Basement Impact Assessment

at
260 Coombe Lane, West Wimbledon, London SW20 0RW

for
Ghlenn Perry Capuyan

Reference: 21173/BIA Rev1.0
December 2023

Control Document

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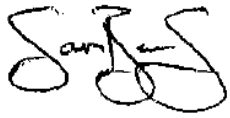

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

This document comprises a Basement Impact Assessment (BIA). General site data is recorded below:

Commission Record	
Client	Ghlenn Perry Capuyan
Site Name	260 Coombe Lane, West Wimbledon, London SW20 0RW
Grid Reference	TQ 22313 69634
Soils Limited Quotation Ref	Q28180 Rev. 2, dated 3rd October 2023
Clients Purchase Order	Q28180 Rev. 2 Job Order Form, dated 17th October 2023

The record of revision to this document is presented below:

Record Of Revisions		
Revision	**Date**	**Reason**
Rev1.0	December 2023	Issue to the Client

Note(s): The latest revised document supersedes all previous revisions of the BIA produced by Soils Limited.

Limitations and Disclaimers

The report was prepared solely for the brief described in Section 1.1 of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Soils Limited's Quotation

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the Client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

If the term "competent person" is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post graduate experience in the understanding and application of the appropriate codes of practice.

Unless the site investigation works have been designed and specified in accordance with EC7, this report is a Geotechnical Investigation Report and is not necessarily a Ground Investigation Report as defined by EC7 (Eurocode 7 Part 1, §3.4, Part 2, §6.1) or a Geotechnical Design Report (Eurocode 7 Part 1, §2.8) as defined by Eurocode 7 and as such may not characterise the ground conditions and additional works may be required to comply with the requirements of EC7.

Within the report reference to ground level relates to the site level at the time of the investigation, unless otherwise stated.

Exploratory hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce an exploratory hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The Client is responsible for establishing the depth to roots and/or of desiccation on a plot by plot basis prior to the construction of foundations. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data or any trees, bushes or shrubs removed prior to or following the site survey.

Where trees are mentioned in the text this means existing trees, substantial bushes or shrubs, recently removed trees (approximately 20 years to full recovery on cohesive soils) and those planned as part of the site landscaping).

The geotechnical laboratory testing was performed by GEO Site & Testing Services Ltd (GSTL) in accordance with the methods given in BS 1377:1990 Parts 1 to 8 and their UKAS accredited test methods.

For the preparation of this report, the relevant BS code of practice were adopted for the geotechnical laboratory testing technical specifications, in the absence of the relevant Eurocode specifications (ref: ISO TS 17892).

The chemical analyses were undertaken by Derwentside Environmental Testing Services (DETS) in accordance with their UKAS and MCERTS accredited test methods or their documented in-house testing procedures. This investigation did not comprise an environmental audit of the site or its environs.

Deleterious materials may be present in any Made Ground that pose a potential risk to site workers, end users and adjacent vulnerable receptors. These could include a range of contaminants, including asbestos, especially if the material includes large fractions of demolition derived materials.

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Section 1 Introduction

1.1 Scope

Soils Limited was commissioned by Ghlenn Perry Capuyan to undertake a BIA for the proposed basement development at 260 Coombe Lane, West Wimbledon, London SW20 0RW.

The report provides details on the local hydrology, geology and hydrogeology, and potential impact to neighbours and the wider environment.

This BIA comprises the following elements:

- Desk Study,
- Screening,
- Scoping,
- Site investigation, monitoring, and interpretation,
- Impact assessment.

It is recognised that any BIA is a live document and that further detailed assessments will be ongoing, if appropriate, as design and construction progresses.

No Preliminary Investigation Report or contamination testing was undertaken by Soils Limited, as this did not form part of the Client's brief.

1.2 Sources of Information

The primary sources of information used within this report are:

1. British Geological Survey Website (accessed December 2023),
2. Existing and Proposed Layout Plans (Appendix D)
3. EA Website (accessed December 2023),
4. Defra Magic Map (accessed December 2023),
5. Google Earth™ (accessed December 2023),
6. The Lost Rivers of London, Historical Publications Ltd, 1992, N Barton,
7. National Library of Scotland (accessed December 2023),
8. LB Merton, Strategic Flood Risk Assessment (SFRA) Online Map (accessed December 2023).

1.3 Site Description

The site had an approximate triangular shape boarding Coombe Lane on the south side and then tapering in a northerly direction. There was vehicle access from the southeast

corner with a tarmacadam drive along the sites eastern side connecting to a single storey outbuilding and then a walkway up to a single storey dwelling located at the northern end, aligned with the western boundary. A paved walkway surrounded the dwelling and up to the site boundary on the west side, with the paving covering the remaining space to the north of the dwelling. The remaining area to the southwest of the site was soft landscaping, cover in grass and surrounding by vegetated borders along the site boundary.

Off-site to the west was 262 Coombe Lane, a two-storey detached dwelling. To the west was an access road leading to 258 Coombe Lane located behind the site to the northeast, followed by allotment gardens to the east.

The site had no significant slope, but the general area was sloping in a south-westerly direction of <3^{o}, based on Google Earth™ elevation data.

The total area of the site was ~570m^{2}, with the existing building, outbuilding and hardstanding covering an area of ~328m^{2}.

An aerial photograph of the site and its close environs has been included in Figure 2.

1.4 Proposed Development

The proposal involved demolishing the existing buildings and construction of a 2-storey house with accommodation at loft and basement level, which will be used as flats. The building included a basement level covering the full footprint of the building and extend out along the southern side to provide light and access to the basement level. The overall basement excavation was anticipated at 3.50m deep. The southern side of the building comprised a permeable driveway and hardstanding for car parking, and bin and cycle storage. On the northern side of the building were gardens comprising areas of permeable paving and decking surrounded by grass lawn.

The total proposed area covered by the buildings footprint and hardstanding was ~300m^{2}, excluding the areas of permeable hardstanding.

In compiling this report reliance was placed the existing and development plans provided by the Client. A list of provided documents are presented in Table 1.1.

The development plans provided by the Client are presented in Appendix D.

Table 1.1 Provided Documents

Document	Reference No.	Date	Author
Proposed Plans and Elevations	Pre-Application No.01	06/09/2023	Unknown

The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

Section 2 Desk Study

2.1 Site History

A review was undertaken of available historic OS mapping and aerial photography, using the following resources, National Library of Scotland, and Google Earth™ (GE).

A summary of pertinent information from the available OS maps and aerial photography are provided in Table 2.1.

Table 2.1 Site History

Map	Description
OS 1896	Road present south of the side, assume to be Coombe Lane. No structures on-site, open land.
OS 1897	Rectangular building location centrally aligned with the western boundary. No neighbouring building present to the west.
OS 1953	Rectangular building marked as no.260. No.262 Coombe Lane now present to the west. Electric Sub-station located ~5m to the east, surrounded by allotment gardens.
Aerial 2003	Potential extension of the rectangular building in a north direction. Small outbuilding potential garage located east of the building along the eastern boundary. There was a driveway along the sites eastern side connecting to the outbuilding and then walkway up to a rectangular building. A paved walkway surrounded the rectangular building and up to the site boundary on the west side, with the paving covering the remaining space to the north. The remaining area on the southern side was grass lawn surrounded by shrubs along the site boundary.
Aerial 2006 to 2020	No material changes.

2.2 Published Geological Data

The 1:50,000 BGS map showed the site to be located upon the bedrock of the London Clay Formation with overlying superficial deposits of Kempton Park Gravel Member. Head Deposits were noted overlying the Kempton Park Gravel Member, ~155m upslope from the site to the north. The geology maps show no artificial (worked) ground at or immediately surrounding the site.

2.2.1 Head

Head deposits are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise soils of local derivation. These are generally poorly sorted clays, silts, sands, gravels of local derivation.

2.2.2 Kempton Park Gravel Member

The Kempton Park Gravel Member is part of the river terrace deposits, which form the base of the Maidenhead Formation. The river terrace deposits were formed by ancient floodplains associated with the rivers of south-east England. The rivers have been subject to at least three changes of level since Pleistocene times, forming a complex series of river terrace deposits. The Kempton Park Gravel is found at an elevation below the current river. The composition varies greatly, depending on the source material that

was available in the river's catchment. Deposits generally consist of sands and gravels of roughly bedded flint or chert gravels commonly in a matrix of silts and clays.

2.2.3 London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

2.3 Web Published Geology

A review of historic boreholes available through the BGS was undertaken to provided information on the expected ground conditions. The nearest borehole (TQ26NW82) was 370m to the west and comprised ground level:

0.0 – 0.2m Topsoil

0.2 – 1.3m Gravelly sandy CLAY (Head)

1.3 – 4.2m Sandy GRAVEL (Kempton Park Gravel Member)

4.2 – 10.0m CLAY (London Clay Formation)

The nearest boreholes of a depth >10m were, TQ27SW3, TQ27SW253 and TQ26NW6, located within a radius of 600m. The London Clay Formation was encountered to a depth of between 93m and 134m below ground level (bgl). Below the London Clay Formation was the Lambeth Group followed by the Thanet Formation and then the Chalk Group.

2.3.1 Groundwater

In the nearest borehole (TQ26NW82) groundwater was struck at 1.85m bgl and standing at 1.80m bgl within the Kempton Park Gravel Member. Within the boreholes >10m resting water level after drilling was recorded between 12.8m and 60.2m bgl.

2.4 Topography

The site had an approximate elevation of 13m above ordnance datum (AOD) with no discernible slope. The surrounding area was sloping down in a south-westerly direction at <3^{o} based on Google Earth™ elevation data. The area had a low topographic relief.

2.5 Hydrogeology

The Environment Agency has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply and their role in supporting water bodies and wetland ecosystems.

The London groundwater model was generally split into three aquifers, the Upper, Intermediate and Lower Aquifer. The historic boreholes on the BGS website record separate groundwater levels within the upper aquifer (superficial deposits) and within deeper boreholes at resting levels of between 12.8m and 60.2m bgl, representing the intermediate and lower aquifers.

2.5.1 Upper Aquifer

The Upper Aquifer comprises groundwater within the superficial River Terrace Deposits (including Kempton Park Gravel Member) which can overly the London Clay Formation in this area. The underlying London Clay Formation acts as an aquiclude to the underlying Intermediate and Lower Aquifers.

2.5.2 Intermediate Aquifer

The Intermediate Aquifer was generally associated with granular layers within the Lambeth Group.

2.5.3 Lower Aquifer

The Lower Aquifer was principally associated with the Chalk but can include the overlying Thanet Formation.

The Kempton Park Gravel Member was anticipated to be present on-site and shallow groundwater could be present within the stratum. If soils of Head Deposits are encountered overlying the Kempton Park Gravel Member, they are typically cohesive and would have a low permeability. Groundwater was not anticipated to be encountered during intrusive investigation in the London Clay Formation, other than very localised minor seepages.

The Environmental Agency (EA) classify the Kempton Park Gravel Member as a Secondary A Aquifer and anticipated to have a typical permeability of 10^{-3} to 10^{-7} m/s with very good to good drainage depending on the constituents of the soil found on-site.

Any water infiltrating the cohesive London Clay Formation will generally tend to flow either with the topography or vertically downwards at a very slow rate towards the Intermediate and subsequently Lower Aquifer. Data for the London Clay Formation indicates horizontal permeability of between 10^{-7} m/s close to the surface in fissured clay, decreasing to 10^{-11} m/s at depth.

2.5.4 Groundwater Flow

Groundwater in the upper aquifer was anticipated to be flowing in a south-westerly direction in alignment with the slope of the surrounding land. In the lower aquifer, flow will be driven by pressure and potential groundwater abstraction points within the chalk. The

intermediate aquifer could be influenced by both depending on local conditions and hydraulic connectivity.

2.6 Hydrology

The nearest surface water feature was Beverly Brook, located ~365m southwest at an elevation of 13m AOD. The nearest pond was part of Coombe Brook located within Malden Golf Club, 600m to the southwest at an elevation of 12m AOD.

Based on the Environmental Agency (EA) online catchment data explorer the site was within the operational catchment area of Beverley Brook.

The site lies outside the extent of the lost rivers of London mapping (Lost Rivers of London, N Barton).

2.7 Flood Risk

The risk of flooding was assessed taking account of the information available from the EA flood maps and LB Merton SFRA.

The site was situated in Flood Zone 1, an area with a low probability of flooding from rivers and seas. The EA and SFRA showed the site to have a low to medium flood risk from surface water and was in surface water critical drainage area. High surface water risk was noted off-site to the east. There was an increase potential for elevated groundwater. The nearest recorded historic flood incident was located ~35m southeast, with the cause of flooding surface water.

An extract of surface water risk is presented in Figure 5.

In summary, the site of interest lies within Flood Zone 1, has an area of less than 1 hectare and did not fall into an area at risk from river and sea. The site was in a critical drainage area with a low to medium risk from surface water flooding, and potential for elevated groundwater.

2.8 Statutory and Locally Listed Buildings & Structures

There was no listed building located on the immediate surrounding roads. The nearest statutory listed building was no.232 Coombe Lane, located 130m southeast.

2.9 Underground Infrastructure

The Transport for London asset map showed no nearby underground infrastructure.

Information on the presence of public utilities, such as sewers or water mains, was not available at this stage.

2.10 Unexploded Ordinance (UXO)

Review of Zetica UXO risk maps indicated the site to be within a low to moderate risk area from bomb strikes.

Section 3 Screening

3.1 Introduction

The London Borough of Merton has not developed a specific screening procedure for determining whether a full BIA is required for basement developments. Soils Limited therefore, have adapted the procedure in the Ove Arup 2008 Scoping Study, prepared for the London Borough of Camden.

Screening tools are included in the Arup document (Ref: Camden geological, hydrogeological, and hydrological study, Issue01/November 2010), which includes a series of questions within a screening flowchart for three categories, Groundwater Flow, Slope Stability and Surface Flow and Flooding. Responses to the questions are tabulated below.

3.2 Groundwater Flow

The response to the Groundwater Flow screening assessment is given in Table 3.1.

Table 3.1 Subterranean (Ground Water) Flow Screening

Question	Response
1a. Is the site located directly above an aquifer?	**Yes** – Historic groundwater data from BGS borehole near the site recorded a groundwater level of 1.80m bgl.
1b. Will the proposed basement extend beneath the water table surface?	**Yes** – Based on the historic groundwater level from a BGS borehole the basement may extend below the water table.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No – The nearest watercourse is Beverley Brook ~365m southwest.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No – The proportion of impermeable surface area will not increase due to the use of permeable hard surfaces.
4. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No – The amount of surface water discharged into the ground was not expected to be different to existing drainage.
5. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	No – The nearest pond was ~600m to the southwest and not expected to be connected to the flow path on-site.

3.3 Land Stability

The response to the Land Stability screening assessment is given in Table 3.2.

Table 3.2 Land Stability Screening

Question	Response
1. Does the existing site include slopes, natural or manmade, greater than 7° (approximately 1 in 8)?	No – Based on Google Earth™ elevation data the site sloped <3°.

Question	Response
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7° (approximately 1 in 8)?	No – No reprofiling to be undertaken.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° (approximately 1 in 8)?	No – Based on Google Earth™ elevation data the area sloped <3°.
4. Is the site within a wider hillside setting in which the general slope is greater than 7° (approximately 1 in 8)?	No – The area was of low topographic relief with slopes <3°.
5. Is the London Clay the shallowest strata at the site?	No – Superficial deposits of Kempton Park Member anticipated to be present.
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained?	No – No trees are to be felled as part of the development works.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	**Unknown** – The potential cohesive ground conditions could allow shrink-swell subsidence to occur.
8. Is the site within 100 m of a watercourse or potential spring line?	No – The nearest watercourse was ~365m southwest (Beverly Brook).
9. Is the site within an area of previously worked ground?	No – The geology maps do not show the site in an area of previously worked ground.
10. Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**Yes** – Historic groundwater noted within the Kempton Park Gravel Member.
11. Is the site within 5 m of a highway or pedestrian right of way?	No – The basement will be >10m from the nearest highway/ pedestrian right of way.
12. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	**Unknown** – It was unknown whether all the neighbouring properties had existing basements.
13. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No – No known tunnels within close proximity to the site.

