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25 OAKHILL AVENUE, LONDON NW3 7ED

Structural Engineer's Construction Method Statement for Planning

October 2022

Issue P1 - Planning

Status	Revision	Issued For	Date	Author
PRELIMINARY	P1	PLANNING	17.10.2022	AZ

CONTENTS

1.0 INTRODUCTION

This report presents Michael Barclay Partnership’s proposals, as Structural Engineers, for the extension and refurbishment of the property at 25 Oakhill Avenue, London NW3 7ED including converting the existing two self-contained flats into a single family house as well as replacing the existing rear extension with new structure, construction of a new single level of basement beneath the rear section of the house, levelling of the existing floors to accommodate a new layouts, converting the loft space to accommodation and:

- records the design criteria and performance parameters to which the new structure has been designed,
- reports on investigations and studies that have been carried out,
- details our proposals and specification for the structural works,
- forms the Construction Method Statement, (CMS), required by the London Borough of Camden at planning stage.

1.1 THE BRIEF

Our proposal is based on the planning drawings prepared by TFF Architects, the Client’s brief, and design discussions with the Project Team.

1.2 EXECUTIVE SUMMARY

This preliminary report addresses some of the planning requirements imposed by London Borough of Camden that are set out in Camden Local Plan and provides a preliminary set of information for planning stage the requirements listed in Camden Planning Guidance for Basements and Local Plan Policy A5 can be found in the following locations within this report:

- The Desk Study can be found in Appendix A.
- A description of the existing structure can be found within the Desk Study and section 2.2 of this report.
- The ground information can be found in section 2.4 of Desk Study and within Site Investigation Report prepared by GEA.
- Our engineering design for the proposed is discussed in detail within section 5.0 of this report and the relevant drawings are contained within Appendix B.
- Analysis of the water table is found within section 2.4 of this report.
- Flood Risk is discussed within the Desk Study in Appendix A and demonstrate that the proposed development does not pose any significant issues in terms of flooding.
- The proposed construction sequence is shown on drawings no. MBP-8536-500 and MBP-8536-501 which is contained within Appendix B and described in sections 3.1 and 5.1 of this report
- The SuDS statement can be found in section 5.3 of this report.

2.0 THE SITE

2.1 LOCATION

No 25 Oakhill Avenue is part of the Royal Borough of Camden at the postcode NW3 7ED and is located on the south-east side of Oakhill Avenue, a two-way road which runs in between Redington Road and Bracknell Gardens. The existing property is Grade II listed building and was constructed in 1909. No 25 forms, with No 27 to the south-west, a pair of symmetrical semi-detached houses. The site is located approximately 700m west of Hampstead Station Underground and 760m north of West Hamstead Thames Link Station. Golders Hill Park is located 800m north of site.

