprising a contiguous/secant piled basement box could be formed. The piles would need to act as retaining walls as well as carry the structural loadings. The piles should be designed to withstand the earth pressures, and still meet the required structural requirements regarding issues such as deflection, deformation and bending.

6.3.5 To provide sufficient support for the excavation, it is recommended that un-propped piles are formed to at least three times the depth of excavation.

6.3.6 If these piles can be suitably propped, then this depth may be reduced. Suitable propping could be provided by the basement floor and the ground floor if they are suitably tied into the piles and suitably reinforced. This may require specialist construction techniques.

6.4 Aggressive Ground Conditions

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 (%)[1)]	Design Sulphate Class	ACEC Class
Made Ground	2	8 – 8.7	80	N/A	DS-1	AC-1
Kempton Park Gravel Member	2	8.4 – 8.7	<10	N/A	DS-1	AC-1
London Clay Formation	1	8.4	173	0.87	DS-3	AC-3

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 London Clay Formation contains significant concentrations of oxidisable sulphides (e.g. pyrite), which can be oxidised to form additional sulphate on disturbance and exposure to air as outlined in BRE SD-1:2005. The total potential sulphate must therefore also be considered in the designation of a Design Class, in cases where the London Clay Formation is to be disturbed and exposed to air.

6.4.5 Where these deposits are not likely to be disturbed and exposed, but foundations are formed within them (such as piles), then a Design Class of DS-2 is recommended, with an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC-2.

6.4.6 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 3m 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. Given the material at these depths, it is considered likely that such floor slabs could be constructed on the in-situ natural granular materials. 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 If a piled option is utilised then suspended floor slabs will be required. The loadings from the suspended floor slab will need to be carried by the foundations, which will need to be designed to not only carry the structural loadings but the additional floor loadings.

6.5.4 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.

6.5.5 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 and granular soils 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 Cantilever retaining walls should be installed in short sections to aid stability of the excavation during construction of the basement.

6.6.4 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.

6.7 Groundwater Control

6.7.1 During the investigation, groundwater was reported within the borehole at a depth of 6.2mbgl, and by the time the drilling had concluded, was sat at a level of 6.45mbgl.

6.7.2 During return monitoring, groundwater was reported at 6.53mbgl. A second visit is due to take place in February 2025 and this report will be updated.

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

6.7.4 Surface water or rainfall ingress is likely to freely drain through the granular materials. If this does not occur, then they too could be dealt with by traditional sump and pump.

7 BASEMENT IMPACT ASSESSMENT

7.1 Geological Impact

7.1.1 The published geological maps indicate that the site is directly underlain solid deposits of the Langley Silt Member and Kempton Park Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation

7.1.2 The ground conditions were confirmed by a ground investigation and comprise Made Ground to a depth of 1.9mbgl, underlain by granular deposits of the Kempton Park Gravel Member to 7.4mbgl, underlain by cohesive deposits of the London Clay Formation to a depth in excess of 10mbgl. The proposed basement will be founded within the Kempton Park Gravel Member at a depth of ca. 3.5mbgl.

7.1.3 Laboratory testing indicates that the London Clay Formation is of high volume change potential. However, with consideration of the depth of these deposits, it is not considered that they will have an impact on the proposed basement.

7.2 Hydrology and Hydrogeology Impact

7.2.1 Based on all the information available at the time of writing, the risk of flooding from groundwater is considered to be low to moderate. The site was shown on mapping to not be located within an area where there is increased potential for elevated groundwater due to permeable surface deposits. The site was identified to be located within an area with a susceptibility to groundwater flooding of <25%.

7.2.2 During the investigation, groundwater was reported at depths of between 6.2mbgl and 6.53mbgl. At this stage, on this basis, it is considered that the proposed basement is unlikely to have a detectable impact on the groundwater regime. However, an additional groundwater monitoring visit is due to be conducted in February 2025, and this report will be updated on receipt of the results.

7.2.3 Appropriate water proofing measures should be included within the whole of the proposed basement wall/floor design as a precaution.

7.2.4 The Kempton Park Gravel Member is classed as a Secondary A Aquifer but the creation of the basement is considered unlikely to have any impact upon the hydrogeology of the area.

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

7.2.6 The River Crane is reported 176m north-west of the site.

7.2.7 The information available suggests that the site lies in an area that is at low risk of surface water flooding.

7.2.8 The proposed basement construction is unlikely to result in an increase in impermeable areas in the post development scenario.

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

7.3 Other Impacts

7.3.1 Impacts such as changes to areas of external hardstanding, past flooding, and impacts to adjacent properties and pavement are addressed within the Stage 1 & 2 (Screening and Scoping) Basement Impact Assessment for 26 Amyand Park Road, Twickenham, TW1 3HE (Jomas Associates Ltd, P5802J3027/HAH, June 2024).

7.3.2 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 Richmond upon Thames.

7.4 Cumulative Impacts

7.4.1 The above individual effects could potentially interact to form a greater issue.

7.4.2 The site has been identified as being directly underlain by a Secondary A Aquifer (Kempton Park Gravel Member).

7.4.3 However, no sensitive uses have been identified in the surrounding area.

7.4.4 Furthermore, the modest size of the proposed basement will not significantly alter the existing groundwater regime.

7.4.5 The development of the basement will therefore not significantly affect the groundwater flow on or surrounding the site.

7.5 Conclusion

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

7.5.2 The proposed development is not expected to cause significant problems to the subterranean drainage.

8 REFERENCES

AGS Guidelines for Good Practice in Geotechnical Ground Investigation, 2016

BRE Report BR 470: Working platforms for tracked plant, 2004. BRE: Watford

BRE Special Digest 1: Concrete in Aggressive Ground, 2005. BRE: Watford

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

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

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

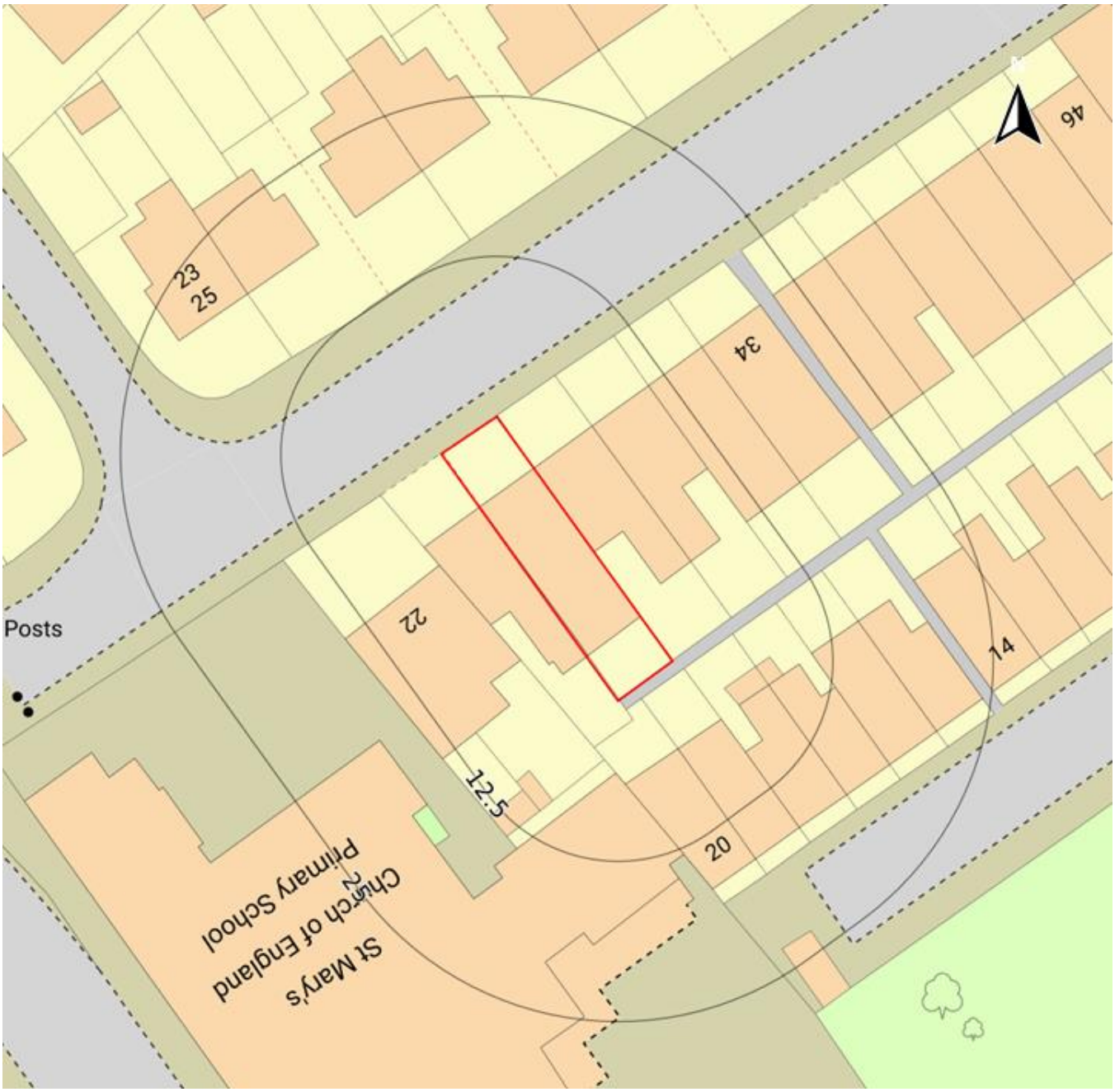
NHBC Standards 2023. NHBC, Milton Keynes