3.4 Surface Flow and Flooding

The response to the Surface Flow and Flooding screening assessment is given in Table 3.3.

Table 3.3 Surface Flow and Flooding Screening

Question	Response
1. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No – Surface water flow was not expected to be materially changes from its existing route, due to an overall slight decrease in impermeable site covering.
2. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No – The proportion impermeable surface area will not increase due to the use of permeable hard surfaces.
3. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No – Surface water flow was not expected to be materially changes from its existing route, due to an overall slight decrease in impermeable site covering.

Question	Response
4. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No – No changes in quality of surface water were expected.
5. Is the site in an area identified to have surface water flood risk?	**Yes** – The site had a low to medium risk from surface water flooding.

3.5 Non-technical Summary of Screening Process

Based on the screening exercise, further stages of the basement impact assessment are required. A summary of the basement impact assessment requirements has been provided in Table 3.4, Table 3.5 and Table 3.6.

Table 3.4 Groundwater Flow

Item	Description
Q1a	Historic groundwater data from a BGS borehole near the site recorded a groundwater level of 1.80m bgl.
Q1b	Based on the historic groundwater level from BGS borehole the basement may extend below the water table.

Table 3.5 Land Stability

Item	Description
Q7	The potential cohesive ground conditions could allow shrink-swell subsidence to occur.
Q10	Historic groundwater noted within the Kempton Park Gravel Member.
Q12	It was unknown whether all the neighbouring properties had existing basements.

Table 3.6 Surface Flow and Flooding Screening

Item	Description
Q5	The site had a low to medium risk from surface water flooding.

Section 4 Scoping

4.1 Introduction

The purpose of scoping is to assess in more detail the issues of concern identified in the screening process (i.e. where the answer is “yes” or “unknown” to any of the questions posed) to be investigated in the impact assessment. Potential hazards are assessed for each of the identified potential impact factors.

The scoping stage is furthermore to assist in defining the nature of the investigation required to assess the impact of the issues of concern identified in the screening process.

4.2 Potential Impacts

The following potential impacts were identified in Table 4.1.

Table 4.1 Potential Impacts

Screening Flowchart Question	Potential Impacts	Discussion
Is the site located directly above an aquifer?	Basement could extend into an underlying aquifer and thus affect the groundwater flow regime.	The BGS data showed the presence of granular soils of the Kempton Park Gravel Member overlying the London Clay Formation. The Kempton Park Gravel Member was classified by the Environment Agency as a Secondary “A” therefore water seeping through the granular soils could enter the excavations during the construction stage. Ground investigation and groundwater monitoring to be carried out for the confirmation of ground and groundwater conditions.
Will the proposed basement extend beneath the water table surface?	Alterations of an existing groundwater flow regime could cause local increase or decrease of groundwater levels.	
Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	Changes to moisture content in soils with a shrink-swell potential can cause damage to structures.	Site investigation and groundwater monitoring to establish soil and groundwater conditions.
Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	The proposed construction could require dewatering, which can cause ground subsidence.	Site investigation and groundwater monitoring to establish soil and groundwater conditions.

Screening Flowchart Question	Potential Impacts	Discussion
Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Basement construction can result in undermining of foundations of neighbouring properties and cause excessive ground movements resulting in structural instability.	Intrusive investigation to confirm ground conditions for a site-specific design. Ground Movement Assessment to estimate the potential damage to surrounding structures, maybe required. Permanent and/or temporary works must be designed to ensure the induced ground movements are within tolerable limits and temporary works to prevent damage during construction. Ground investigation to establish soil conditions. Structural Impact Assessment.
Is the site in an area identified to have surface water flood risk?	Increased risk from flooding due to the introduction of more vulnerable use.	Surface water must be managed to reduce risk of flooding. Undertaking of a site-specific flood risk assessment.

Section 5 Site Works

5.1 Proposed Project Works

The proposed intrusive investigation was designed to provide information on the ground conditions and to aid the design of foundations for the proposed residential development. The intended investigation, as outlined within the Soils Limited quotation (Q28180 Rev. 2, dated 3rd October 2023), was to comprise the following items:

- 3No. up to 6m windowless sampler boreholes with core recovery
- 2No. up to 6m dynamic probes
- 2No. up to 6m deep monitoring wells
- 1No. post site works groundwater monitoring visit
- 1No. hand excavated trial pit with shallow infiltration testing to BRE365
- Geotechnical laboratory testing
- Factual reporting

5.1.1 Actual Project Works

The actual project works were undertaken on 16th November 2023, with subsequent sample logging, laboratory testing, monitoring, and reporting. The actual works comprised:

- 3No. windowless sampler boreholes (WS01 to WS03)
- 2No. up to 6m dynamic probes (DP01 and DP02)
- 2No. up to 6m deep monitoring wells (WS01 and WS02)
- 1No. post site works groundwater monitoring visit
- 1No. hand excavated trial pit (TP01) with shallow infiltration testing to BRE365
- Geotechnical laboratory testing
- Factual reporting

Two windowless sampler boreholes (WS01 and WS02) were backfilled with gravel and bentonite following the installation of monitoring wells. Due to time and access restrictions, WS03 comprised a hand excavated trial pit only. Both this and TP01 were backfilled with arisings upon completion.

All exploratory hole locations have been presented in Figure 3.

Following completion of site works, soil cores were logged and sub-sampled so that samples could be sent to the laboratory for geotechnical testing.

5.2 Ground Conditions

On 16th November 2023 two windowless sampler boreholes (WS01 and WS02) were drilled, using a Premier Compact 110 Series windowless sampler drilling rig, to a depth of 6.00m below ground level (bgl) at locations selected by Soils Limited using a development plan provided by the Client. A further location (WS03) was undertaken as a hand excavated trial pit due to access and time constraints.

A single standpipe was installed within two window sample borehole locations (WS01 and WS02) to allow for continued monitoring of groundwater.

Two super heavy dynamic probes, (DP01 and DP02) were driven prior and adjacent to their corresponding windowless sampler borehole to a depth of 6.00m bgl.

A further trial pit (TP01) was hand excavated to a depth of 1.50m bgl, to allow for infiltration testing in general accordance with BRE DG365.

The maximum depths of exploratory holes have been included in Table 5.1.

All exploratory holes were scanned with a Cable Avoidance Tool (C.A.T.) and GENNY prior to excavation to ensure the health and safety of the operatives.

Table 5.1 Final Depth of Exploratory Holes

Exploratory Hole	Depth (m bgl)	Exploratory Hole	Depth (m bgl)
WS01[W]	6.00	DP01	6.00
WS02[W]	6.00	DP02	6.00
WS03	1.20	TP01	1.50

Note(s): [W] - well installation. The depths given in this table are taken from the ground level on-site at the time of investigation.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the exploratory hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report.

For more complete information about the soils encountered within the general area of the site reference must be made to the detailed records given within Appendix B, but for the purposes of discussion, the succession of conditions encountered in the exploratory holes in descending order can be summarised as:

Made Ground (MG)
Kempton Park Gravel Member (KPGR)
London Clay Formation (LC)

The ground conditions encountered in the exploratory holes are summarised in Table 5.2.

Table 5.2 Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
	Top	Bottom		
MG	G.L.	0.50 – 1.20[1]	0.60 (where proven)	Firm greyish brown mottled yellowish brown and dark grey, slightly sandy, slightly gravelly CLAY, locally with fragments of brick, concrete, ash, clinker, glass and cement. Frequent rootlets.
KPGR	0.50 – 0.70	1.40 – 1.85	3.00 (where proven)	**Cohesive:** Firm greyish brown mottled yellowish brown slightly sandy silty CLAY. Increasing gravel content with depth.
	1.40 – 1.85	3.50 – 3.60		**Granular:** Orange and yellowish brown slightly silty very gravelly SAND. Gravel is angular to well-rounded fine to coarse flint.
LC	3.50 – 3.60	6.00[1]	Not proven[2]	Firm brownish grey fissured silty CLAY.

Note(s): [1] Final depth of exploratory hole. [2] Base of strata not encountered. The depths given in this table are taken from the ground level on-site at the time of investigation.

5.3 Ground Conditions Encountered in Exploratory Holes

The ground conditions encountered in exploratory holes have been described below in descending order. The engineering logs are presented in Appendix B.1.

5.3.1 Made Ground

Soils described as Made Ground were encountered in each of the four exploratory holes from ground level to depths ranging between 0.50m and 1.20m bgl. Made Ground was recorded to the base of WS03, so its full depth was not established in this location.

The Made Ground typically comprised firm greyish brown mottled yellowish brown and dark grey, slightly sandy, slightly gravelly CLAY, locally with fragments of brick, concrete, ash, clinker, glass and cement. Frequent rootlets. Gravel was angular to sub-rounded fine to coarse flint and chalk.

The established depth of Made Ground found at each exploratory hole location have been included in Table 5.3.

Table 5.3 Established Depth of Made Ground

Exploratory Hole	Depth (m bgl)
WS/DP01	0.50
WS/DP02	0.55
WS03	1.20[1]

Exploratory Hole	Depth (m bgl)
TP01	0.70

Note(s): [1] Final depth of exploratory hole.

5.3.2 Kempton Park Gravel Member

Soils of the Kempton Park Gravel Member were encountered directly underlying the Made Ground in three of the four exploratory holes and recorded to depths of between 1.50m and 3.60m bgl. The Kempton Park Gravel Member was recorded to the base of WS03, so its full depth was not established in this location.

The Kempton Park Gravel Member consisted of a cohesive horizon over a granular horizon. The cohesive soils typically comprised firm greyish brown mottled yellowish brown slightly sandy silty CLAY with increasing gravel content with depth, recorded to depths of between 1.40m and 1.85m bgl.

The granular soils typically comprised orange and yellowish brown slightly silty very gravelly SAND. Gravel is angular to well-rounded fine to coarse flint.

The established depth of Kempton Park Gravel Member found at each exploratory hole location have been included in Table 5.4.

Table 5.4 Established Depth of Kempton Park Gravel Member

Exploratory Hole	Depth (m bgl)
WS/DP01	3.60
WS/DP02	3.50
WS03	Not encountered
TP01	1.50[1]

Note(s): [1] Final depth of exploratory hole.

5.3.3 London Clay Formation

Soils of the London Clay Formation were encountered directly underlying the Kempton Park Gravel Member in two of the four exploratory holes and recorded to the full depth of the investigation at 6.00m bgl.

The London Clay Formation typically comprised firm brownish grey fissured silty CLAY.

5.4 Roots

Roots were encountered in three out of the four exploratory holes at depths ranging between 1.50m and 1.75m bgl. The established depth of root penetration found at the exploratory hole locations has been included in Table 5.5. Roots were encountered to the base of TP01, so the full depth of roots in this location was not established.

Table 5.5 Established Depth of Root Penetration

Exploratory Hole	Depth (m bgl)
WS01	1.75

Exploratory Hole	Depth (m bgl)
WS02	1.65
WS03	Not encountered
TP01	1.50[1]

Note(s): [1] Final depth of exploratory hole.

Roots may be found to greater depth at other locations on the site particularly close to trees and/or trees that have been removed both within the site and its close environs.

It must be emphasised that the probability of determining the maximum depth of roots from a narrow diameter borehole is low. A direct observation such as from within a trial pit is necessary to gain a better indication of the maximum root depth.

There were no mature trees noted on site at the time of the investigation. A review of aerial imagery on Google Earth™ did not reveal any significant changes in vegetation on or near the site during the past 20 years or so.

5.5 Groundwater

Groundwater was encountered in WS01 and WS02 at a depth of 3.00m bgl, towards the base of the Kempton Park Gravel Member. WS03 and TP01 remained dry to their base at 1.20m and 1.50m bgl, respectively.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in November (2023), when groundwater levels should be rising from their annual minimum (lowest) elevation, which typically occurs around September to their annual maximum (highest) which typically occurs around March.

Further groundwater monitoring was conducted within the standpipes installed on site following completion of site works and has been presented in Table 5.6.

Table 5.6 Groundwater Monitoring

Exploratory Hole	Well Depth (m bgl)	Depth to Water (m bgl) 11/12/2023
WS01	6.00	1.36
WS02	6.00	1.26

Shallow groundwater was recorded in the Kempton Park Gravel Member, as anticipated. The levels noted may reflect the recent high amount of rainfall experienced in the UK.

Groundwater equilibrium conditions may only be conclusively established if a series of observations are made via groundwater monitoring wells.

Section 6 Geotechnical In-Situ and Laboratory Testing

6.1 Dynamic Probe Tests

The results were converted to equivalent SPT "N60" values based on dynamic energy using commercial computer software (Geostru). The results were then interpreted based on the classifications outlined in Appendix C.1,Table C.1.1 to Table C.1.2.

Table 6.1 SPT Hammer Efficiency

Rig Reference	Energy Ratio Er (%)
Premier 3	87.45

Table 6.2 Standard Penetration Tests (SPT) Interpretation

Strata	Depth Range (m bgl)	Inferred N60 Range	Soil Classification
KPGR (c)	0.50 – 1.70	0 – 9	Extremely low to Medium (Cu = <10 – 45kPa)
KPGR (g)	1.40 – 3.60	0 – 34	Very loose to dense
LC	3.50 – 6.00	4 – 13	Low to medium (Cu = 20 – 65kPa)

Note(s): SPT "N60" values presented have been corrected in accordance with BS EN 22476 Part 3.

A full interpretation of the DPSH tests, are outlined in Appendix C.2, Table C.2.1.

6.2 Atterberg Limit Tests

Atterberg Limit tests were performed on three samples, two obtained from the cohesive soils of the Kempton Park Gravel Member and the remaining one from the London Clay Formation. The results were classified in accordance with BRE Digest 240 and NHBC Standards Chapter 4.2.

Table 6.3 Atterberg Limit Results Classification

Strata	Depth (m bgl)	Volume Change Potential	
		NHBC	BRE 240
KPGR (c)	0.90 – 1.20	Medium	Medium
LC	3.90	Medium	Medium

A full interpretation of the Atterberg Limit tests, are outlined in Table C.2.2, Appendix C.2 and the laboratory report in Appendix C.3.

6.3 Particle Size Distribution Tests

Particle Size Distribution (PSD) tests were performed on two samples from the Granular soils of the Kempton Park Gravel Member.

Table 6.4 Particle Size Distribution Classification

Strata	Depth (m bgl)	Volume Change Potential	
		NHBC	BRE 240
KPGR (g)	1.70 – 2.00	None	None

Note that a cohesive soil is only classified as having a volume change potential if it is also plastic and an Atterberg Limit test can be conducted on the strata.

A full interpretation of the PSD tests, are outlined in Table C.2.3, Appendix C.2 and the laboratory report in Appendix C.3.

6.4 Sulphate and pH Tests

Water soluble sulphate (2:1) and pH testing in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

Table 6.5 Sulphate and pH Test Results

Strata	Depth (m bgl)	Sulphate Concentration (mg/l)	pH
KPGR	1.50	<10	7.3
LC	3.70	76	8.2

The significance of the sulphate and pH Test results are discussed in Section 8.2 and the laboratory report in Appendix C.3.

Section 7 Engineering Appraisal

7.1 Established Ground Conditions

An engineering appraisal of the soil types encountered during the site investigation and likely to be encountered during the redevelopment of this site is presented. Soil descriptions are based on analysis of disturbed samples taken from the exploratory holes.