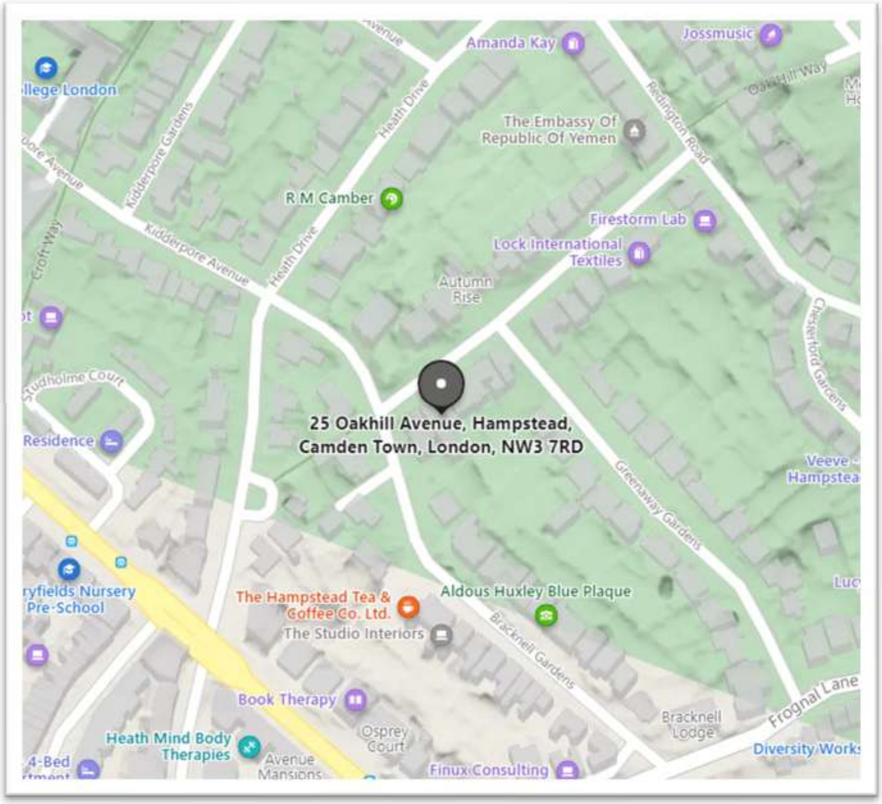


Figure 1 - Site Location

2.2 THE EXISTING BUILDING

The existing building at No 25 Oakhill Avenue is a two-storey above the ground floor, semi-detached house with loadbearing masonry structure and timber floors. The foundations will be formed off the underlying Clay about 1m below ground level. The foundation will be investigated further with trial pits before the site work commences.

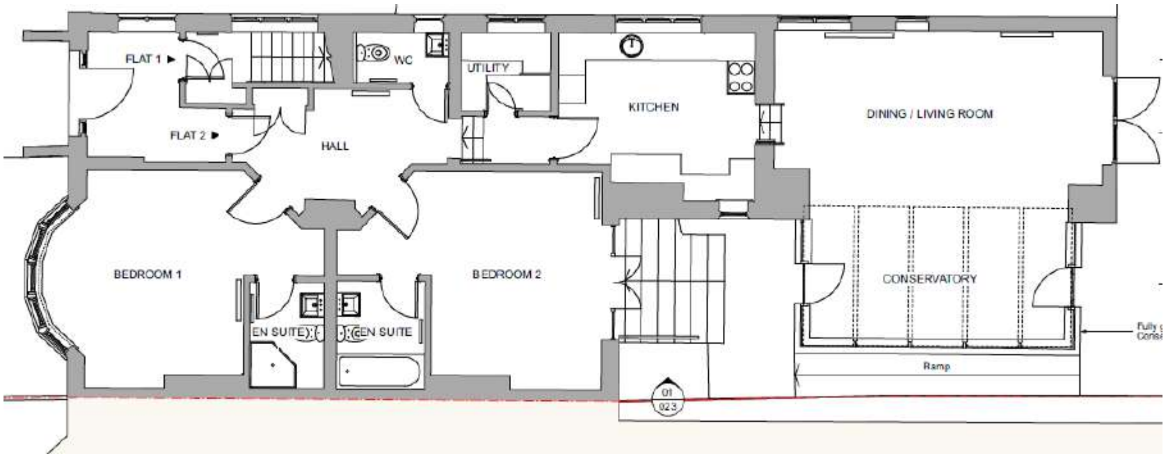


Figure 2 - No 25 Oakhill Avenue Existing Ground Floor Plan

2.3 DESK STUDY AND SITE HISTORY

Historical maps show that the area around Oakhill Avenue was not developed until the early 20th century. A separate Desk Study has been prepared by Michael Barclay Partnership and is included in the planning submission and as Appendix A to this report.

2.4 SITE GEOLOGY

The initial site investigation was carried out by GEA in February, and the summary of condition indicates that beneath a nominal thickness of made ground or topsoil, the Claygate Mamber was encountered overlaying the London Clay, which extended to the flull thepth of 12m of investigation. The water table was found at about 6.0m below the ground level in the rear garden. Borehole Logs are shown in Figure 4 and 5 of this report.