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

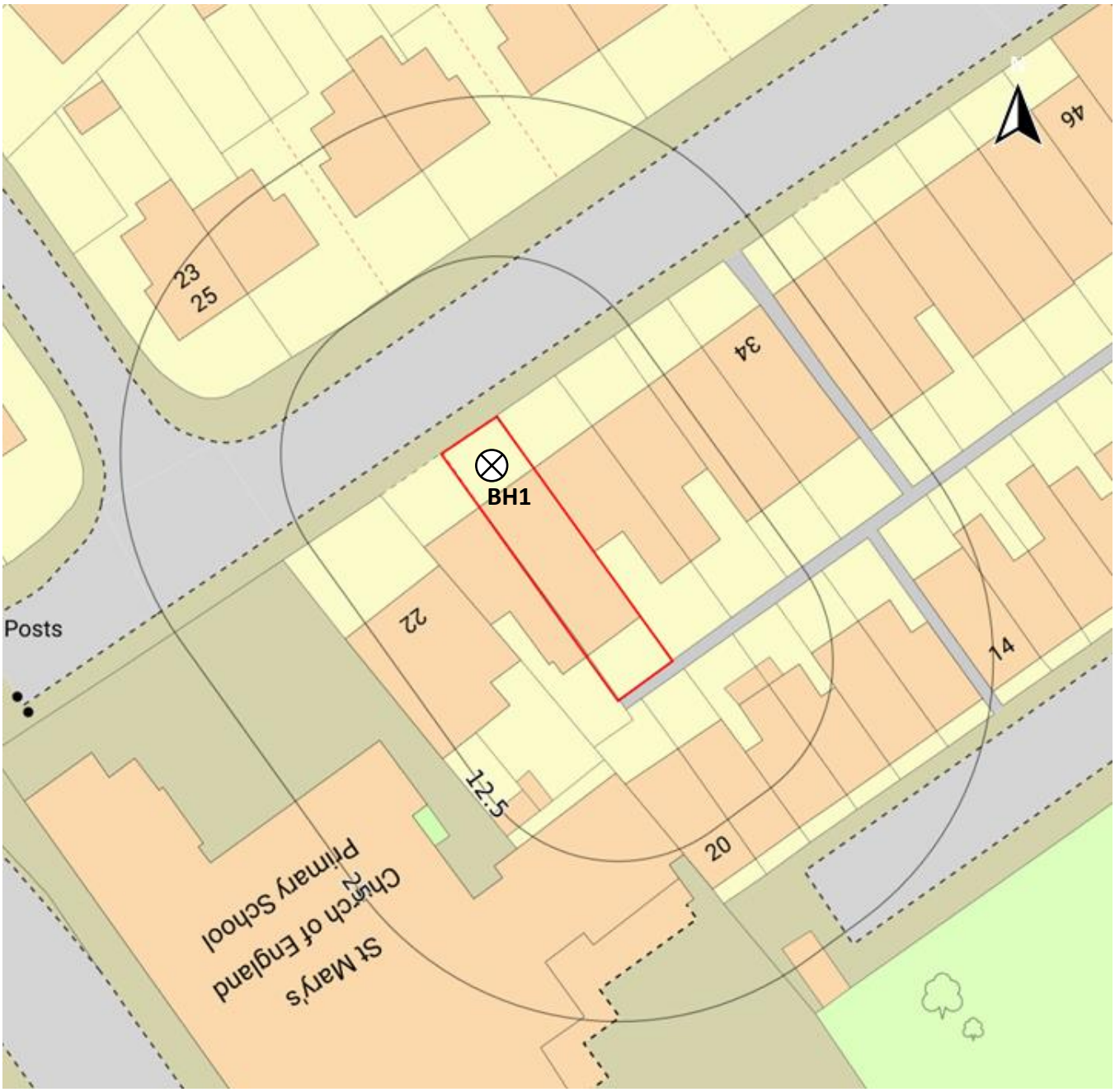
APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME	26 Amyand Park Road, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Site Location Plan	**PROJECT NO.**	P5802J3027
DATE	June 2024	**FIGURE NO.**	1



PROJECT NAME	26 Amyand Park Road, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Completed Exploratory Hole Plan	**PROJECT NO.**	P5802J3027
DATE	October 2024	**FIGURE NO.**	2



PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

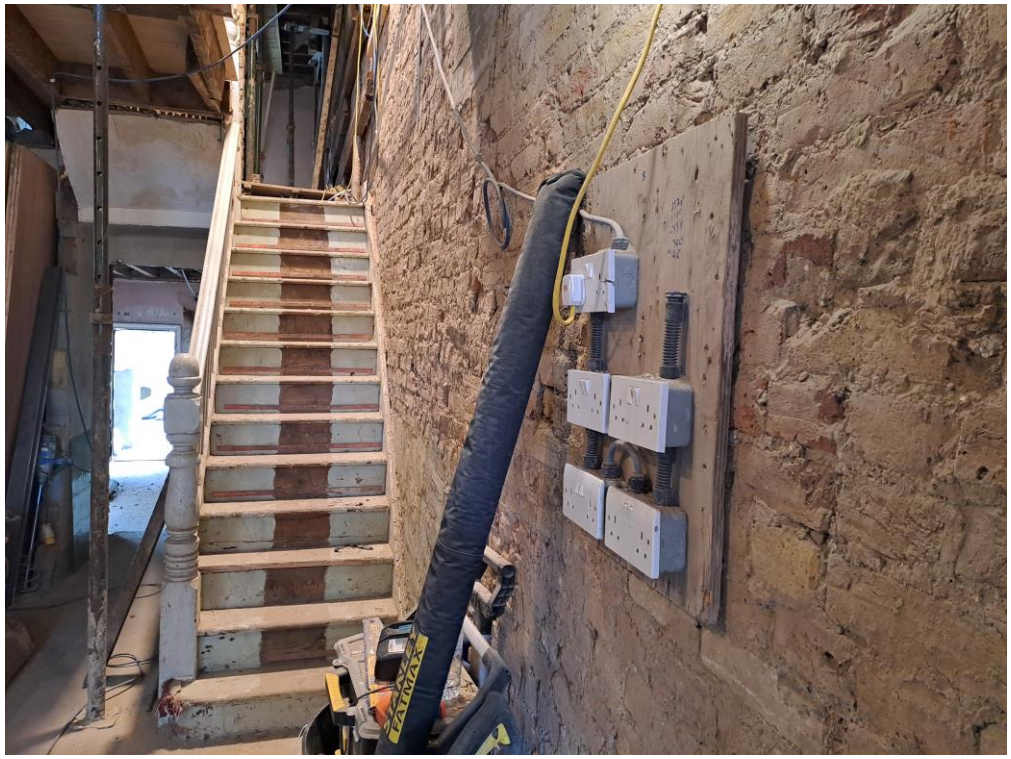
Photo 1: Overview of front of site.

Photo 2: Overview of front garden of site.

PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

Photo 3: Main living room of site.

Photo 4: Site is connected to electrics.



PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

Photo 5: Internal doorway leading to kitchen area of site.

Photo 6: Back doors of site.

PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

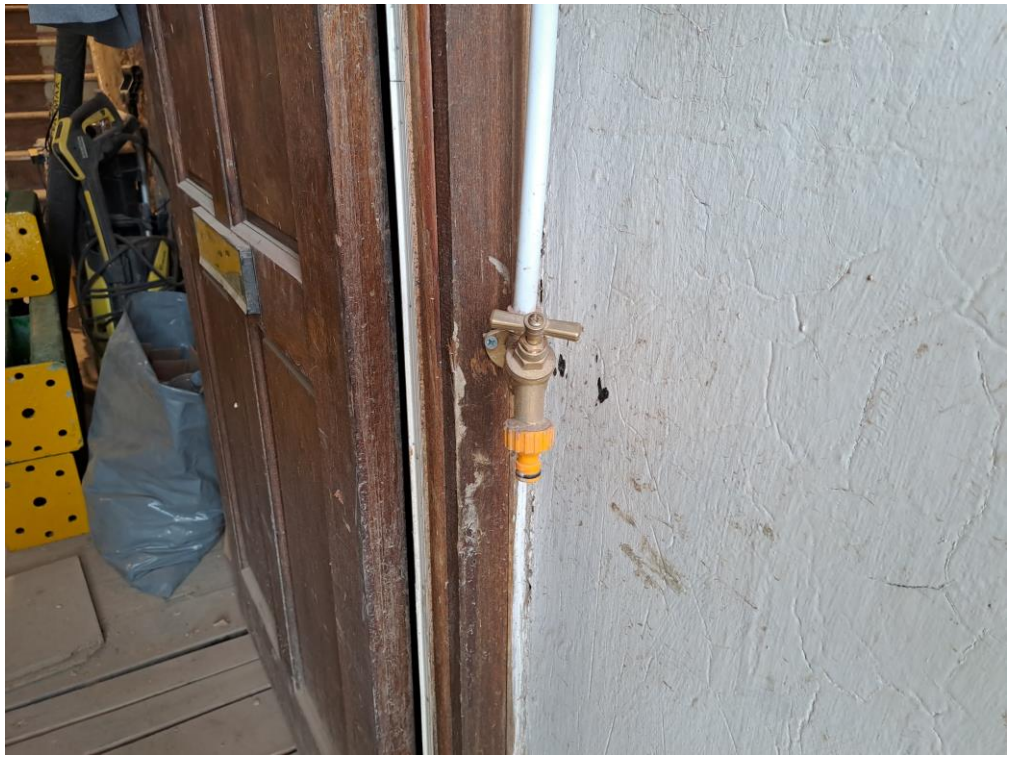
Photo 7: Toilet of site.

Photo 8: Back garden of site from the doorway.

PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

Photo 9: Back garden of site from gate.

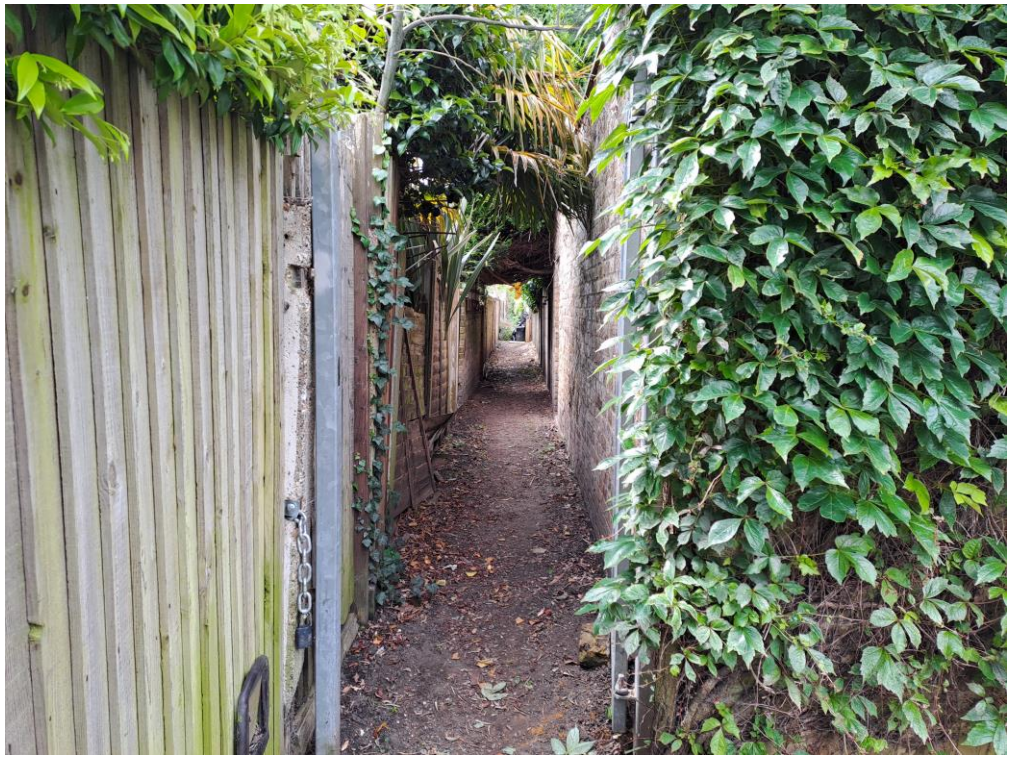
Photo 10: External water supply by front door.



PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

Photo 11: Drainage in back garden.

Photo 12: Alleyway leading to back gate.

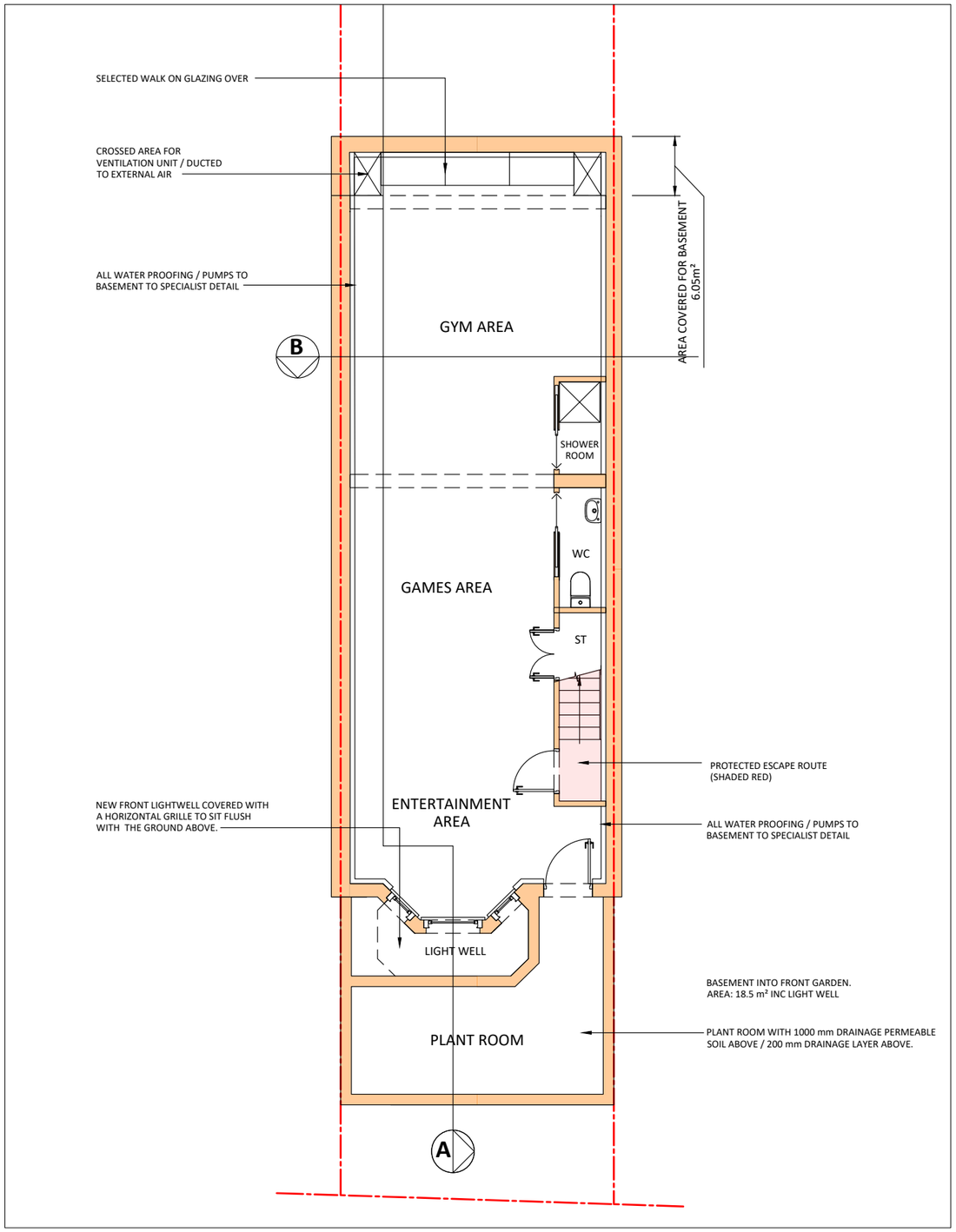


PROJECT NAME	26 Amyand Park Rd, TW1 3HE	**CLIENT**	05 Group Ltd
TITLE	Walkover Photo Plan	**FIGURE**	3

Photo 13: Back gate of site from alleyway.