7.1.1 Made Ground and Topsoil

Soils described as Made Ground were encountered in each of the four exploratory holes from ground level to depths ranging between 0.50m and 1.20m bgl. Made Ground was recorded to the base of WS03, so its full depth was not established in this location.

Foundations must not be placed on non-engineered fill unless such use can be justified on the basis of a thorough ground investigation and detailed design. Foundations must be taken through any Topsoil and/or Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.

7.1.2 Kempton Park Gravel Member

Soils of the Kempton Park Gravel Member were encountered directly underlying the Made Ground in three of the four exploratory holes and recorded to depths of between 1.50m and 3.60m bgl. The Kempton Park Gravel Member was recorded to the base of WS03, so its full depth was not established in this location.

The Kempton Park Gravel Member consisted of a cohesive horizon over a granular one. The cohesive soils typically comprised firm greyish brown mottled yellowish brown slightly sandy silty CLAY with increasing gravel content with depth, recorded to depths of between 1.40m and 1.85m bgl.

The granular soils typically comprised orange and yellowish brown slightly silty very gravelly SAND. Gravel is angular to well-rounded fine to coarse flint.

Soils of the Kempton Park Gravel Member are normally consolidated cohesive soils over granular soils.

The cohesive soils are expected to display low bearing capacities with high settlement characteristics.

The granular soils are expected to display moderate bearing capacity with low to moderate settlement characteristics.

The soils of the Kempton Park Gravel Member would not be considered a suitable bearing stratum due to their depth and the proposed basement, which would be founded below the stratum.

7.1.3 London Clay Formation

Soils of the London Clay Formation were encountered directly underlying the Kempton Park Gravel Member in two of the four exploratory holes and recorded to the full depth of the investigation at 6.00m bgl.

The London Clay Formation typically comprises overconsolidated cohesive soils, although in this case the upper horizons appear weathered and as such will behave more like a normally consolidated cohesive soil with low bearing capacity and high settlement characteristics. The London Clay Formation would be a suitable bearing stratum for the proposed development, but bearing capacities will be limited unless piles are adopted.

7.1.4 Guidance on Shrinkable Soils

The ground conditions were established as Kempton Park Gravel Member with a typical thickness of 3.00m, overlying the bedrock of the London Clay Formation.

The volume change potential for each stratum was established and presented in Table 7.1.

Table 7.1 Established Volume Change Potential by Strata

Strata	Volume Change Potential		Established Lower Boundary (m bgl)
	BRE	NHBC	
KPGR (c)	Medium	Medium	1.85
KPGR (g)	None	None	3.60
LC	Medium	Medium	Not proven

7.1.5 Groundwater

Groundwater was encountered in WS01 and WS02 at a depth of 3.00m bgl, towards the base of the Kempton Park Gravel Member. WS03 and TP01 remained dry to their base at 1.20m and 1.50m bgl, respectively.

Further groundwater monitoring recorded shallow groundwater (1.26m to 1.36m bgl) in the Kempton Park Gravel Member, as anticipated. The levels noted may reflect the recent high amount of rainfall experienced in the UK.

Section 8 Foundation Scheme

8.1 Foundation Recommendations

Foundations **must not** be constructed within any Made Ground/Topsoil and cohesive soils of the Kempton Park Gravel Member due to the likely variability and potential for large load induced settlements both total and differential.

Given the proposed single height basement across the footprint of the new structure, foundations must be placed into the soils of the London Clay Formation, which were encountered at depths of between 3.50m and 3.60m bgl.

Roots were encountered in three out of the four exploratory holes at depths ranging between 1.50m and 1.75m bgl. If roots are encountered during the construction phase foundations **must not be placed within any live root penetrated** or desiccated **cohesive soils or those with a volume change potential**. Should the foundation excavations reveal such materials, the excavations **must** be extended to greater depth to bypass these unsuitable soils. Excavations must be checked by a suitable person prior to concrete being poured.

Considering the type of development, a shallow foundation within basement excavation solution was considered the most suitable.

The proposed development is likely to be both light and brittle. It is therefore considered that foundation design is undertaken using NHBC Standards Chapter 4.2.

8.1.1 Shallow Foundations within Basement Excavations

Foundations constructed within the basement excavation could be considered and the bearing capacity of such foundations is given below. If the foundation is to include lateral load from retained soil, then the distribution of loads on the foundation will be trapezoidal and the maximum pressure will be at the toe of the foundation. In such cases additional analyses must be requested by the Client such that the appropriate analyses are undertaken.

If the wall is to have backfill placed on both sides, the backfill must be placed in shallow rises on both sides to maintain similar lateral forces on both sides of the wall.

A proposed basement excavation 3.50m deep would remove an overburden pressure of 63kPa, based on a unit weight of 18kN/m^3, for the overlying soil.

An "**net**" allowable bearing capacity of **60kPa** was calculated, founding at a minimum depth of 3.50m bgl within the London Clay Formation, based on a 5m by 0.75m strip foundation.

Taking account of the removed overburden pressure the "**gross**" bearing value could be taken as **125kPa**.

For the allowable bearing value given above, settlements **should not** exceed **10mm**, provided that excavation bases are carefully bottomed out and blinded, or concreted as soon after excavation as is possible and kept dry. Settlements may be taken as proportional to the applied foundation pressure for the given size of the foundations.

The use of reinforced trench fill foundations reduces the potential for differential settlement affecting the foundations.

Anticipated settlements may be taken as proportional to the bearing capacity adopted (for the same configuration of foundation), therefore if the bearing value is halved the anticipated settlement will halve.

All foundation formations must be examined, recorded, and signed off by a competent person.

Foundations must not be cast over foundations of former structures and other hard spots.

8.1.2 Stability Issues

The excavation of the basement must not affect the integrity of any adjacent structures or land beyond the site boundaries. Given the proximity of the site boundaries a piled foundation solution around the periphery of the basement excavation is likely to be required to form a coffer dam structure using a sheet piles, secant or contiguous concrete piled wall.

Generally cantilevered piled walls have an open face to embedded ratio of about one to two i.e. a supported face 3.50m in height would require a penetration into the ground, below the base of the excavation, of about 7.00m, however, deflection for this minimum depth of penetration were likely to be outside of tolerable limits. Should the piled wall be purely an unsupported cantilever then it is likely that quite deep section sheet piles or large diameter bored piles would be required. Installing a braced waling to the wall could reduce the sheet section, or diameter of the piles.

The excavation of the proposed basement was estimated at 3.50m bgl. Groundwater was struck at 3.00m bgl and recorded at the highest level of 1.26m bgl during monitoring. Water ingress must be prevented by dewatering during construction, either by exclusion, extraction, or a combination.

Groundwater levels could rise, particularly after prolonged periods of wet weather.

If the construction works take place during the winter months or during/after prolonged periods of wet weather perched water could accumulate or groundwater could be found migrating through the granular deposits of the Kempton Park Gravel Member. If any water ingress is not prevented by dewatering, the basement slab could become “buoyant” whilst empty. This must be taken into account in the design. Support of excavation and dewatering with pumps from sumps introduced into the floor of the excavation must be considered.

8.1.3 Anticipated Heave

Given the anticipated volume of soil being excavated and loads applied, long term heave would be minimal, anticipated to be <5mm. Immediate heave is likely to have a minimal effect as it would take place soon after excavation and any immediate heave is likely to be removed during the excavation of the basement slab to achieve the correct dig level prior to casting the slab.

It must be mentioned that it was assumed that excavations will be kept dry and either concreted or blinded as soon after excavation. If water is allowed for even a short time to enter excavations, not only will a greater heave be experiencing owing to the soil increasing in volume by taking up water, but the shear strength, and hence the bearing capacity, will also be reduced.

Note(s): For the calculations of the immediate heave, the Ey (Young's Modulus) for uploading was taken as equal to the Ey for loading, which is considered to be a conservative approach. For the calculations of the long-term swelling, the ratio of swelling index (Cs) compression index (Cc) was taken as Cs=Cc/5 *(Reference: Simon & Menzies, Foundation Engineering)*.

8.1.4 Piled Foundations

If adopted, piled foundations must be taken through any Made Ground and soils of the Kempton Park Gravel Member into suitable strength soils of the London Clay Formation.

The construction of a piled foundation is a specialist job with the actual pile working load depending on the pile type and installation method. Prior to finalising the foundation design the advice from a reputable contractor who is familiar with the ground and groundwater conditions present at the site must be sought.

Additional boreholes would be required to determine the geotechnical parameters of the deeper soils including in-situ testing and laboratory testing of deeper samples. A cable percussive borehole to a minimum depth of 15m would be required.

8.2 Subsurface Concrete

The sulphate and pH tests carried out in accordance with BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground', established the site concrete classifications for each stratum as presented in Table 8.1.

Table 8.1 Concrete Classification

Stratum	Design Sulphate Class	ACEC Class
KPGR	DS-1	AC-1
LC	DS-1	AC-1

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1 2005, *'Concrete in Aggressive Ground'* taking into account any possible exposure of potentially pyrite bearing natural ground and the pH of the soils.

8.3 Excavations

Shallow excavations in the Made Ground and cohesive soils of the Kempton Park Gravel Member are likely to be marginally stable in the short term at best.

Deeper excavations taken into the granular Kempton Park Gravel Member and London Clay Formation are likely to be unstable and require support. Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions must therefore be taken to ensure that such earth faces are adequately supported or battered back to a safe angle of repose.

Excavations beneath the groundwater table are likely to be unstable and dewatering of foundation trenches may be necessary.

Section 9 Basement Impact Assessment

9.1 Mitigation of Adverse Effects

This section of the report addresses the potential impacts identified by the scoping study and the relevant findings of the ground investigation and mitigation measures, where required.

9.1.1 Groundwater Flow

The following potential impacts were identified during the screening and scoping study.

- Basement could extend into an underlying aquifer and thus affect the groundwater flow regime.
- Alterations of an existing groundwater flow regime could cause local increase or decrease of groundwater levels.

The ground conditions were established to be Made Ground with a typical thickness of 0.60m, overlying the Kempton Park Gravel Member (3.00m), which in turn overlies the London Clay Formation. The London Clay Formation comprised cohesive soils classified as Unproductive Strata.

Groundwater was encountered in the Kempton Park Gravel Member at a depth of 3.00m bgl during drilling and standing between 1.26m and 1.36m bgl during the monitoring undertaken in December 2023.

Mitigation: The basement had an anticipated depth of 3.50m and would be taken below the recorded groundwater level.

The basement would be constructed within the Kempton Park Gravel Member, which are highly permeable and allow groundwater to move freely around the basement. Any groundwater level rise would be local to the basement periphery, on a cm scale, and have limited impact on the groundwater flow regime.

Local dewatering will be required during construction, either by exclusion, extraction, or a combination. If extraction methods are used, best practice must be adopted to prevent the loss of material from the surrounding ground, which could cause instability.

9.1.2 Land Stability

The following potential impacts were identified during the screening and scoping study.

- Changes to moisture content in soils with a shrink-swell potential can cause damage to structures.
- The proposed construction could require dewatering, which can cause ground subsidence.
- Basement construction can result in undermining of foundations of neighbouring properties and cause excessive ground movements resulting in structural instability.

The intrusive investigation established the natural soils to be Kempton Park Gravel Member, which overlay the London Clay Formation. The cohesive soils of the Kempton Park Gravel Member and London Clay Formation were classified as medium volume change potential and are susceptible to shrinkage and swelling due to moisture changes.

Basement excavation through the Kempton Park Gravel Member is likely to be unstable and will require support.

Mitigation: The development works, including temporary and permanent works, must be designed to ensure ground movements are within acceptable limits, and are sufficient to prevent slope instability. Groundwater dewatering will be required during construction, either by exclusion, extraction, or a combination, with suitable support to prevent instability.

Foundations must be designed for a medium volume change potential.

Given the limited space and ground and groundwater conditions the construction of the basement is recommended to be undertaken using a coffer dam structure using a sheet piles, secant or contiguous concrete piled wall around the periphery of the structure.

A Ground Movement Assessment can be undertaken to estimate potential damage to surrounding structures. Soils Limited can assist in the production of a Ground Movement Assessment as required.

Structural design and method statements must draw on established successful practices, with the use of suitable temporary and permanent support to prevent damage to neighbouring properties or causing instability. Pre-start and completion surveys made of the adjoining properties. Monitoring of ground and structures to be undertaken before, during and for a sufficiently long period after the completion of the basement for the properties falling within the area of influence of the proposed development.

9.1.3 Surface Flow and Flooding

The following potential impacts were identified during the screening and scoping study.

- Increased risk from flooding due to the introduction of more vulnerable use.

The ground conditions at shallow depth were found to be predominantly cohesive and these soils will have a low permeability and low infiltration potential. It was unlikely that significant rainfall and surface water will infiltrate these soils, prior too or post redevelopment.

Mitigation: Surface water must be managed, whether using SUDS or into the sewer and drainage system, subject to approval. Given the cohesive nature of the upper Kempton Park Gravel Member infiltration SUDS are likely to have limited used and a combination of infiltration and attenuation SUDS in combination with drainage to the sewer system may have to be adopted.

A separate Drainage Strategy Report is being prepared for the site to provide further details.

Additional mitigation measures could be incorporated into the design of the basement, including the introduction of a cavity drainage membrane system, which drains into a surface water pump chamber (Delta Dual V3 SW Sump) which is then positively pumped into the existing surface water sewer. Similarly, any foul water drainage from the basement will be via a separate foul water pump chamber (Delta V3 FW Pump Station) which will be positively pumped into the existing foul water sewer. The pump chambers are fitted with non-return valves to prevent sewer back up. They are also provided with integrated alarm systems and can have a battery back up in the event of a power failure.

9.2 Surrounding Buildings

This section considers the potential effects of basement construction on nearby properties.

This report is not a ground movement assessment, which would quantify any anticipated ground movements resulting from the construction of the basement. Should a ground movement report be required this can be undertaken by Soils Limited.

Detrimental effects can manifest as cracking and more serious structural damage. Many old buildings do exhibit signs of historic movement and repair. In practice, it is often difficult to attribute cracks visible in a structure to specific site construction activities unless a detailed survey of the affected structure and its founding strata had been undertaken before the construction works.

Any observed changes in the state of the building can then be causally linked to the works with more confidence and less debate than if no pre-works condition survey had been undertaken. Surveys require the cooperation of the property owners, as entry by surveyors into the property will be necessary. This would normally be undertaken in collaboration with the neighbour's party wall surveyors.

Close supervision will be made during the construction phase. Movement monitoring of ground, neighbouring and nearby structures will be undertaken before construction starts and continued through the construction phase and for an appropriate period thereafter.

The data from the site investigation has established soil and groundwater conditions. The Client's engineer can prepare working drawings and construction method statements that will mitigate adverse effects of nearby properties.

9.3 Cumulative Effects

The properties along Coombe Lane were mainly detached and semi-detached with small corridors between the buildings. To the east of the subject site was allotment gardens. If eventual basements were constructed at neighbouring properties and within the allotment gardens there would be an increased cumulative effect due to the impermeable basement extending below the groundwater table. The basement would extend through

the Kempton Park Gravel Member, which has a high permeability which allows water to freely flow. Therefore, provided corridors are maintained around the basements, water will freely flow around the basements and the overall impact on the shallow ground was anticipated to be minimal with a localised increase at the head of the basements row, against groundwater flow and a slight decrease at the base of the basement row.

Provided corridors of groundwater flow are maintained around potential future neighbouring basements the impact to groundwater flow would be controlled, without cause a significant damming to groundwater up hydraulic gradient.

Section 10 Conclusions and Recommendations of BIA

10.1 General

The findings of this report are informed by site investigation data and information provided by the Client.

The site did not fall into an area at risk from river and sea. The site was in a critical drainage area with a low to medium risk from surface water flooding, and potential for elevated groundwater.

Development of a surface water management plan will allow any surface water to be managed and reduce potential flood risk.