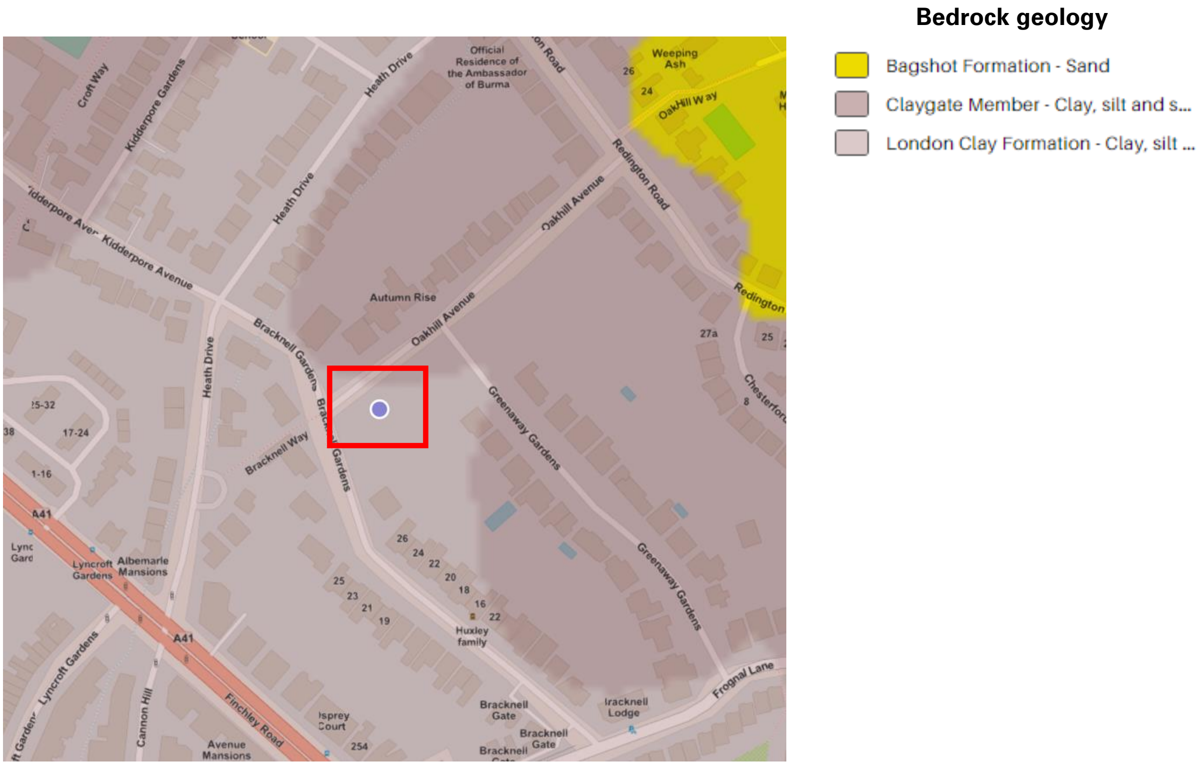