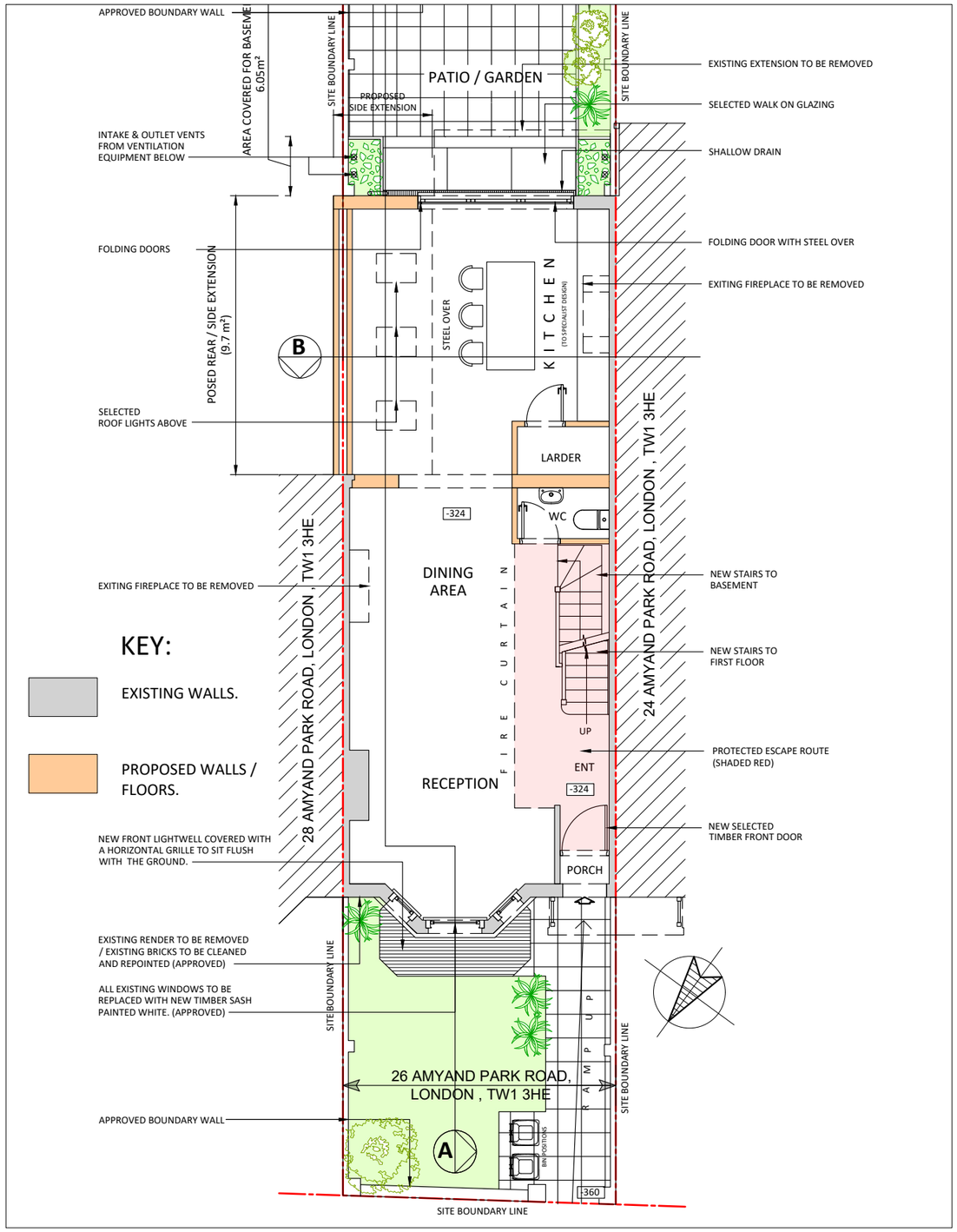
Photo 14:

Figure 4: Proposed Development Plan (Basement and Ground floor)



PROPOSED BASEMENT FLOOR

SCALE 1:100 @ A3



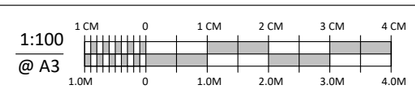
PROPOSDED GROUND FLOOR PLAN

SCALE 1:100 @ A3

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE.
2. THIS DRAWING HAS BEEN DRAWN TO SCALE, AS SHOWN, FOR THE PURPOSE OF OBTAINING LOCAL AUTHORITY APPROVAL.

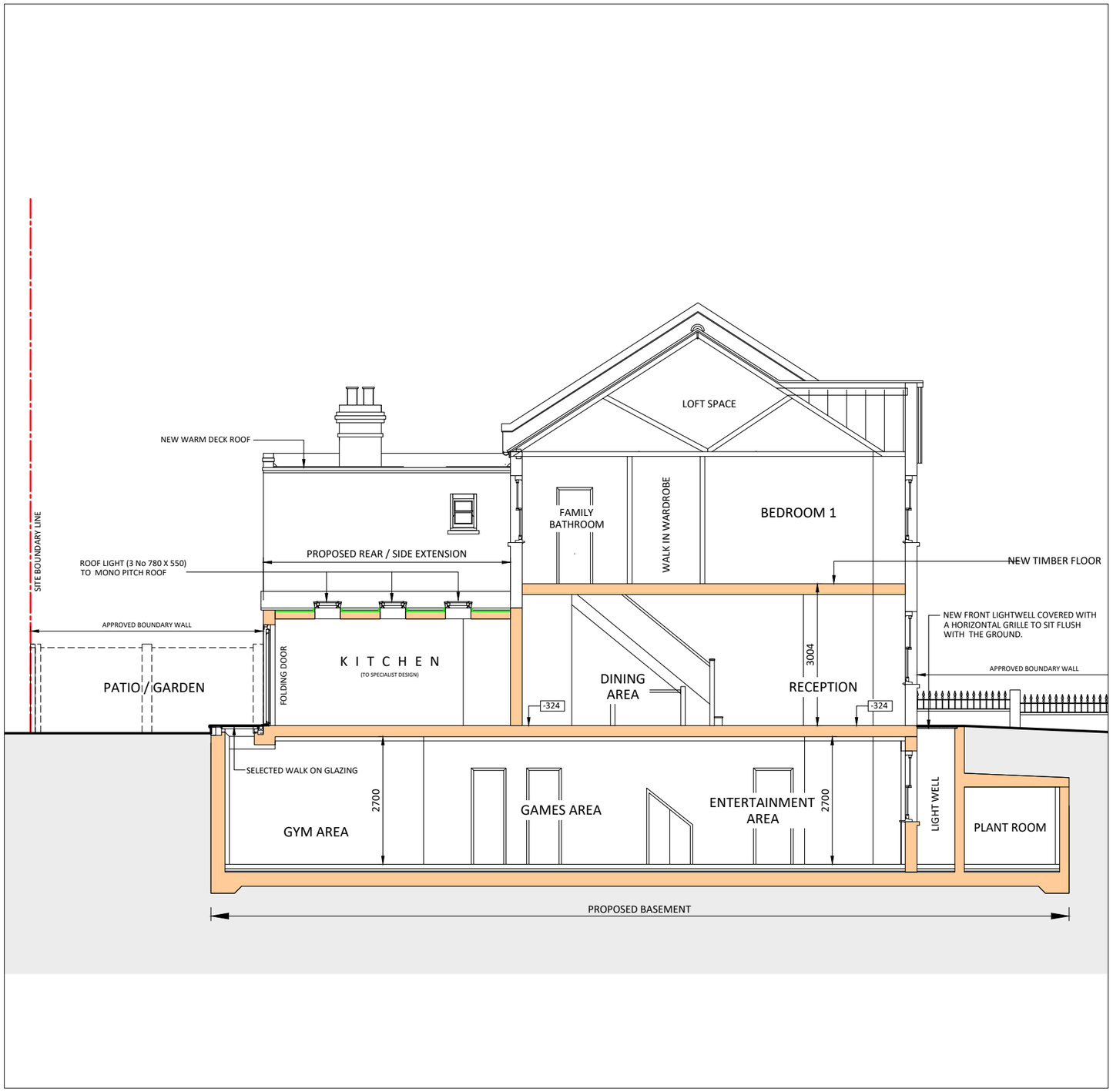
BAR SCALE: 1:100 @ A3



REVISIONS:

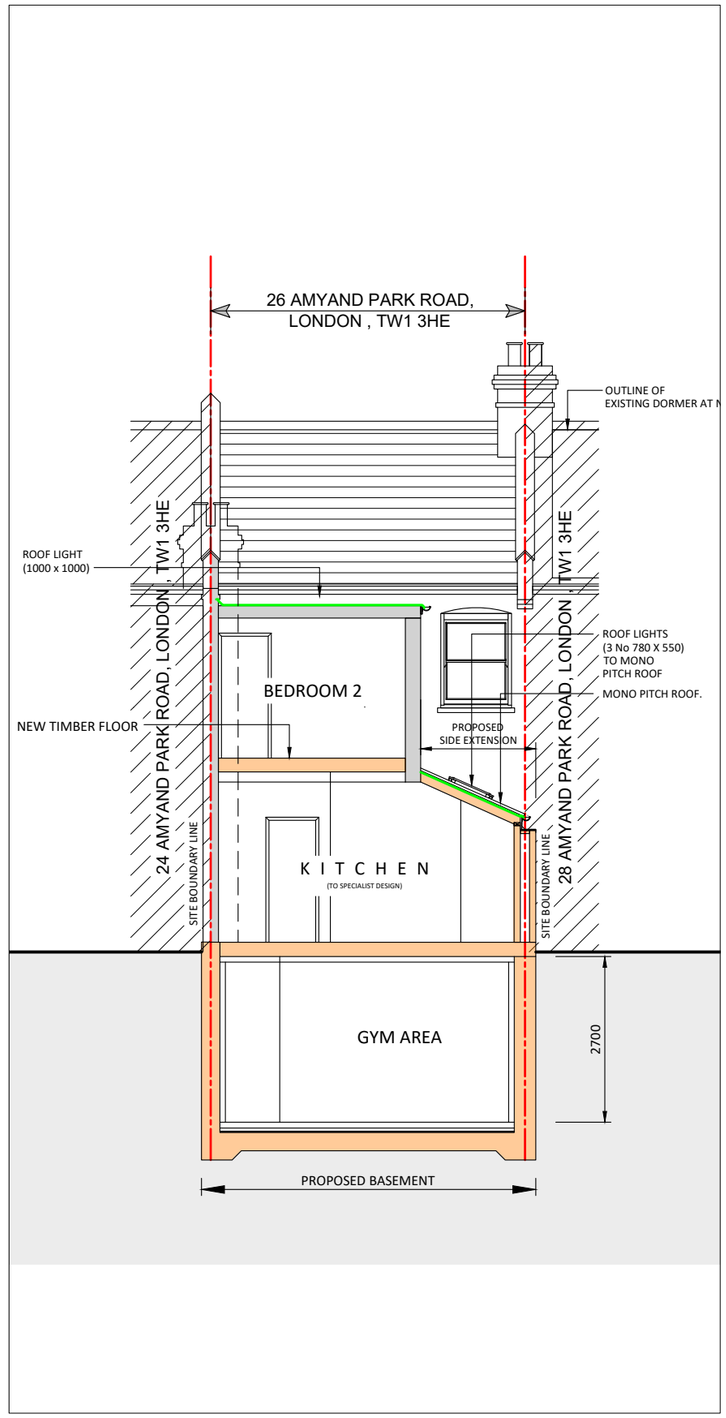
Drawing Title:	PROPOSED BASEMENT & GROUND FLOOR PLANS.
Property Address:	26 AMYAND PARK ROAD, LONDON, TW1 3HE.
Date:	MAY 2024
Scale @ A3:	1:100
Drawing Number:	SC 23111 / AP / BA01

Figure 5: Proposed Development Plan (Sections)



PROPOSED SECTION AT 'A'

SCALE 1:100 @ A3



PROPOSED SECTION AT 'B'

SCALE 1:100 @ A3

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE.
2. THIS DRAWING HAS BEEN DRAWN TO SCALE, AS SHOWN, FOR THE PURPOSE OF OBTAINING LOCAL AUTHORITY APPROVAL.

BAR SCALE: 1:100 @ A3

1 CM 0 1 CM 2 CM 3 CM 4 CM
1.0M 0 1.0M 2.0M 3.0M 4.0M

REVISIONS:

Drawing Title:	PROPOSED SECTIONS AT 'A' & 'B'
Property Address:	26 AMYAND PARK ROAD, LONDON, TW1 3HE.
Date:	MAY 2024
Scale @ A3:	1:100
Drawing Number:	SC 23111 / AP / BA03

APPENDIX 2 – EXPLORATORY HOLE RECORDS

JOMAS ENGINEERING ENVIRONMENTAL LAND REMEDIATION

CABLE PERCUSSION RECORD

Borehole Number **BH1**

Project Name: 26 Amyand Park Road	Client: 05 Group Ltd	Date: 10/10/2024
Location: Twickenham, TW1 3HE	Logged by: HAH/BD	
Project No. : P5802J3027	Crew Name: RD	Drilling Equipment: Cable Percussion Drilling Equipment

Log Status	Hole Type	Level	Approved By	Scale	Page Number
FINAL	CP		SC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.25	B		0.20	-0.20		Concrete. (MADE GROUND)
		0.50	B		0.40	-0.40		Dark brown silty gravelly sand. Sand is fine to coarse. Gravel consists of fine to coarse, angular to rounded flint, brick and concrete. (MADE GROUND)
		1.00	B					Dark brown clayey gravelly sand. Sand is fine to medium. Gravel consists of fine to coarse, angular to rounded flint and brick. (MADE GROUND)
		1.00	D					
		1.20	SPT	N=8 (1,0/1,2,1,4)	1.40	-1.40		
		1.70	B					Brown clayey slightly gravelly sand. Sand is fine. Gravel consists of fine to medium, sub-angular to rounded flint, with occasional brick fragments. (MADE GROUND)
		1.70	D		1.90	-1.90		
		2.50	B					Dense to very dense orangish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel consists of fine to coarse, angular to rounded flint. (KEMPTON PARK GRAVEL MEMBER)
		2.50	D					
		2.50	SPT	N=48 (3,5/9,11,14,14)				
		3.50	B					
		3.50	SPT	50 (7,11/50 for 172mm)				
		4.50	B					
		4.50	D					
		4.50	SPT	50 (8,12/50 for 185mm)				
		5.50	B					
		5.50	SPT	N=33 (3,4/5,9,9,10)				
	▼							
		7.50	B		7.40	-7.40		Firm to stiff consistency** dark grey CLAY. (LONDON CLAY FORMATION)
		7.50	SPT	N=16 (2,3/3,4,4,5)				
		8.00	U					
		9.50	B					
		9.50	D					
		9.50	SPT	N=20 (3,3/4,5,5,6)				
					10.00	-10.00		End of Borehole at 10.00m

Remarks:

*Field description

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

Groundwater reported at 6.2mbgl during drilling and at 6.45mbgl post-drilling.

Casing Diameter by Depth			Chiselling		
Depth Top	Depth Base	Diameter	Depth Top	Depth Base	Duration

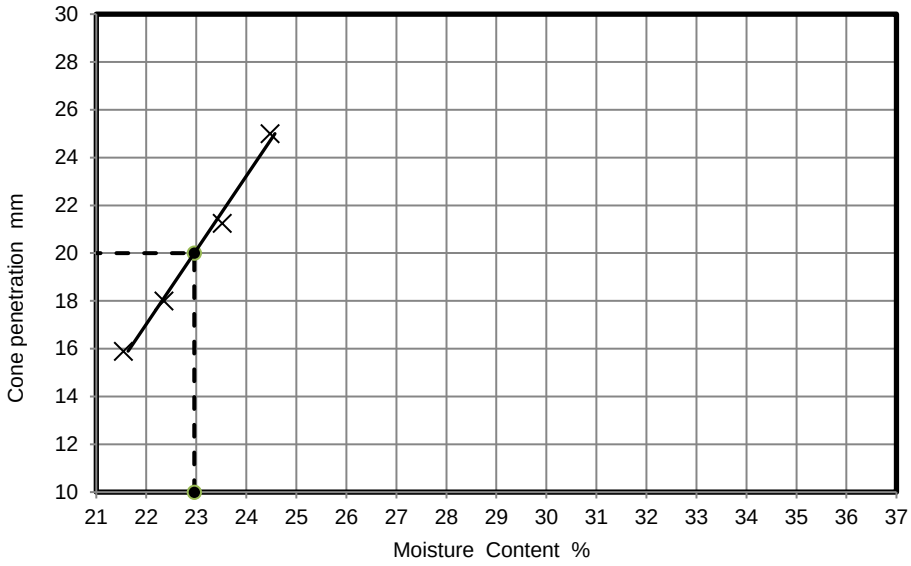
JOMAS ASSOCIATES LTD

Unit 24 Sarum Complex, Salisbury Road, Uxbridge UB8 2RZ

www.jomasassociates.com 0333-305-9054 info@jomasassociates.com

APPENDIX 3 – GEOTECHNICAL LABORATORY TEST RESULTS

K4 SOILS	**LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX**			Job No.	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	1.70 m
Soil Description	Brown slightly gravelly very sandy silty CLAY (gravel is fmc and angular to sub-rounded)			Depth Base	- m
				Sample Type	B
				Samples received	14/10/2024
				Schedules received	14/10/2024
				Project Started	15/10/2024
				Date Tested	23/10/2024