Groundwater was encountered in the Kempton Park Gravel Member from 1.26m bgl. Local dewatering will be required during construction, either by exclusion, extraction, or a combination. If extraction methods are used, best practice must be adopted to prevent the loss of material from the surrounding ground, which could cause instability.

Foundations must be designed for a medium volume change potential through the cohesive soils of the Kempton Park Gravel Member and the London Clay Formation.

Given the limited space and ground and groundwater conditions the construction of the basement is recommended to be undertaken using a coffer dam structure using a sheet piles, secant or contiguous concrete piled wall around the periphery of the structure.

The permanent works must be designed to ensure induced ground movements surrounding the site are within tolerable limits and temporary works sufficiently design to prevent damage during construction. It was recommended that pre-start and completion surveys made of the adjoining properties. Monitoring of ground and structures to be undertaken before, during and for a sufficiently long period after the completion of the basement for the properties falling within the area of influence of the proposed development.

A ground movement assessment was not undertaken as part of this assessment, but can be undertaken by Soils Limited, as required.

The cumulative effects of eventual multiple basements, of similar construction to the proposed were considered to have limited effect on the groundwater regime, provide groundwater corridors are maintained.

Overall, it was considered the proposed development would have a limited impact on neighbouring properties provided a suitable basement construction was selected. This BIA was developed with reference to the information provided by the Client, presented in Appendix D. Soils Limited must be promptly informed in the case of different solutions be designed by the chosen contractor, as this could require the BIA to be reviewed.

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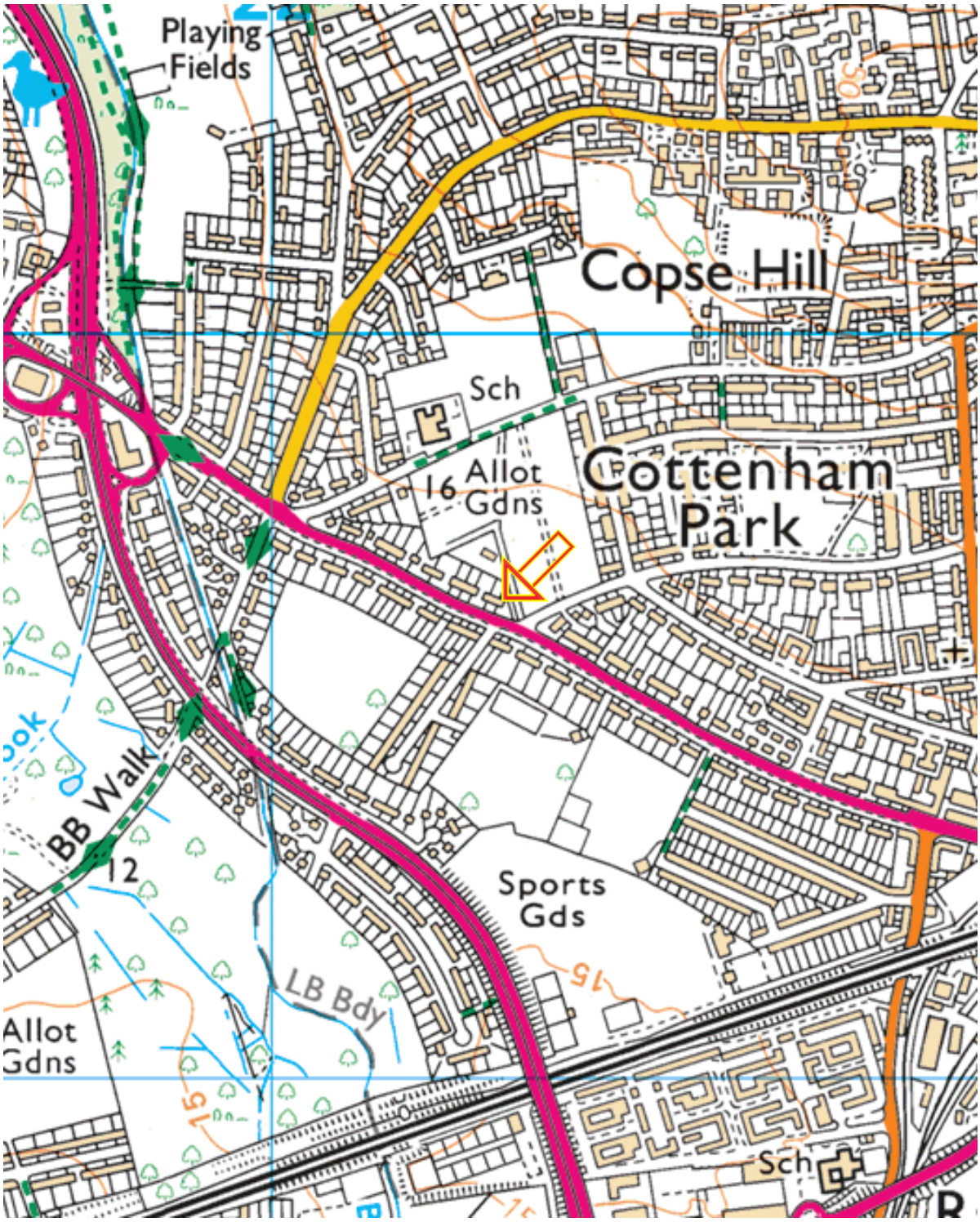


Figure 1 – Site Location Map

Job Number 21173	**Project** 260 Coombe Lane, West Wimbledon, London SW20 0RW
Client Ghlenn Perry Capuyan	**Date** December 2023

Figure 2 – Aerial Photograph

Project
260 Coombe Lane, West Wimbledon, London SW20 0RW

Client
Ghlenn Perry Capuyan

Date
December 2023

Job Number
21173

N

Figure 3 – Exploratory Hole Plan

Project
260 Coombe Lane, West Wimbledon, London SW20 0RW

Client
Ghlenn Perry Capuyan

Date
December 2023

Job Number
21173

N

Figure 4 – Flood Zone Map

Project
260 Coombe Lane, West Wimbledon, London SW20 0RW

Client
Ghlenn Perry Capuyan

Date
December

Job Number
21173

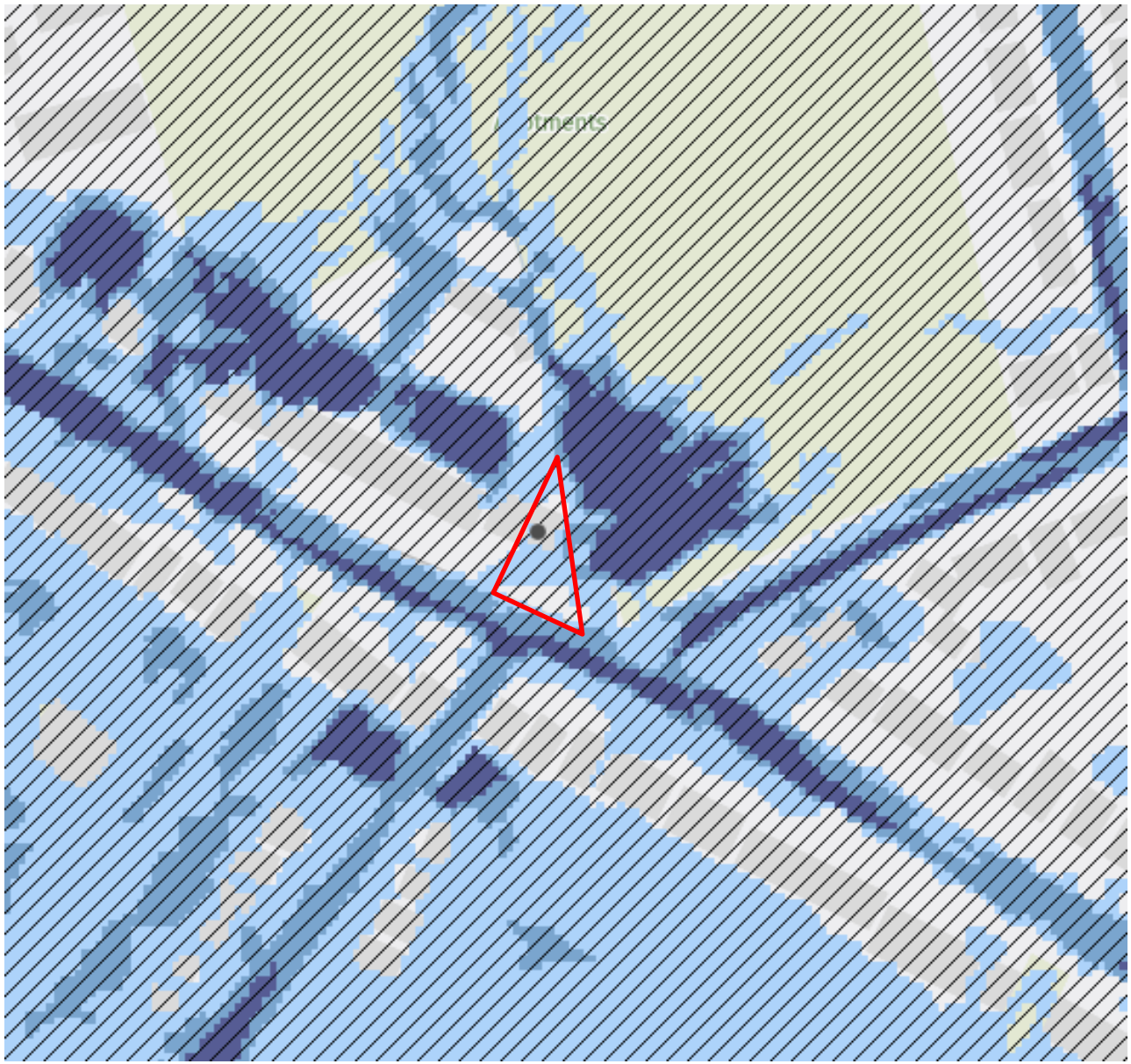


Figure 5 – Surface Water Flooding Extent

Project
260 Coombe Lane, West Wimbledon, London SW20 0RW

Client
Ghlenn Perry Capuyan

Date
December

Job Number
21173

N

Appendix A Standards and Resources

The site works, soil descriptions and geotechnical testing was undertaken in accordance with the following standards were applicable:

- BS 5930:2015 and BS EN ISO 22476-2 2005+A1:2011
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design
- BS EN ISO 14688-1:2018 - Geotechnical investigation and testing - Identification and description
- BS EN ISO 14688-2:2018 - Geotechnical investigation and testing - Principles for a classification
- BS 8004:2015 – Code of practice for foundations
- BS 1377:1990 Parts 1 to 8
- BRE Digest 241 “Low-rise buildings on shrinkable clay soils: Part 2
- BRE Special Digest 1, 2005, ‘Concrete in Aggressive Ground’
- Stroud, M. A. 1974, “The Standard Penetration Test – its application and interpretation”, Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.
- N.E. Simons, B.K. Menzies, “A Short Course in Foundation Engineering”
- NHBC Standards Chapter 4.2, January 2023.
- Google Earth
- British Geological Survey Website & iGeology App

Appendix B Field Work

Appendix B.1 Engineers Logs

soils LIMITED

Contract Name:		Client:			Hole ID:
260 Coombe Lane		Ghlenn Perry Capuyan			**WS1**
Contract Number:	Start and End Date:	Logged By:	Checked By:	Status:	Hole Type:
21173	16/11/23	DEE	SB	FINAL	**WS**
Easting:	Northing:	Ground Level:	Plant Used:	Print Date:	Scale:
			Premier 3	20/12/2023	1:50

Weather: | Termination: Hole complete. | Sheet 1 of 1

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.10	D			0.20		Soft to firm greyish brown slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse flint, and fine clinker. Frequent rootlets. MADE GROUND.		
0.30	D			(0.30)		Firm greyish brown mottled yellowish brown and dark grey, slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse flint, chalk, and rare brick. Frequent rootlets. MADE GROUND.		
0.60	D			0.50		*Angular brick cobble.*		
0.90	D			(1.20)		Firm greyish brown mottled yellowish brown and brownish grey, slightly sandy, silty CLAY. Frequent rootlets and desiccated roots. Rare sub-angular fine to medium flint gravel. KEMPTON PARK GRAVEL MEMBER		
						No sample in liner.		
1.50	D			1.70				
1.75	D			1.85		Firm yellowish brown mottled orange and greyish brown, slightly gravelly, very sandy CLAY. Gravel is angular to sub-angular, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
2.00	D			(0.35)		Orange and yellowish brown mottled, slightly silty, very gravelly SAND. Gravel is angular to sub-angular, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
2.30	D			2.20		*Band of clayey SAND AND GRAVEL.*		
2.70	D			(0.70)		Yellowish brown mottled orangish brown, slightly silty, slightly gravelly SAND. Sand is predominantly medium. Gravel is angular to sub-angular, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
						Clayey inclusion with ironstone.		
3.00	D			2.90		Orangish brown mottled yellowish brown, slightly silty gravelly SAND. Sand is predominantly medium. Gravel is angular to sub-angular, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
3.50	D			(0.70)				
3.70	D			3.60		Firm brownish grey silty fissured CLAY. LONDON CLAY FORMATION.		
				(2.40)				
				6.00		End of Borehole at 6.00m		

1 2 3 4 5 6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Remarks:
Rootlets observed to 1.75m bgl.

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)
0.00	1.00	PLAIN	33
1.00	6.00	SLOTTED	33

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
			0	0.00	Groundwater encountered at 3.00m bgl

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.

soils LIMITED

Contract Name:		Client:			Hole ID:
260 Coombe Lane		Ghlenn Perry Capuyan			**WS2**
Contract Number:	Start and End Date:	Logged By:	Checked By:	Status:	Hole Type:
21173	16/11/23	DEE	SB	FINAL	**WS**
Easting:	Northing:	Ground Level:	Plant Used:	Print Date:	Scale:
			Premier 3	20/12/2023	1:50

Weather: | Termination: Hole complete. | Sheet 1 of 1

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.20	D			(0.55)		Soft to firm blackish brown mottled greyish brown slightly silty, slightly gravelly sandy CLAY. Gravel is angular to sub-rounded, fine to coarse flint, clinker, chalk, glass and cement. Frequent rootlets. MADE GROUND.		
0.60	D			0.55		Firm to stiff greyish brown mottled yellowish brown and brownish grey, slightly sandy, silty CLAY. Frequent rootlets and desiccated roots. Rare becoming frequent at base of stratum sub-angular fine to medium flint gravel. Coarsens down. KEMPTON PARK GRAVEL MEMBER		
0.90	D			(0.85)				
1.20	D			1.40		Yellowish brown mottled orange and greyish brown, gravelly, SAND. Gravel is angular to sub-angular, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
1.50	D			1.55		Orange and yellowish brown mottled, slightly silty, gravelly SAND. Gravel is angular to well rounded, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
1.70	D			(0.45)				
2.10	D			2.00		Yellowish brown, slightly silty gravelly SAND. Sand is predominantly medium. Gravel is angular to well rounded, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
2.60	D			(0.60)				
3.10	D			2.60		Orangish brown mottled yellowish brown, slightly clayey SAND AND GRAVEL. Sand is predominantly medium. Gravel is angular to well rounded, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
3.60	D			(0.40)				
3.90	D			3.00		Orangish brown, slightly silty, gravelly SAND. Gravel is angular to well rounded, fine to coarse flint. KEMPTON PARK GRAVEL MEMBER		
				(0.50)				
				3.50		Firm to stiff brownish grey silty fissured CLAY. LONDON CLAY FORMATION.		
				(2.50)				
				6.00		End of Borehole at 6.00m		

1 2 3 4 5 6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Remarks:
Rootlets observed to 1.65m bgl.