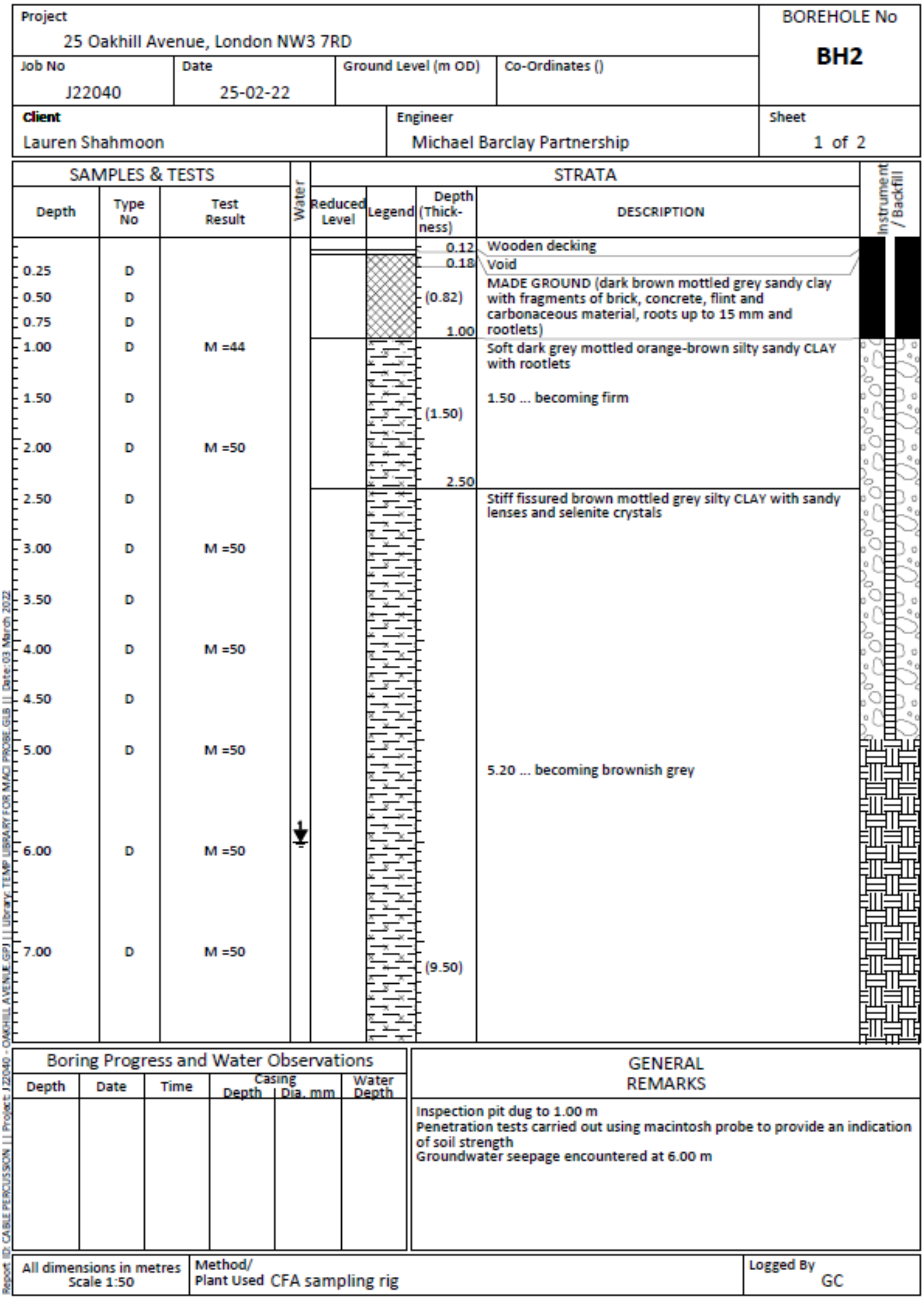