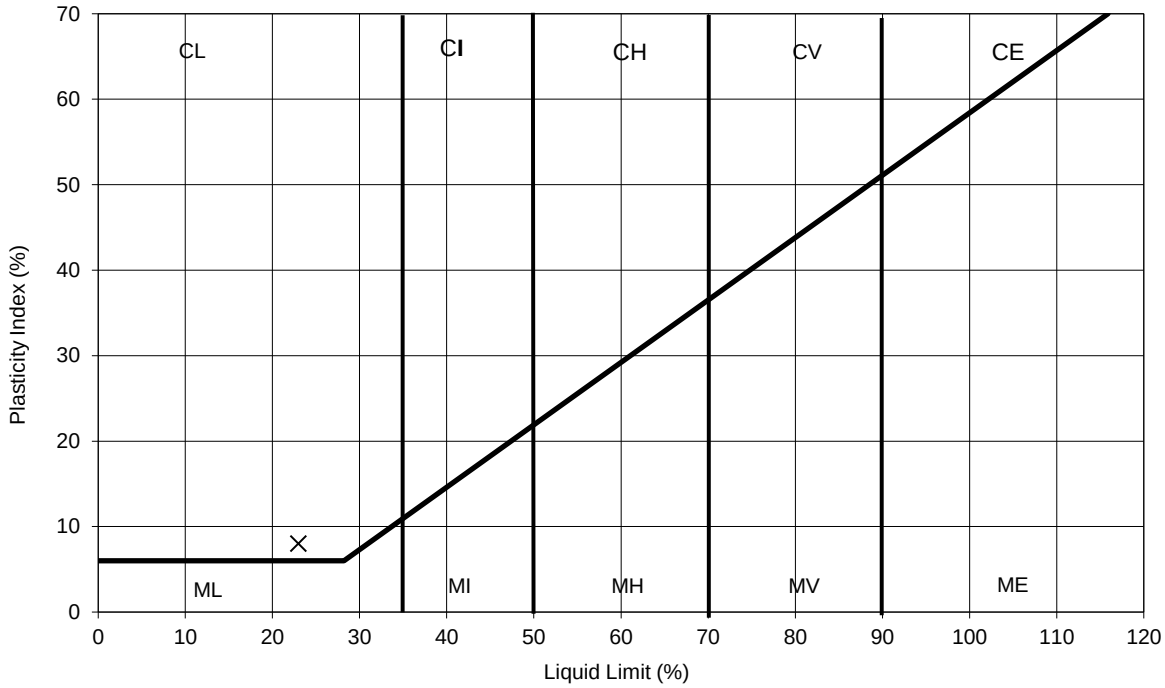


NATURAL MOISTURE CONTENT	**19**	**%**
% PASSING 425µm SIEVE	**62**	**%**
LIQUID LIMIT	**23**	**%**
PLASTIC LIMIT	**15**	**%**
PLASTICITY INDEX	**8**	**%**

Remarks

Sample washed to obtain test fraction

PLASTICITY INDEX



UKAS TESTING

TEST METHOD

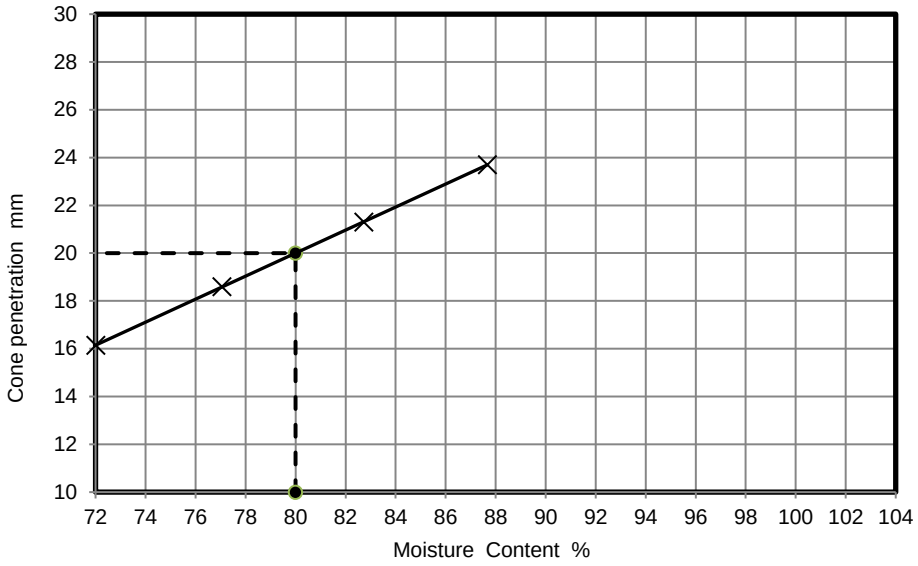
BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 25/10/2024

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

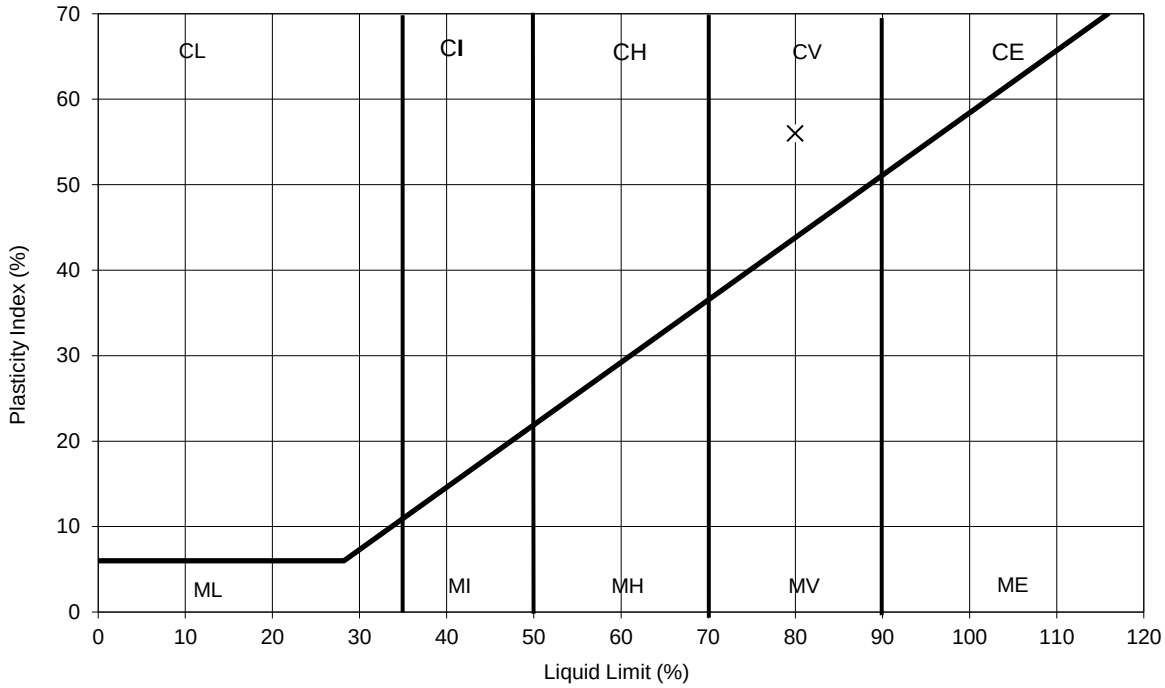
	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX			Job No.	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	9.50 m
Soil Description	High strength dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	14/10/2024
				Schedules received	14/10/2024
				Project Started	15/10/2024
				Date Tested	23/10/2024



NATURAL MOISTURE CONTENT	**26**	**%**
% PASSING 425µm SIEVE	**95**	**%**
LIQUID LIMIT	**80**	**%**
PLASTIC LIMIT	**24**	**%**
PLASTICITY INDEX	**56**	**%**

Remarks

PLASTICITY INDEX



UKAS TESTING

TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 25/10/2024

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
36184	26 Amyand Park Rd TW1 3HE	Samples received	14/10/2024
		Schedule received	14/10/2024
Project No.	Client	Project started	15/10/2024
J3027	Jomas Associates	Testing Started	23/10/2024

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
BH1	-	1.70	-	B	Brown slightly gravelly very sandy silty CLAY (gravel is fmc and angular to sub-rounded)	19	62	23	15	8	Sample washed to obtain test fraction
BH1	-	9.50	-	U	High strength dark grey silty CLAY	26	95	80	24	56	

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3, 4.4 and 5.0
These results only apply to the items tested

NOTE: The report shall not be reproduced except in full without authority of the laboratory