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)
0.00	1.00	PLAIN	33
1.00	6.00	SLOTTED	33

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
			0	0.00	Groundwater encountered at 3.00m bgl

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.

soils LIMITED

Contract Name:		Client:			Hole ID:
260 Coombe Lane		Ghlenn Perry Capuyan			**WS3**
Contract Number:	Start and End Date:	Logged By:	Checked By:	Status:	Hole Type:
21173	16/11/23	GJB	SB	FINAL	**WS**
Easting:	Northing:	Ground Level:	Plant Used:	Print Date:	Scale:
			Premier 3	20/12/2023	1:50

Weather: | Termination: Hole complete. | Sheet 1 of 1

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.20	D			0.06 (0.15) 0.25		CONCRETE paving slab. CONCRETE sub-base. Dark greyish brown slightly sandy slightly clayey fine to coarse concrete GRAVEL. Rare fine tarmacadam fragments. MADE GROUND.		
0.50	D			(0.75)		Soft dark grey slightly sandy gravelly CLAY. Occasional frequent fine to coarse tarmacadam, concrete, brick, ash fragments. Slight hydrocarbon odour. Occasional intermittent pockets of light orange brown fine to coarse sand. MADE GROUND.		
0.90	D			1.00				
1.20	D			1.20		Soft orange grey mottled brown slightly gravelly sandy CLAY. Rare fine brick fragments. Gravel is angular to sub-angular fine to coarse flint gravel. Frequent pockets of light orange brown fine to coarse sand. MADE GROUND.		
						End of Borehole at 1.20m		

1 2 3 4 5 6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Remarks:

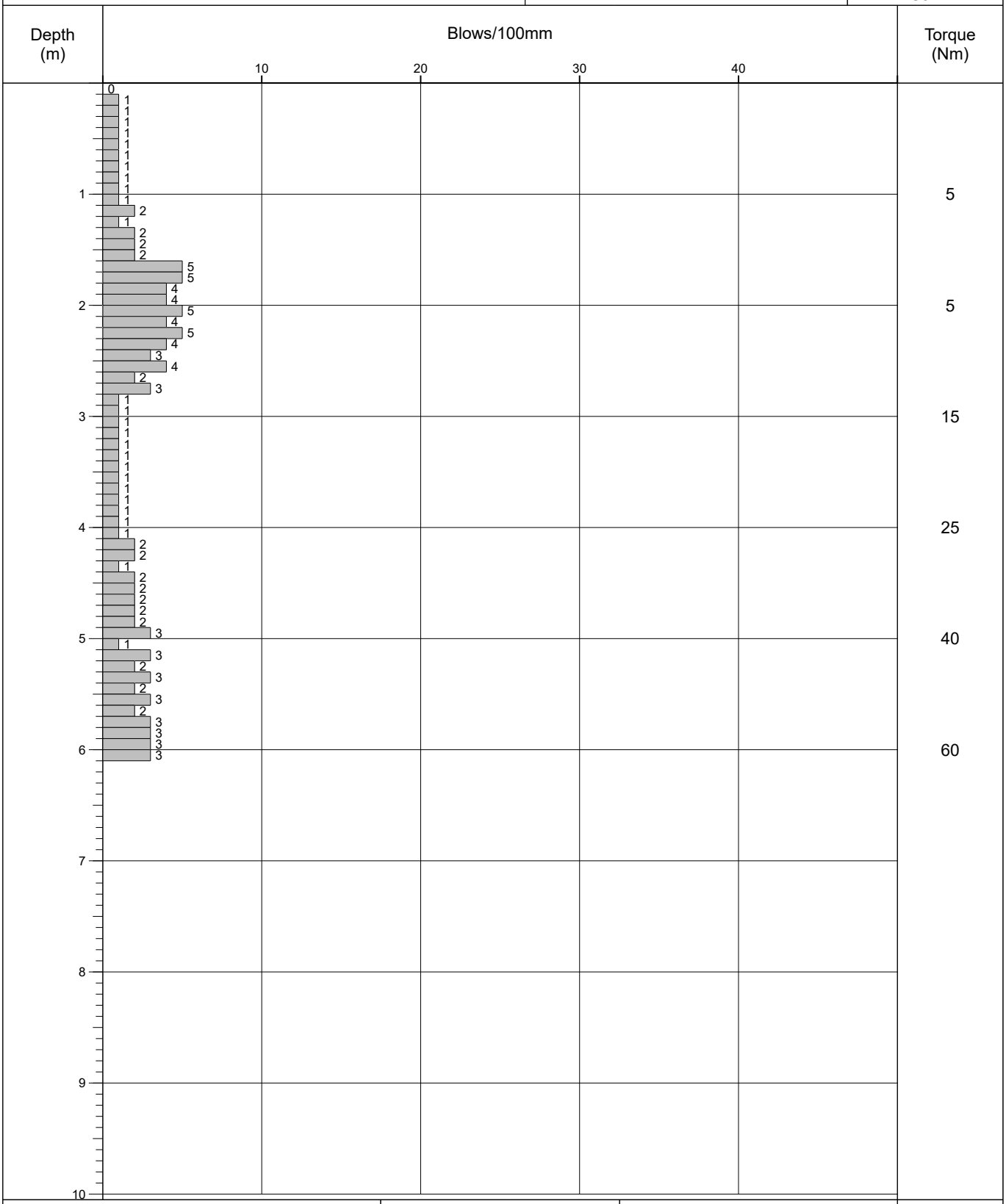
Chiselling				Installation			
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
			0	0.00	Groundwater not encountered

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.

Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk	**Probe Log**	Probe No. **DP1** Sheet 1 of 1

Project Name:	260 Coombe Lane	Project No. 21173	Co-ords:	Hole Type DP
Location:	West Wimbledon, London, SW20 0RW		Level: m AOD	Scale 1:50
Client:	Ghlenn Perry Capuyan		Dates: 16/11/2023	Logged By GJB

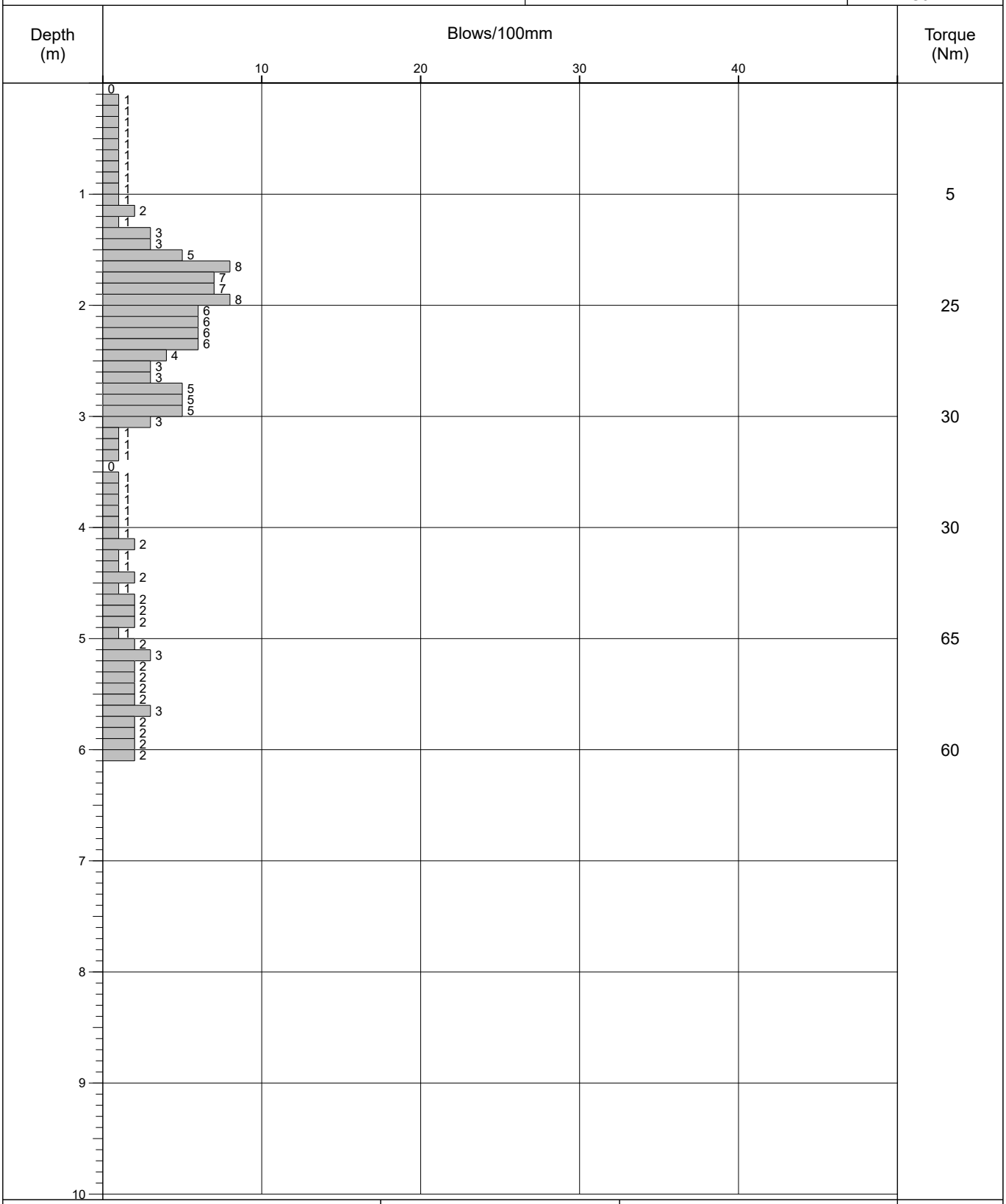


Remarks				
	Fall Height	760mm	Cone Base Diameter	52mm
	Hammer Weight	63.5kg	Final Depth	6m
	Probe Type	DPSH	Energy Ratio (Er)	87.45%

AGS REGISTERED USER 2020

Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk	**Probe Log**	Probe No. **DP2** Sheet 1 of 1

Project Name:	260 Coombe Lane	Project No. 21173	Co-ords:	Hole Type DP
Location:	West Wimbledon, London, SW20 0RW		Level: m AOD	Scale 1:50
Client:	Ghlenn Perry Capuyan		Dates: 16/11/2023	Logged By GJB



Remarks	Fall Height	760mm	Cone Base Diameter	52mm
	Hammer Weight	63.5kg	Final Depth	6m
	Probe Type	DPSH	Energy Ratio (Er)	87.45%

AGS REGISTERED USER 2020

Soils Limited
Newton House, Cross Road, Tadworth KT20 5SR
Tel: 01737 814221 Email: admin@soilslimited.co.uk

Trial Pit Log

Trial Pit No.
TP01
Sheet 1 of 1

Project Name: 260 Coombe Lane	Project No.: 21173	Method: Hand Excavation	Hole Type TP
Location: West Wimbledon, London, SW20 0RW		Plant: Hand Tools	
		Support: None	Scale 1:25
Client: Ghlenn Perry Capuyan	Trial Pit Length: m	Trial Pit Width: m	
Dates: 16/11/2023	Level:	Co-ords:	Logged By GJB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (mAOD)	Legend	Stratum Description
	0.20	D		0.30			Turf over soft dark grey brown silty CLAY. Occasional rootlets. Rare fine roots. Occasional fine to coarse brick and ash fragments. Rare fine dark orange brown organic material. Rare occasional fine to coarse angular to sub-angular to sub-rounded flint gravel. MADE GROUND.
	0.50	D		0.70			Soft orange grey mottled brown slightly gravelly sandy CLAY. Rare occasional rootlets. Rare fine roots. Rare fine brick fragments. Occasional rare fine chalk fragments. Occasional fine to coarse angular to sub-angular flint gravel. Frequent intermittent pockets of light orange brown fine to coarse sand. MADE GROUND.
	0.90	D		1.20			Soft orange grey mottled brown slightly gravelly sandy CLAY. Rare occasional rootlets. Gravel is angular to sub-angular fine to coarse flint and chalk. Frequent intermittent pockets of light orange brown fine to coarse sand. KEMPTON PARK GRAVEL MEMBER
	1.30	D		1.50			Soft light orange grey mottled brown slightly gravelly very sandy CLAY. Rare rootlets. Gravel is angular to sub-angular fine to coarse flint. Rare fine to coarse chalk fragments. KEMPTON PARK GRAVEL MEMBER
	1.50	D					End of Pit at 1.500m

1
2
3
4
5

General Remarks:
Rootlets observed to 1.20m bgl.

Groundwater Remarks: Groundwater not encountered

Sample Type
D: Disturbed
B: Bulk
J: Jar
W: Water

Appendix C Geotechnical In-Situ and Laboratory Testing

Appendix C.1 Classification

Classification based on SPT "N" values:

The inferred undrained strength of the cohesive soils was based on the SPT "N" blow counts, derived from the relationship suggested by Stroud (1974) and classified using Table C.1.1. (Ref: Stroud, M. A. 1974, "The Standard Penetration Test – its application and interpretation", Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.).

Table C.1.1 SPT "N" Blow Count Cohesive Classification

Classification	Undrained Cohesive Strength C_u (kPa)
Extremely low	<10
Very low	10 – 20
Low	20 – 40
Medium	40 – 75
High	75 – 150
Very high	150 – 300
Extremely high	> 300

Note(s): (Ref: BS EN ISO 14688-2:2004+A1:2013 Clause 5.3.)

The relative density of granular soils was classified based of the relationship given in Table C.1.2.

The *UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing, NA 3.7 SPT test, BS EN 1997-2:2007, Annex F* states "Relative density descriptions on borehole records should also be based on uncorrected SPT N values, unless significantly disturbed, using the density classification in BS 5930:2015, Table 7.

Table C.1.2 SPT "N" Blow Count Granular Classification

Classification	SPT "N" blow count (blows/300mm)
Very loose	0 to 4
Loose	4 to 10
Medium dense	10 to 30
Dense	30 to 50
Very dense	Greater than 50

Note(s): (Ref: The Standard Penetration Test (SPT): Methods and Use, CIRIA Report 143, 1995)

Appendix C.2 Interpretation

Table C.2.1 Interpretation of DPSH Blow Counts

DP	Strata	Equivalent SPT N60 Blow Counts	Inferred Cohesive Strength/Granular Density
DP01	KPGR 0.50 – 1.70 Sandy gravelly CLAY	0 – 9	Extremely low to Medium (C_u = <10 – 45kPa)
	KPGR 1.70 – 2.70 Gravelly SAND	13 – 22	Medium dense
	KPGR 2.70 – 3.50 Silty gravelly SAND	4 – 13	Loose to medium dense
	LC 3.50 – 6.00 Silty CLAY	4 – 13	Low to medium (C_u = 20 – 65kPa)
DP02	KPGR 0.55 – 1.40 Sandy silty CLAY	4 – 9	Low to medium (C_u = 20 – 45kPa)
	KPGR 1.40 – 3.00 Gravelly SAND	13 – 34	Medium dense to dense
	KPGR 3.00 – 3.60 Gravelly SAND	0 – 4	Very loose
	LC 3.60 – 6.00 Silty CLAY	4 – 13	Low to medium (C_u = 20 – 65kPa)

Table C.2.2 Interpretation of Atterberg Limit Tests

Stratum	Moisture Content (%)	Plasticity Index (%)	Passing 425µm Sieve (%)	Modified Plasticity Index (%)	Soil Classification	Volume Change Potential	
						BRE	NHBC
KPGR	15 – 26	25 – 39	88 – 89	22 – 35	CI – CH	Medium	Medium
LC	37	37	100	37	CH	Medium	Medium

Note(s): BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results)
NHBC Volume Change Potential refers to NHBC Standards Chapter 4.2
Soils Classification based on British Soil Classification System
The most common use of the term clay is to describe a soil that contains enough clay-sized material or clay minerals to exhibit cohesive properties. The fraction of clay-sized material required varies, but can be as low as 15%. Unless stated otherwise, this is the sense used in Digest 240. The term can be used to denote the clay minerals. These are specific, naturally occurring chemical compounds, predominately silicates. The term is often used as a particle size descriptor. Soil particles that have a nominal diameter of less than 2 µm are normally considered to be of clay size, but they are not necessarily clay minerals. Some clay minerals are larger than 2 µm and some particles, 'rock flour' for example, can be finer than 2 µm but are not clay minerals.
(The Atterberg Limit Tests were undertaken in accordance with BS 1377:Part 2:1990 Clauses 3.2, 4.3 and 5)

Table C.2.3 Interpretation of PSD Tests

Location	Depth (m bgl)	Soil Description	Volume Change Potential		Passing 63µm Sieve (%)
			BRE	NHBC	
WS01	2.00	Brown slightly silty/clayey fine to coarse gravelly fine to coarse SAND	No	No	2
WS02	1.70	Brown silty/clayey fine to medium gravelly fine to coarse SAND	No	No	6

Note(s): BRE 240 states that a soil has a volume change potential when the clay fraction **exceeds 15%**. Only the silt and clay combined fraction are determined by sieving therefore the volume change potential is estimated from the percentage passing the 63µm sieve. NHBC Standards Chapter 4.2 states that a soil is shrinkable if the percentage of silt and clay passing the 63µm sieve is greater than 35% and the Plasticity Index is greater than 10%.
(The Particle Size Distribution Tests were undertaken in accordance with BS 1377: Part 2: 1990 Clause 9)

Appendix C.3 Geotechnical In-Situ and Laboratory Results

Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

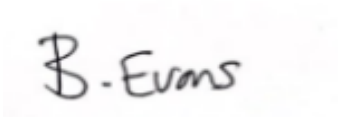
Contract Number: 69888

Client Ref: **21173**
Client PO: **21173/SB**

Date Received: **29-11-2023**
Date Completed: **11-12-2023**
Report Date: **11-12-2023**

Client: **Soils Limited**
Newton House
Cross Road
Tadworth
Surrey
KT20 5SR

This report has been checked and approved by:



Brendan Evans
Office Administrator

Contract Title: **Coombe Lane**
For the attention of: **Sam Bevins**

Test Description	Qty
Moisture Content of Soil BS1377 : Part 2 : Clause 3.2 : 1990 - * UKAS	3
1 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.4 & 5.3 - * UKAS	3
PSD Wet & Dry Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	2
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (Human Resources/ Health and Safety Manager)

GEO Site & Testing Services Ltd
Units 3-4, Heol Aur, Dafen, Llanelli, Carmarthenshire, Wales SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)

Contract Number	69888
Project Name	Coombe Lane
Date Tested	05/12/2023

DESCRIPTIONS

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS01	D		0.90	-		Brown gravelly silty CLAY
WS02	D		1.20	-		Brown gravelly silty sandy CLAY
WS02	D		3.90	-		Brown silty CLAY
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				-		
				-		
				-		
				-		
				-		
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Operator
Clayton Jenkins

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.4 & 5.3)	
Contract Number	69888	
Project Name	Coombe Lane	
Date Tested	05/12/2023	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS01	D		0.90	-		26	61	22	39	89	CH High Plasticity
WS02	D		1.20	-		15	41	16	25	88	CI Intermediate Plasticity
WS02	D		3.90	-		37	60	23	37	100	CH High Plasticity
				-							
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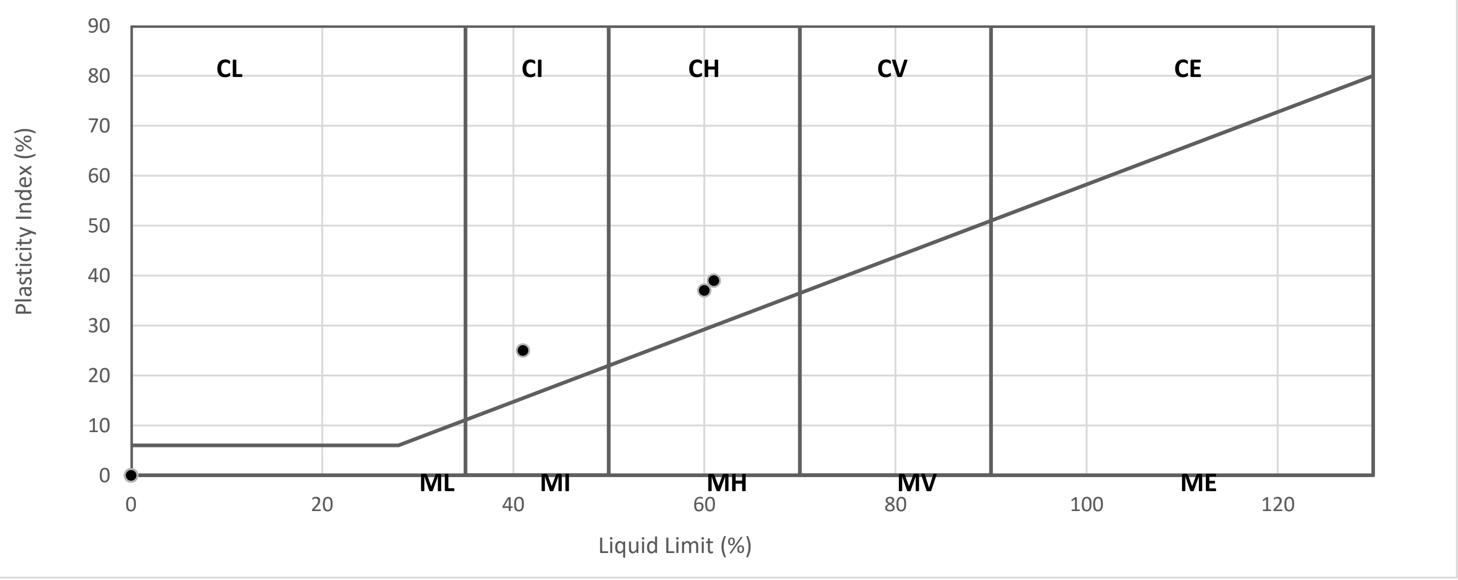
Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

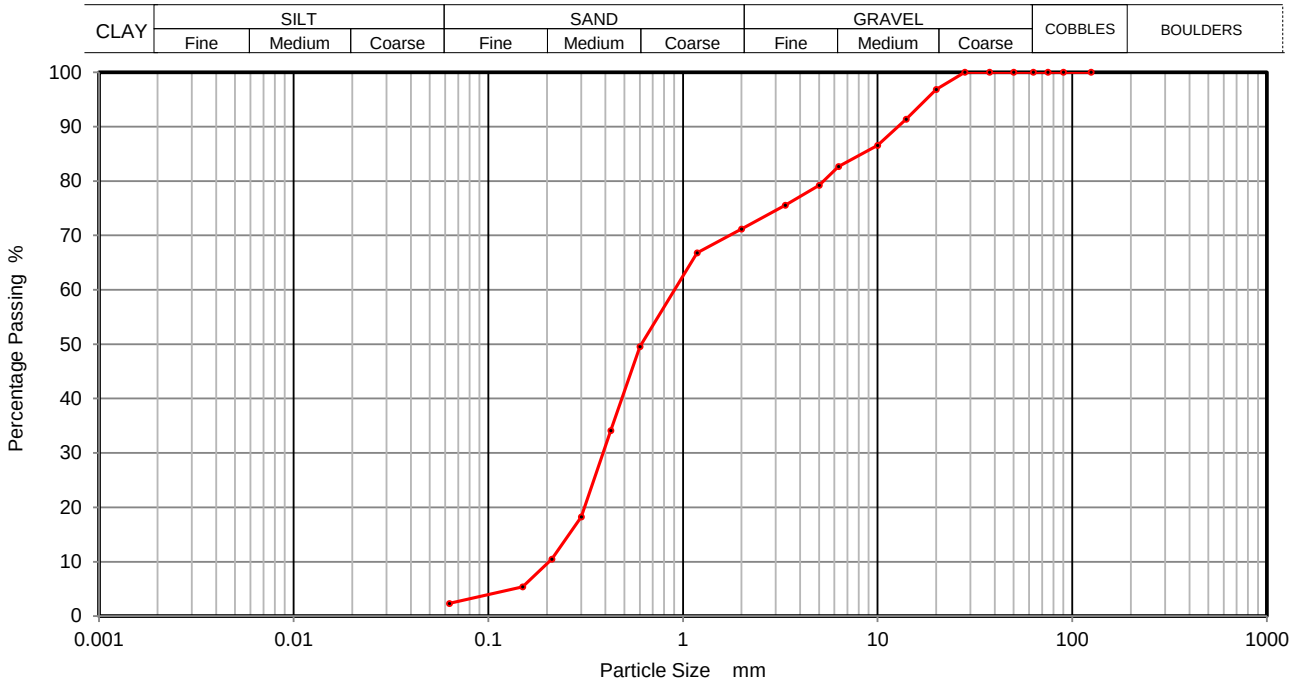
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:2015+A1:2020



Operator
Clayton Jenkins

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	69888
		Borehole/Pit No.	WS01
Project Name	Coombe Lane	Sample No.	
Soil Description	Brown slightly silty/clayey fine to coarse gravelly fine to coarse SAND	Depth Top	2.00
		Depth Base	
Date Tested	06/12/2023	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	91		
10	87		
6.3	83		
5	79		
3.35	76		
2	71		
1.18	67		
0.6	50		
0.425	34		
0.3	18		
0.212	10		
0.15	5		
0.063	2		

Sample Proportions	% dry mass
Cobbles	0
Gravel	29
Sand	69
Silt and Clay	2

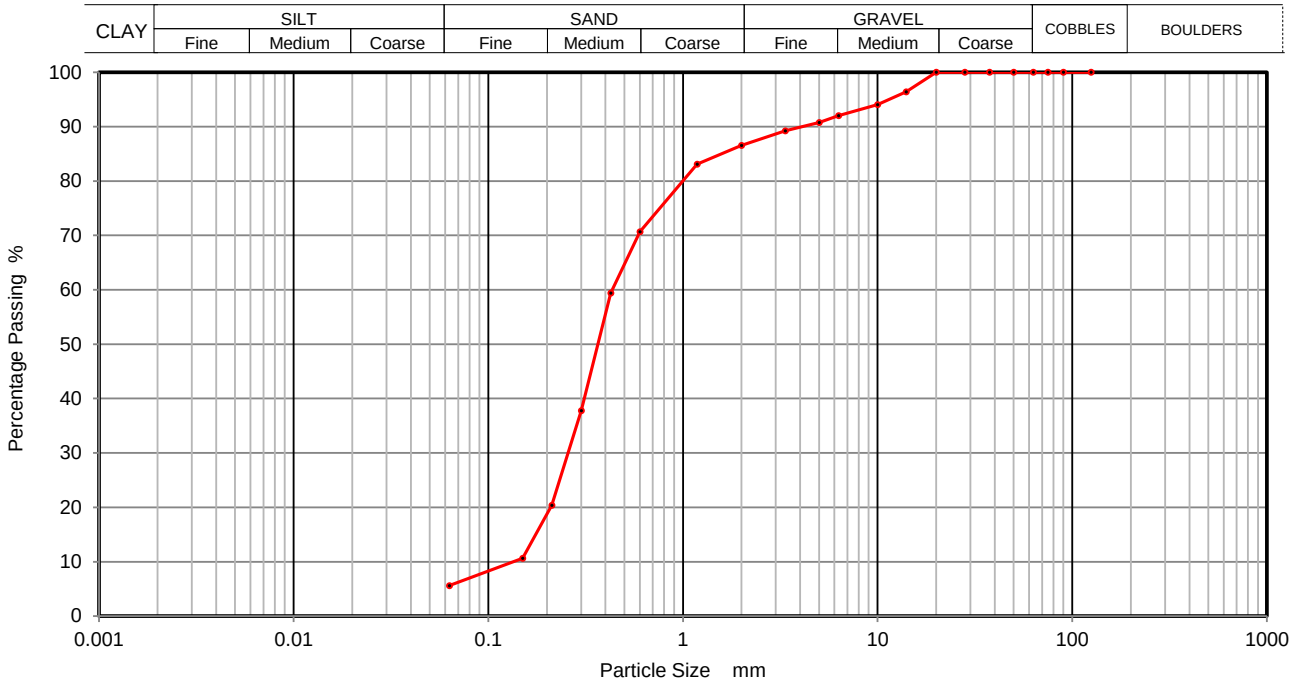
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	69888
		Borehole/Pit No.	WS02
Project Name	Coombe Lane	Sample No.	
Soil Description	Brown silty/clayey fine to medium gravelly fine to coarse SAND	Depth Top	1.70
		Depth Base	
Date Tested	06/12/2023	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	94		
6.3	92		
5	91		
3.35	89		
2	87		
1.18	83		
0.6	71		
0.425	59		
0.3	38		
0.212	20		
0.15	11		
0.063	6		

Sample Proportions	% dry mass
Cobbles	0
Gravel	13
Sand	81
Silt and Clay	6

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

Sam Bevins
Soils Ltd
Newton House
Cross Road
Tadworth
Surrey
KT20 5SR

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-14661

Site Reference:	Coombe Lane
Project / Job Ref:	21173
Order No:	21173/SB
Sample Receipt Date:	29/11/2023
Sample Scheduled Date:	29/11/2023
Report Issue Number:	1
Reporting Date:	05/12/2023

Authorised by:

Kevin Old
Operations Director

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

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

4480

Soil Analysis Certificate						
DETS Report No: 23-14661	**Date Sampled**	27/11/23	27/11/23			
Soils Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Coombe Lane	**TP / BH No**	WS1	WS2			
Project / Job Ref: 21173	**Additional Refs**	None Supplied	None Supplied			
Order No: 21173/SB	**Depth (m)**	3.70	1.50			
Reporting Date: 05/12/2023	**DETS Sample No**	687912	687913			

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.2	7.3			
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	555	< 200			
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.06	< 0.02			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	76	< 10			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.08	< 0.01			
Total Sulphur	%	< 0.02	NONE	0.47	< 0.02			
Ammonium as NH_4	mg/kg	< 0.5	MCERTS	6.6	3.5			
Ammonium as NH_4	mg/l	< 0.05	MCERTS	0.66	0.35			
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	20	6			
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	10.2	3.1			
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	< 3	< 3			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	< 1.5	< 1.5			
W/S Magnesium	mg/l	< 0.1	NONE	4.8	1.6			

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)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14661	
Soils Ltd	
Site Reference: Coombe Lane	
Project / Job Ref: 21173	
Order No: 21173/SB	
Reporting Date: 05/12/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
687912	WS1	None Supplied	3.70	19.1	Brown clay
687913	WS2	None Supplied	1.50	12.7	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-14661
Soils Ltd
Site Reference: Coombe Lane
Project / Job Ref: 21173
Order No: 21173/SB
Reporting Date: 05/12/2023

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

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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List of HWOL Acronyms and Operators
DETS Report No: 23-14661
Soils Ltd
Site Reference: Coombe Lane
Project / Job Ref: 21173
Order No: 21173/SB
Reporting Date: 05/12/2023