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: James@k4soils.com

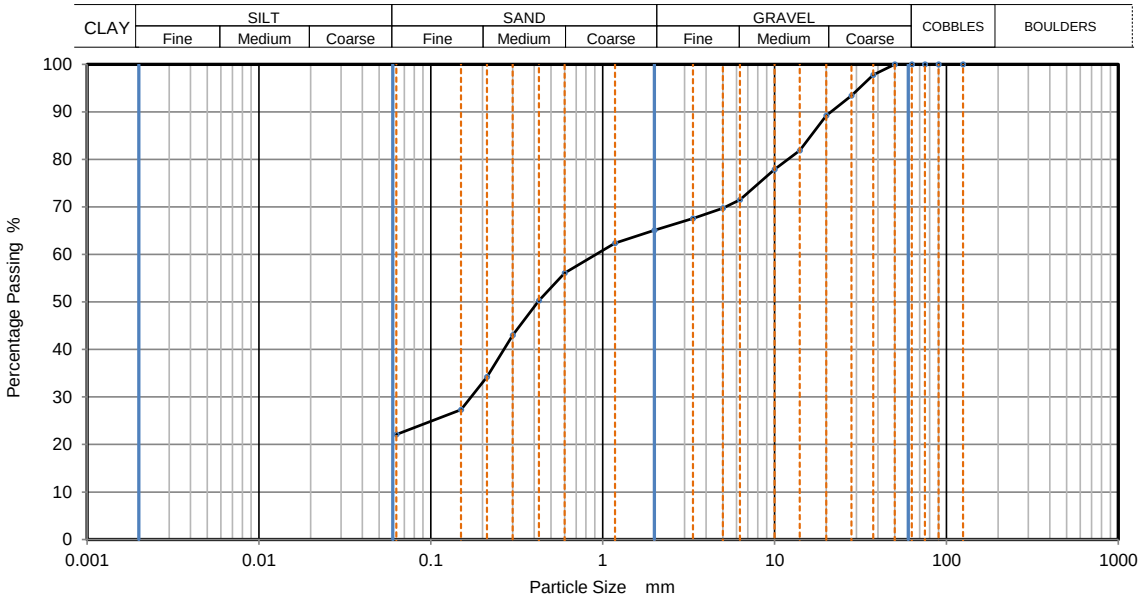
Checked and Approved

Initials J.P

Date: 25/10/2024

PARTICLE SIZE DISTRIBUTION

				Job Ref	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	0.50 m
Soil Description	Greyish brown silty clayey very gravelly SAND with fmc brick and concrete fragments (gravel is fm and sub-rounded)			Depth Base	- m
				Sample Type	B
				Samples received	14/10/2024
				Schedules received	14/10/2024
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/10/2024
These results only apply to the items tested				Date tested	22/10/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	93		
20	89		
14	82		
10	78		
6.3	72		
5	70		
3.35	68		
2	65		
1.18	62		
0.6	56		
0.425	50		
0.3	43		
0.212	34		
0.15	27		
0.063	22		

Sample Proportions	% dry mass
Very coarse	0
Gravel	35
Sand	43
Fines <0.063mm	22

Grading Analysis		
D100	mm	
D60	mm	0.915
D30	mm	0.172
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

Unit 8, Olds Close, Watford, Herts, WD18 9RU

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Tel: 01923 711288

Checked and Approved

Initials: **J.P**

Date: 25/10/2024

UKAS TESTING

2519

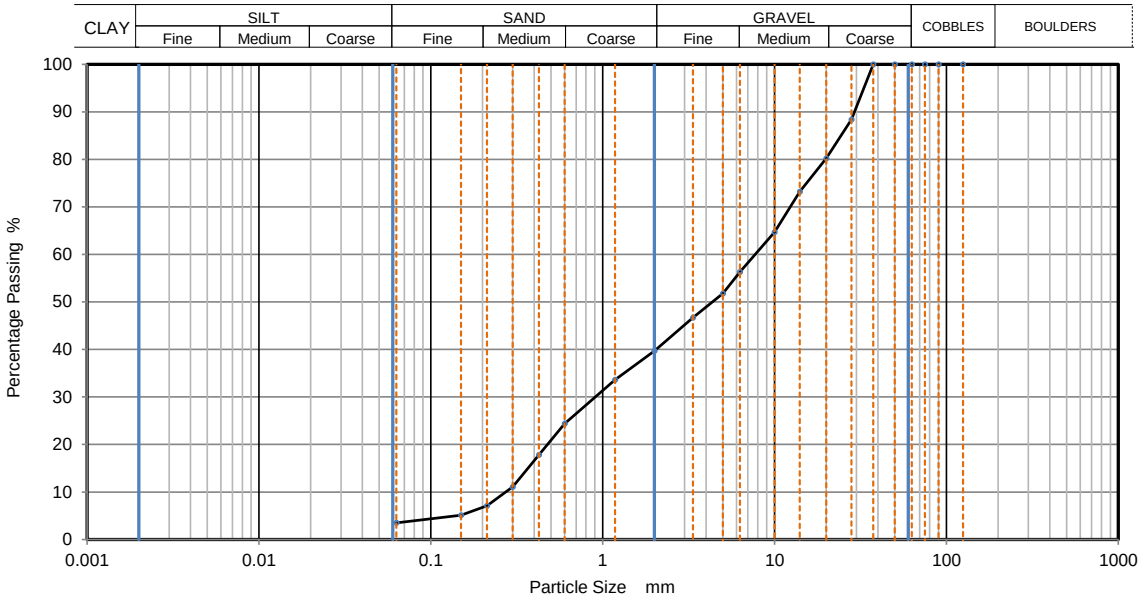
Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

PARTICLE SIZE DISTRIBUTION

				Job Ref	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	2.50 m
Soil Description	Brown slightly clayey very sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)			Depth Base	- m
				Sample Type	B
				Samples received	14/10/2024
				Schedules received	14/10/2024
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/10/2024
				Date tested	22/10/2024

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	88		
20	80		
14	73		
10	65		
6.3	56		
5	52		
3.35	47		
2	40		
1.18	34		
0.6	24		
0.425	18		
0.3	11		
0.212	7		
0.15	5		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	60
Sand	36
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	7.72
D30	mm	0.904
D10	mm	0.272
Uniformity Coefficient		28
Curvature Coefficient		0.39

Remarks

Preparation and testing in accordance with BS1377 unless noted below

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Initials: **J.P**

Date: 25/10/2024

UKAS TESTING

2519

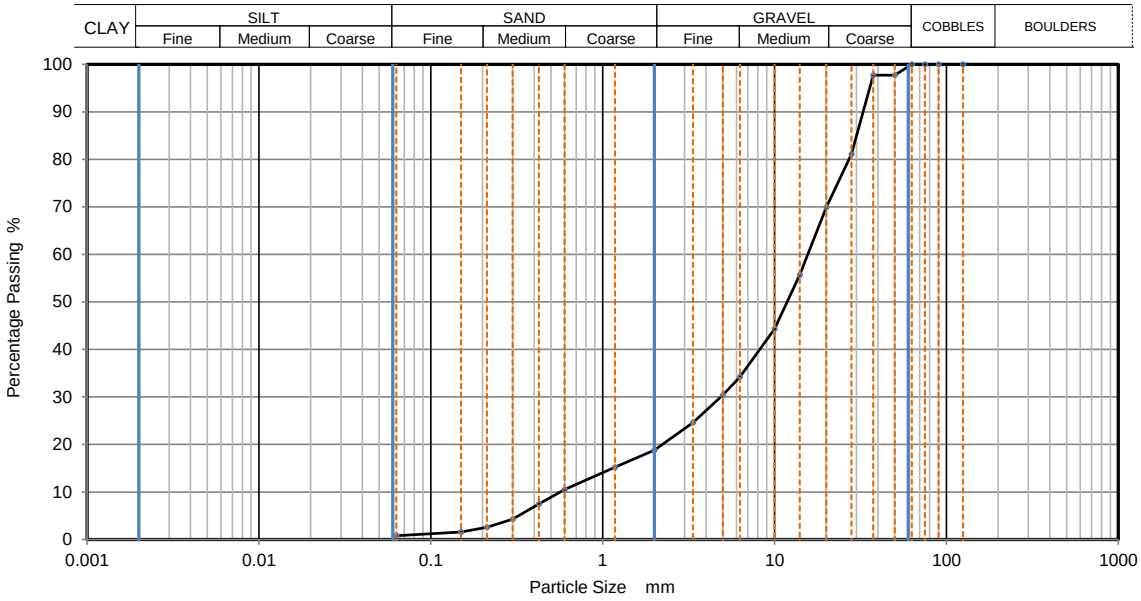
Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

PARTICLE SIZE DISTRIBUTION

				Job Ref	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	4.50 m
Soil Description	Brown slightly clayey sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)			Depth Base	- m
				Sample Type	B
				Samples received	14/10/2024
				Schedules received	14/10/2024
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	15/10/2024
				Date tested	22/10/2024

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	98		
28	81		
20	70		
14	56		
10	44		
6.3	34		
5	30		
3.35	25		
2	19		
1.18	15		
0.6	11		
0.425	8		
0.3	4		
0.212	3		
0.15	2		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	81
Sand	18
Fines <0.063mm	1

Grading Analysis		
D100	mm	
D60	mm	15.6
D30	mm	4.88
D10	mm	0.565
Uniformity Coefficient		28
Curvature Coefficient		2.7