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

Det - Acronym

Appendix D Information Provided by the Client

PROPOSED PLANS AND ELEVATIONS

260 COOMBE LANE

WEST WIMBLEDON, LONDON, SW20 0RW, UK

PURPOSE OF ISSUANCE: **PRE-APPLICATION NO.01**

Issued: 06/09/2023

N

A 01 | LOCATION PLAN

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

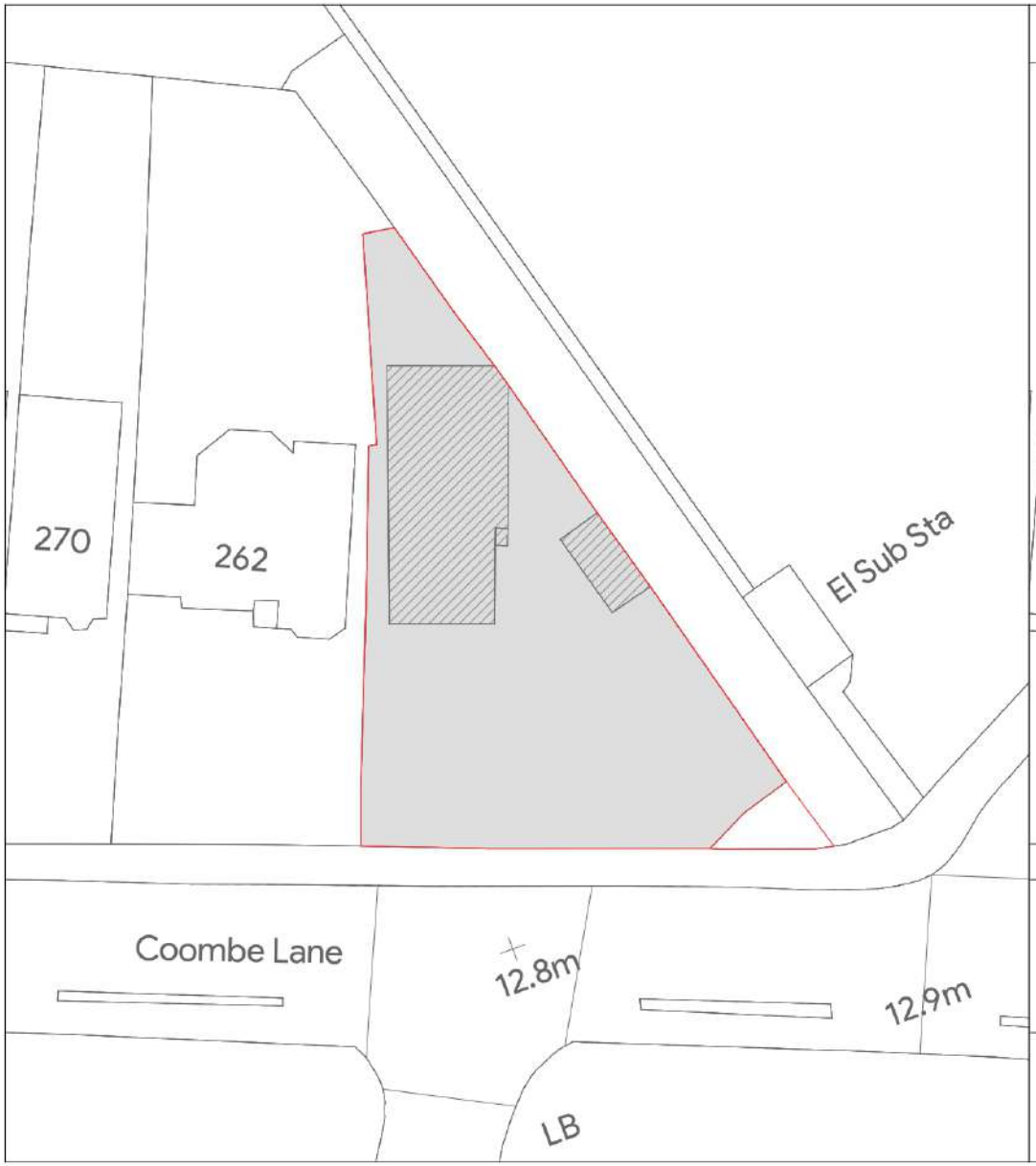
DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W / ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
LOCATION PLAN	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS. THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				DRAWN	MCV	A-01
					APPROVED		
					REVISED		A3 PAPER SIZE



A 02 **EXISTING BLOCK PLAN**

B 02 **PROPOSED BLOCK PLAN**

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

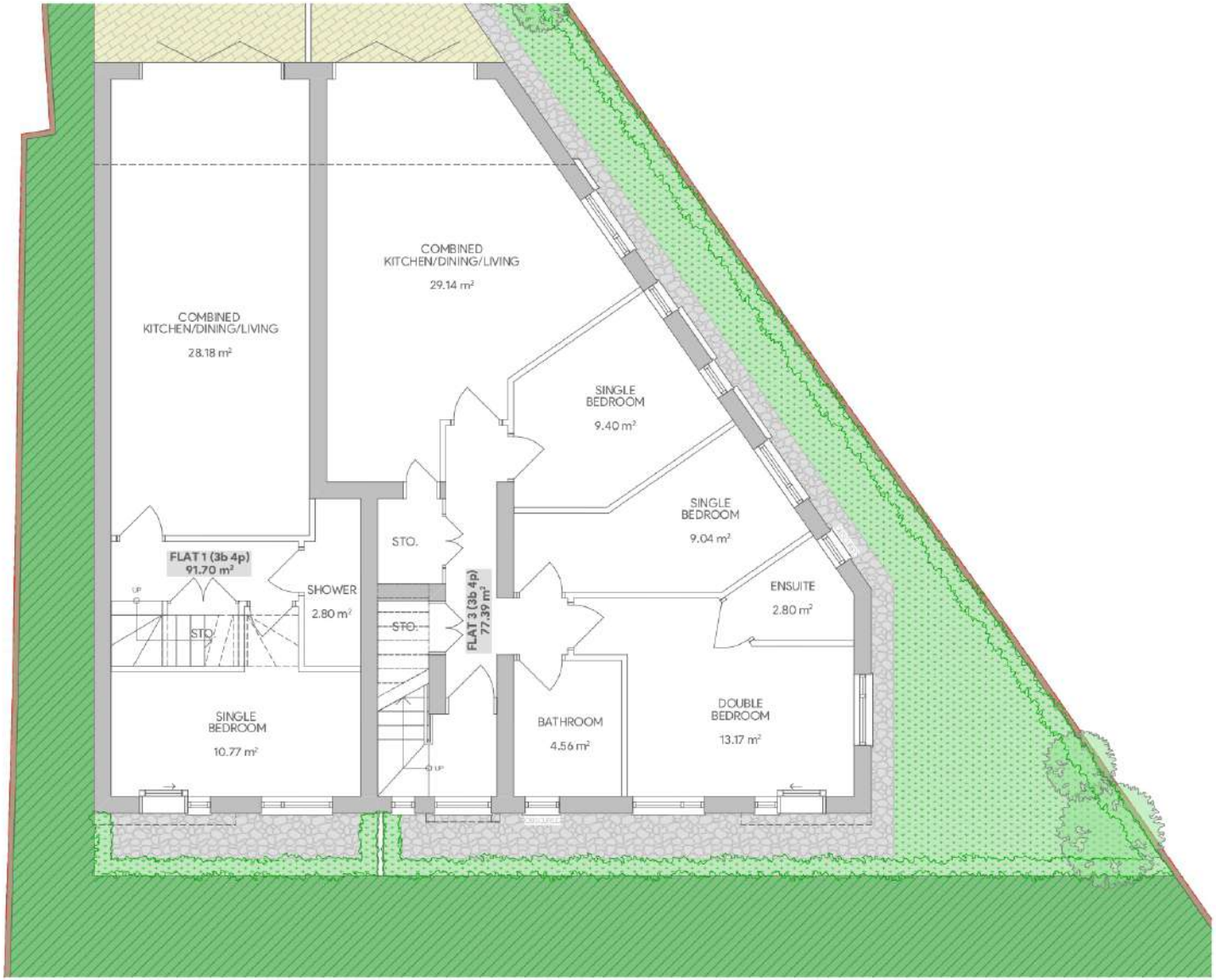
SHEET CONTENTS

EXISTING BLOCK PLAN
PROPOSED BLOCK PLAN

REVISION	DATE	SUBJECT

DESIGNED	CHD	SHEET NO.
DRAWN	MCV	A-02
APPROVED		
REVISED		A3 PAPER SIZE

KEYPLAN



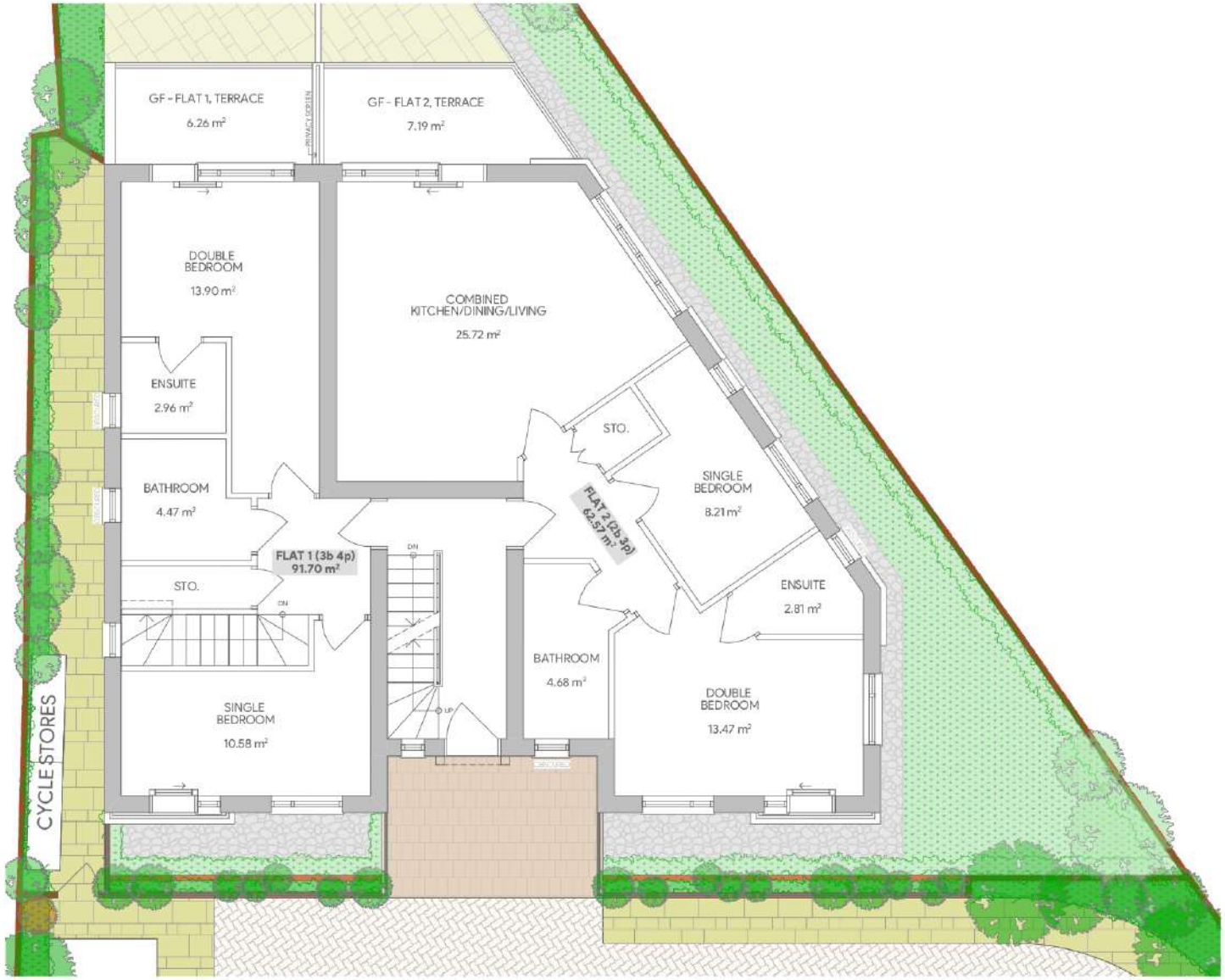
A 03 | PROPOSED BASEMENT FLOOR PLAN

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMDATION AT THE LOFT AND BASEMENT
260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
PROPOSED BASEMENT FLOOR PLAN	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.				DRAWN	MCV	A-03
	ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS.				APPROVED		
	THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				REVISED		A3 PAPER SIZE

KEYPLAN

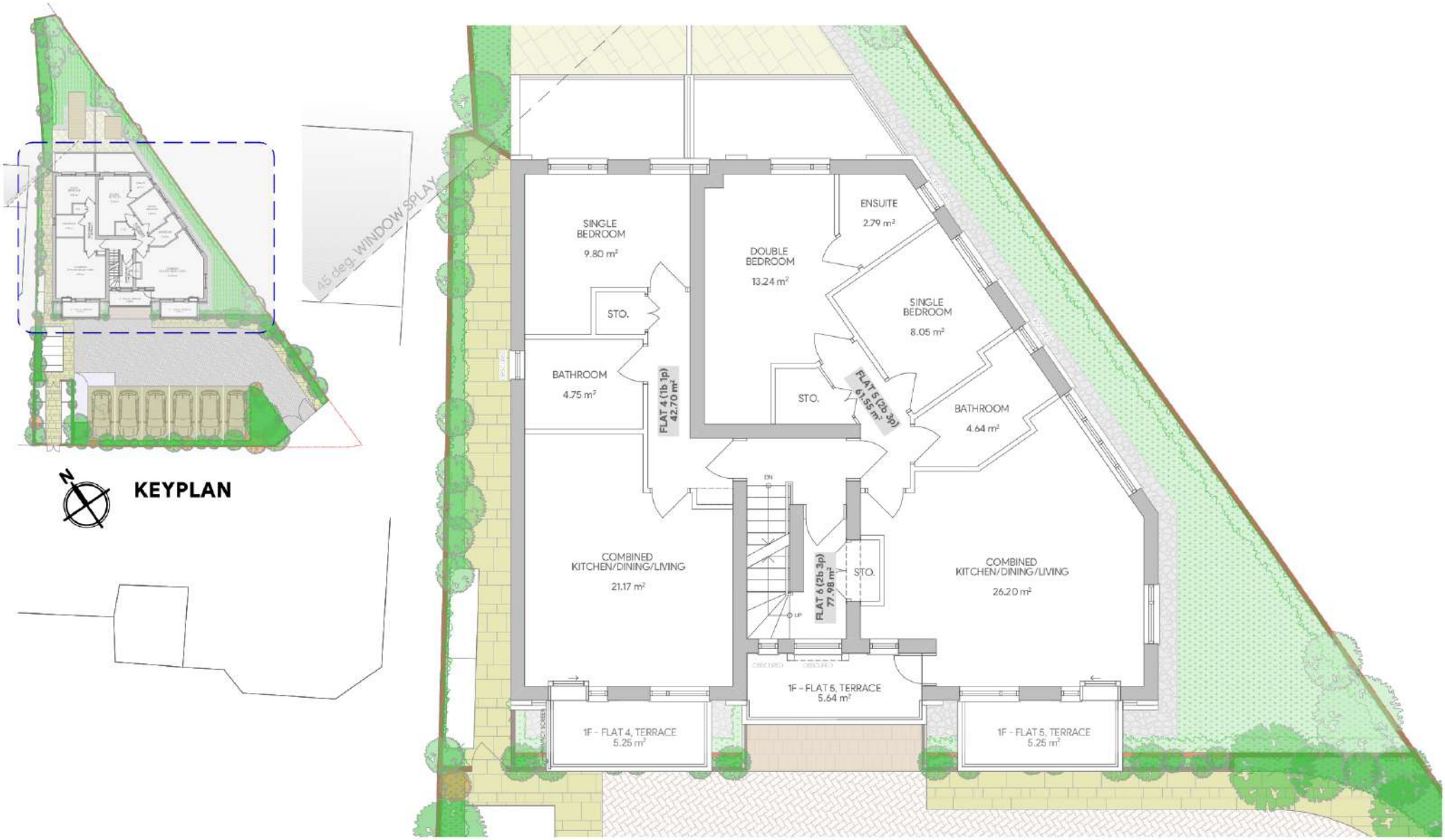


A 04 | PROPOSED GROUND FLOOR PLAN

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMDATION AT THE LOFT AND BASEMENT
260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
PROPOSED GROUND FLOOR PLAN	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS. THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				DRAWN	MCV	A-04
					APPROVED		
					REVISED		A3 PAPER SIZE