Remarks

Preparation and testing in accordance with BS1377 unless noted below

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Checked and Approved

Initials: **J.P**

Date: 25/10/2024

UKAS TESTING

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

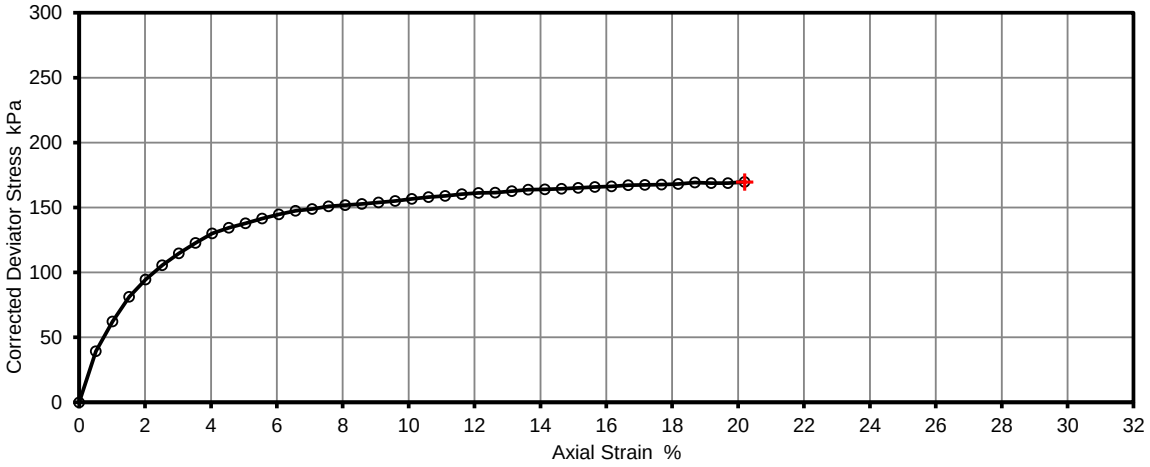
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	36184
				Borehole/Pit No.	BH1
Site Name	26 Amyand Park Rd TW1 3HE			Sample No.	-
Project No.	J3027	Client	Jomas Associates	Depth Top	8.00 m
Soil Description	High strength dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	14/10/2024
				Schedules received	14/10/2024
Test Method	BS1377:Part 7 : 1990 clause 8			Date of test	21/10/2024

Remarks

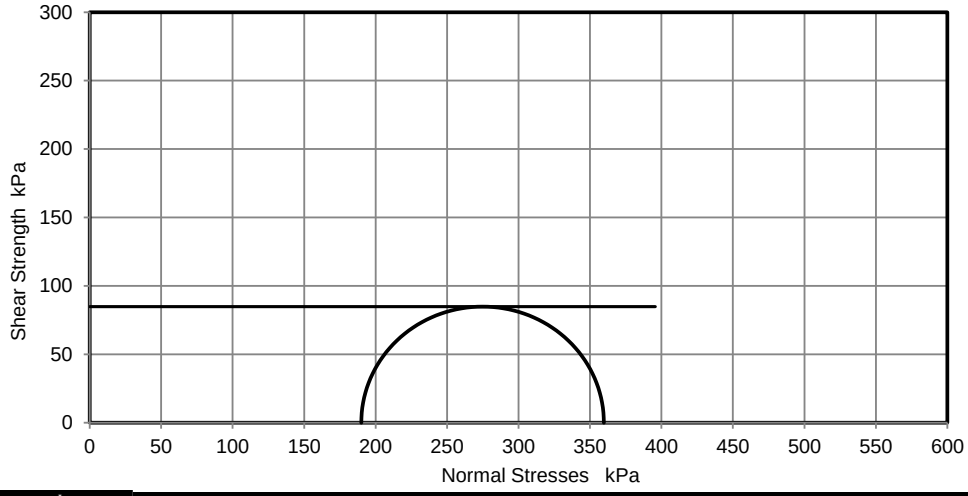
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	1.97	Mg/m3
Moisture Content	26	%
Dry Density	1.56	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	190	kPa
Axial Strain	20	%
Deviator Stress, (σ1 - σ3)f	170	kPa
Undrained Shear Strength, cu	85	kPa ½(σ1 - σ3)f
Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
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Checked and Approved
Initials: J.P
Date 25/10/2024

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure
Summary of Results

Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test

Job No.	Project Name	Programme	
36184	26 Amyand Park Rd TW1 3HE	Samples received	14/10/2024
		Schedule received	14/10/2024
Project No.	Client	Project started	15/10/2024
J3027	Jomas Associates	Testing Started	21/10/2024

Hole No.	Sample Ref	Sample Top m	Sample Base m	Sample Type	Soil Description	Test Type	Density bulk Mg/m3	Density dry Mg/m3	w %	Length mm	Diameter mm	σ3 kPa	At failure: Axial strain %	At failure: σ1 - σ3 kPa	At failure: cu kPa	At failure: Mode	Remarks
BH1	-	8.00	-	U	High strength dark grey silty CLAY	UU	1.97	1.56	26	198	102	190	20	170	85	C	

Legend
UU - single stage test (single and multiple specimens)
UUM - Multistage test on a single specimen
suffix R - remoulded or recompacted
σ3 Cell pressure
σ1 - σ3 Maximum corrected deviator stress
cu Undrained shear strength, ½ (σ1 - σ3)
Mode of failure ; B - Brittle P - Plastic C - Compound

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
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Email: james@k4soils.com

Checked and Approved

Initials: J.P

Date: 25/10/2024

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

APPENDIX 4 – CHEMICAL LABORATORY TEST RESULTS

Hamza Hashi
Jomas Associates Limited
24 Sarum Complex
Salisbury Road
Uxbrdge
UB8 2RZ

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-12235

Site Reference:	26 Amyand Park Road, TW1 3HE
Project / Job Ref:	J3027
Order No:	P5802J3027.5
Sample Receipt Date:	15/10/2024
Sample Scheduled Date:	15/10/2024
Report Issue Number:	1
Reporting Date:	21/10/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 24-12235	**~Date Sampled**	10/10/24	10/10/24	10/10/24	10/10/24	10/10/24
Jomas Associates Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: 26 Amyand Park Road, TW1 3HE	**~TP / BH No**	BH1	BH1	BH1	BH1	BH1
~Project / Job Ref: J3027	**~Additional Refs**	Jar	Jar	Jar	Jar	Jar
~Order No: P5802J3027.5	**~Depth (m)**	1.00	1.70	2.50	4.50	9.50
Reporting Date: 21/10/2024	**DETS Sample No**	743975	743976	743977	743978	743979

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.7	8.0	8.7 (n)	8.4 (n)	8.4
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	1217	493	< 200	< 200	618
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.12	0.05	< 0.02	< 0.02	0.06
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	80	34	< 10	< 10	173
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.08	0.03	< 0.01	< 0.01	0.17
Total Sulphur	%	< 0.02	NONE	0.05	0.03	< 0.02	< 0.02	0.29

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-12235	
Jomas Associates Limited	
~Site Reference: 26 Amyand Park Road, TW1 3HE	
~Project / Job Ref: J3027	
~Order No: P5802J3027.5	
Reporting Date: 21/10/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
743975	BH1	Jar	1.00	13.4	Brown sandy clay with stones and brick
743976	BH1	Jar	1.70	15.9	Brown sandy clay with stones
743977	BH1	Jar	2.50	6.2	Brown sandy gravel with stones
743978	BH1	Jar	4.50	5.2	Brown sandy gravel with stones
743979	BH1	Jar	9.50	22	Brown clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-12235

Jomas Associates Limited

~Site Reference: 26 Amyand Park Road, TW1 3HE

~Project / Job Ref: J3027

~Order No: P5802J3027.5

Reporting Date: 21/10/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received
~Sample details provided by customer and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

List of HWOL Acronyms and Operators
DETS Report No: 24-12235
Jomas Associates Limited
~Site Reference: 26 Amyand Park Road, TW1 3HE
~Project / Job Ref: J3027
~Order No: P5802J3027.5
Reporting Date: 21/10/2024

Acronym	**Description**
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by customer and can affect the validity of results

Det - Acronym

APPENDIX 5 – GROUNDWATER MONITORING RESULTS

GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: 26 Amyand Park Road	**Operative(s):** DJH	**Date:** 18/10/2024	**Time:** 10:00	**Round:** 1	**Page:** 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Dip Meter – Interface Probe	In-Situ	-	-

MONITORING CONDITIONS

Weather Conditions: Overcast	**Ground Conditions:** Damp	**Temperature:** 10°C
Barometric Pressure (mbar): N/A	**Barometric Pressure Trend (24hr):** Rising	**Ambient Concentration:** N/A

MONITORING RESULTS

Monitoring Point Location	VOC (ppm)		Depth to product (mbgl)	Depth to water (mbgl)	Depth to base of well (mbgl)	Comments
	Peak	Steady				
BH1	-	-	-	6.53	8.02	

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