A 05 PROPOSED FIRST FLOOR PLAN

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

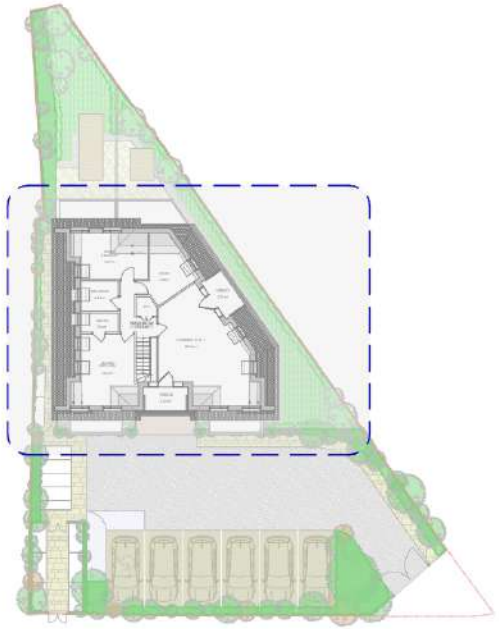
DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
PROPOSED FIRST FLOOR PLAN	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS. THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				DRAWN	MCV	A-05
					APPROVED		
					REVISED		A3 PAPER SIZE



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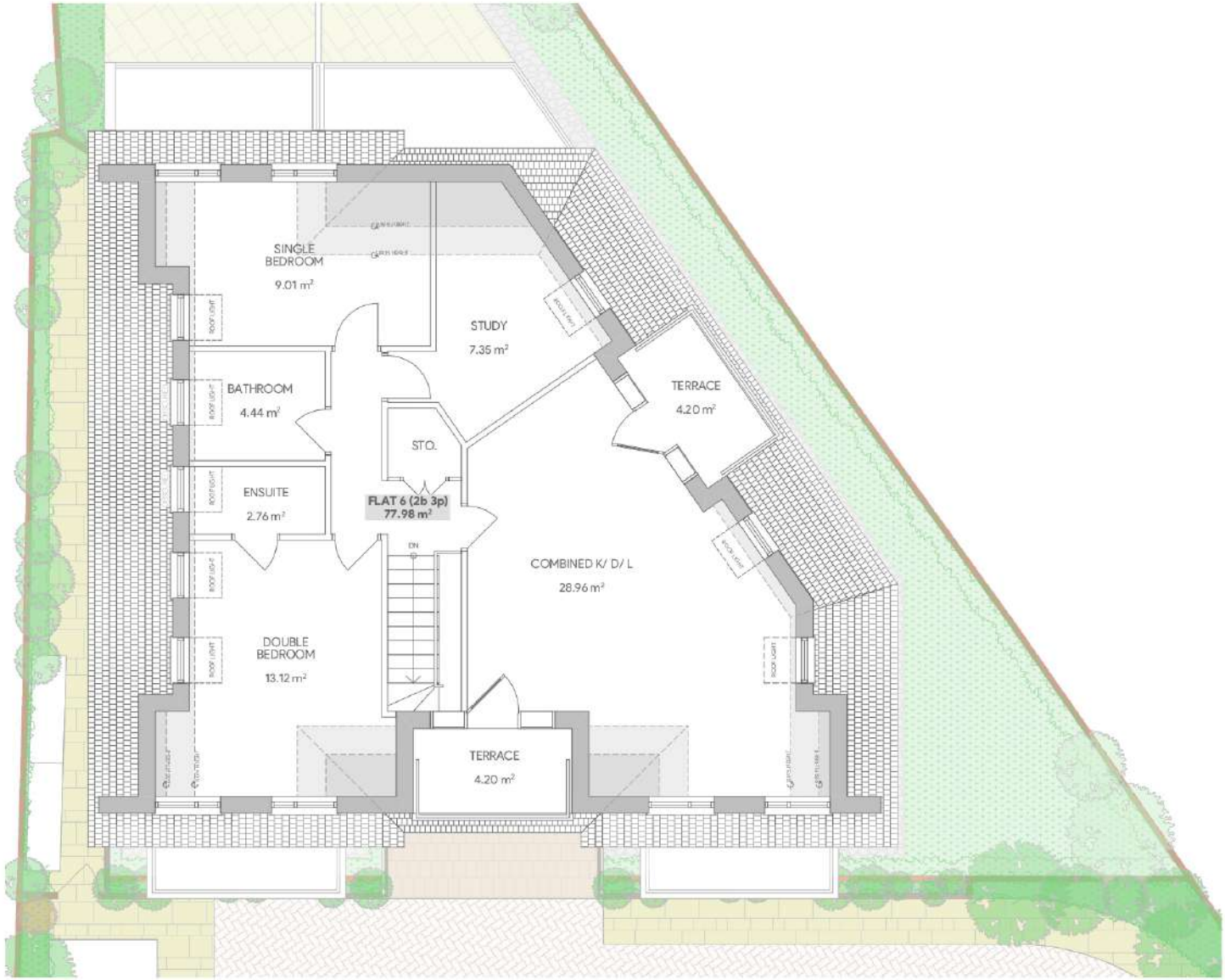


A 06 | PROPOSED SECOND FLOOR PLAN

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

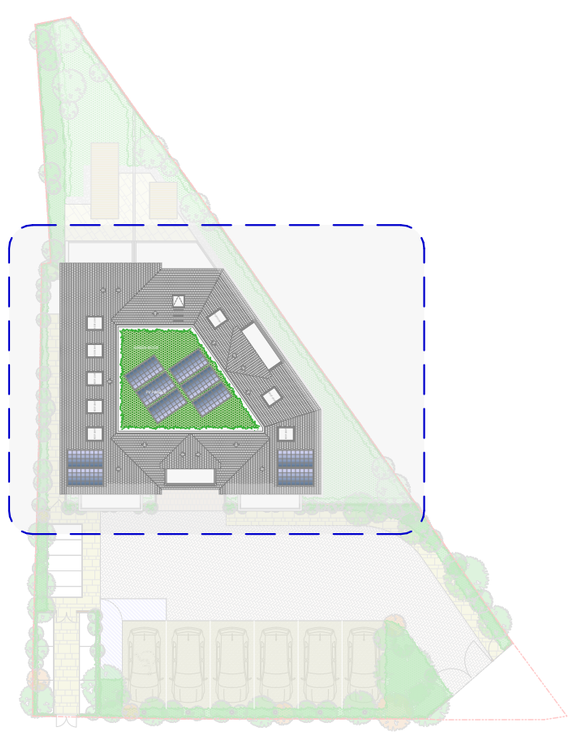
DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
PROPOSED SECOND FLOOR PLAN	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS. THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				DRAWN	MCV	A-06
					APPROVED		
					REVISED		A3 PAPER SIZE



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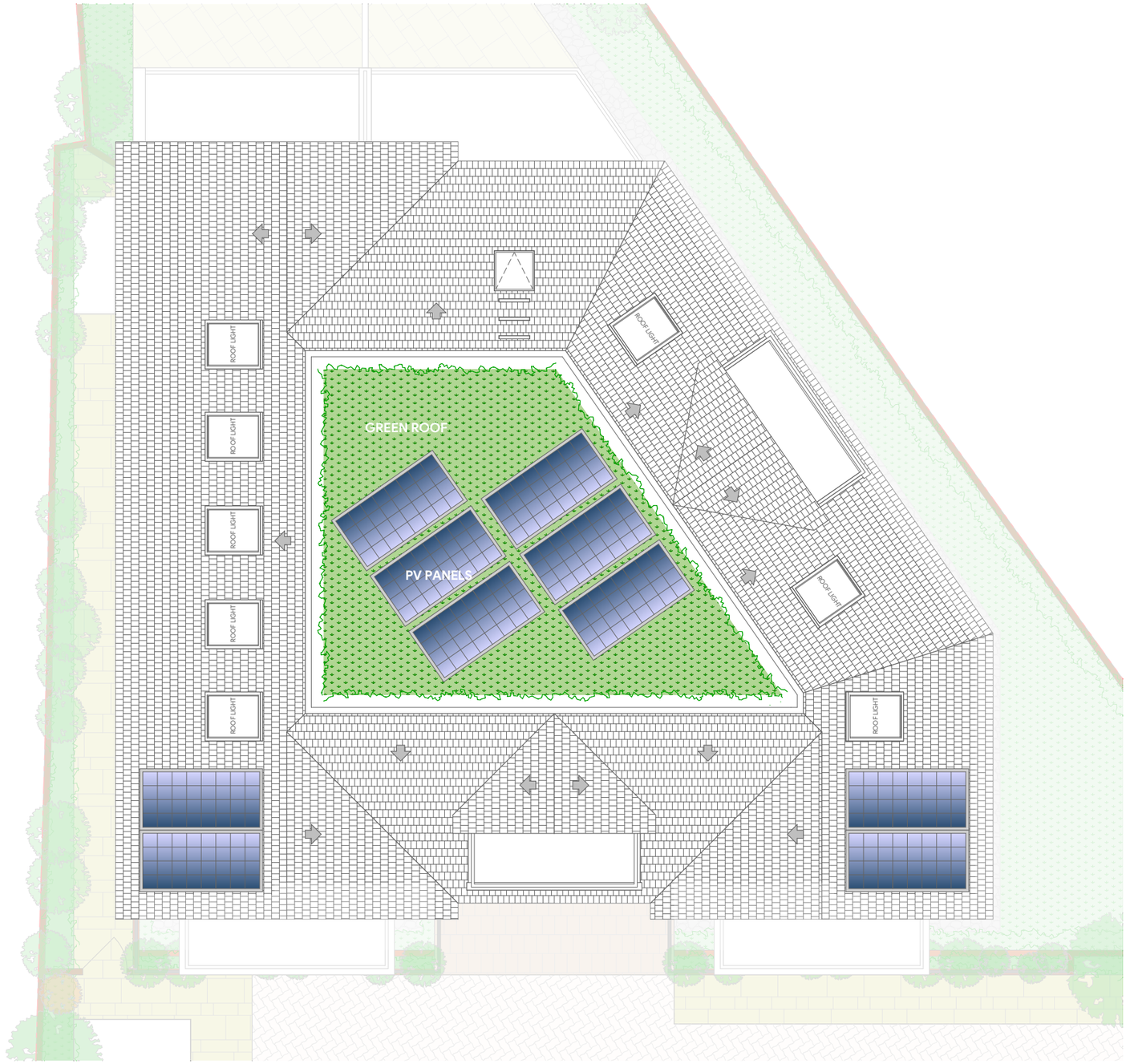


A 07 | PROPOSED ROOF PLAN

1 10

0 5

PURPOSE OF ISSUANCE : **FULL PLANNING APPLICATION**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMMODATION IN THE ROOF AND BASEMENT

260 COOMBE LANE, LONDON, SW20 0RW, UK

SHEET CONTENTS

PROPOSED ROOF PLAN

REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
			DRAWN	MCV	A-07
			APPROVED		
			REVISED		A3 PAPER SIZE

A 08 | FRONT ELEVATION

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
FRONT ELEVATION	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.				DRAWN	MCV	A-08
	ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS.				APPROVED		
	THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				REVISED		A3 PAPER SIZE

A 09 | LEFT SIDE ELEVATION

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMDATION AT THE LOFT AND BASEMENT
260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
LEFT SIDE ELEVATION	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS. THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				DRAWN	MCV	A-09
					APPROVED		
					REVISED		A3 PAPER SIZE

A 10 | RIGHT SIDE ELEVATION

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMDATION AT THE LOFT AND BASEMENT
260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS

RIGHT SIDE ELEVATION

REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
			DRAWN	MCV	A-10
			APPROVED		
			REVISED		A3 PAPER SIZE

A 11 | **REAR ELEVATION**

PURPOSE OF ISSUANCE : **DRAWING REFERENCE**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMDATION AT THE LOFT AND BASEMENT

260 COOMBE LANE, WEST WIMBLEDON, LONDON, SW20 0RW, UK

SHEET CONTENTS		REVISION	DATE	SUBJECT	DESIGNED	CHD	SHEET NO.
REAR ELEVATION	ALL MEASUREMENTS ARE TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION. ALL DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ARCHITECTS / PROJECT MANAGERS.				DRAWN	MCV	A-11
					APPROVED		
	THIS DRAWING IS THE PROPERTY OF OWNER AND CANNOT BE REPRODUCED WITHOUT WRITTEN CONSENT				REVISED		A3 PAPER SIZE

A 12 | SECTIONAL VIEW

PURPOSE OF ISSUANCE : **FULL PLANNING APPLICATION**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMMODATION IN THE ROOF AND BASEMENT
260 COOMBE LANE, LONDON, SW20 0RW, UK

SHEET CONTENTS
SECTIONAL VIEW

REVISION	DATE	SUBJECT

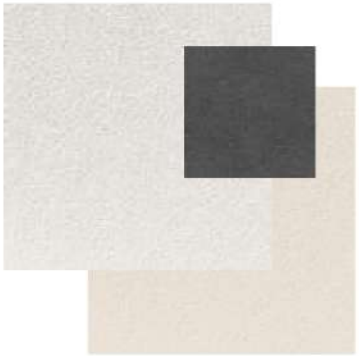
DESIGNED	CHD	SHEET NO.	
DRAWN	MCV	A-12	
APPROVED			
REVISED		A3 PAPER SIZE	

A 20 | **MATERIAL ELEVATION**

1 RED STOCK FACING BRICK

2 BROWN ROOF TILES

3 4 5 RENDERED FINISH



6 GLASS RAILINGS

7 EXTERIOR STEEL RAILING

8 ALUMINUM - FRAMED GLASS DOORS & WINDOWS

PURPOSE OF ISSUANCE : **FULL PLANNING APPLICATION**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A
2 STOREY, DETACHED HOUSE
W/ ACCOMMODATION IN THE ROOF AND BASEMENT
260 COOMBE LANE, LONDON, SW20 0RW, UK

SHEET CONTENTS: **MATERIAL ELEVATION**

REVISION	DATE	SUBJECT

DESIGNED	CHD	SHEET NO.	
DRAWN	MCV	A-13	
APPROVED			
REVISED		A3 PAPER SIZE	

A 14 | LANDSCAPE PLAN

1 PERMEABLE PAVING FOR DRIVEWAYS

2 BONDED GRAVEL FOR PARKING AREAS

3 PERMEABLE PAVING FOR PATHWALKS

4 COMPOSITE WOOD DECKING

5 EXTENSIVE GREEN ROOF

6 SOLAR PANEL ON GREEN ROOF

7 TIMBER BIN & CYCLE STORAGES

8 TIMBER FENCE

9 INVIDUAL PER PARKING BAY EV CHARGERS

10 RIVER ROCKS FOR BORDERING PATHWAYS

11 STEEL RAILING ALONG LIGHT WELLS

PLANTS; SHRUBS AND LOW HEDGING

GROUND-COVERING GRASSLAND

COMB. OF NEW AND EXISTING SMALL TREES

PURPOSE OF ISSUANCE : **FULL PLANNING APPLICATION**

DEMOLITION OF EXISTING SINGLE DETACHED BUNGALOW AND ERECTION OF A

2 STOREY, DETACHED HOUSE

W/ ACCOMMODATION IN THE ROOF AND BASEMENT

260 COOMBE LANE, LONDON, SW20 0RW, UK

SHEET CONTENTS

LANDSCAPE PLAN

REVISION	DATE	SUBJECT

DESIGNED	CHD	SHEET NO.
DRAWN	MCV	A-14
APPROVED		
REVISED		A3 PAPER SIZE

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Geotechnical & Environmental Consultants

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