Figure 3 - British Geological Survey Map



Project 25 Oakhill Avenue, London NW3 7RD				**BOREHOLE No** **BH2**
Job No J22040	**Date** 25-02-22	**Ground Level (m OD)**	**Co-Ordinates ()**	
Client Lauren Shahmoon		**Engineer** Michael Barclay Partnership		**Sheet** 1 of 2

SAMPLES & TESTS

Depth	Type No	Test Result	Water
0.25	D		
0.50	D		
0.75	D		
1.00	D	M =44	
1.50	D		
2.00	D	M =50	
2.50	D		
3.00	D	M =50	
3.50	D		
4.00	D	M =50	
4.50	D		
5.00	D	M =50	
			▼
6.00	D	M =50	
7.00	D	M =50	

STRATA

Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
		0.12	Wooden decking
		0.18	Void
	▨	(0.82) 1.00	MADE GROUND (dark brown mottled grey sandy clay with fragments of brick, concrete, flint and carbonaceous material, roots up to 15 mm and rootlets)
		(1.50) 2.50	Soft dark grey mottled orange-brown silty sandy CLAY with rootlets 1.50 ... becoming firm
		(9.50)	Stiff fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals 5.20 ... becoming brownish grey

Instrument / Backfill

Boring Progress and Water Observations

Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth

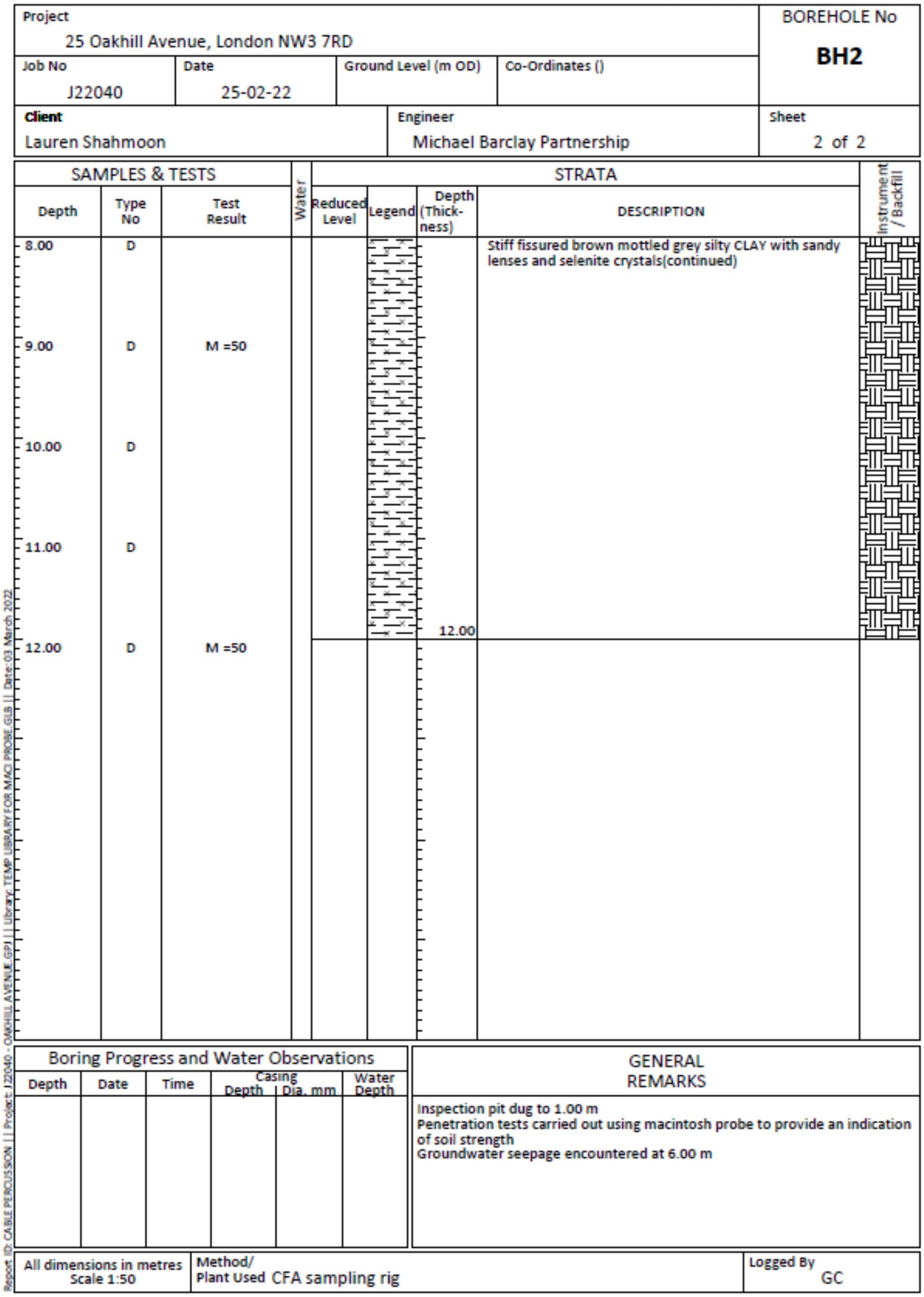
GENERAL REMARKS

Inspection pit dug to 1.00 m
Penetration tests carried out using macintosh probe to provide an indication of soil strength
Groundwater seepage encountered at 6.00 m

All dimensions in metres Scale 1:50	Method/ Plant Used CFA sampling rig	Logged By GC

Report ID: CABLE PERCUSSION || Project: J22040 - OAKHILL AVENUE.GPJ || Library: TEMP LIBRARY FOR MACI PROBE.GLB || Date: 03 March 2022

Figure 4 – Borehole BH2 log at 25 Oakhill Avenue
(continues on page below)



Project 25 Oakhill Avenue, London NW3 7RD				BOREHOLE No **BH2**
Job No J22040	Date 25-02-22	Ground Level (m OD)	Co-Ordinates ()	
Client Lauren Shahmoon		Engineer Michael Barclay Partnership		Sheet 2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D						Stiff fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals(continued)	
9.00	D	M =50						
10.00	D							
11.00	D							
12.00	D	M =50				12.00		

Boring Progress and Water Observations					
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth

GENERAL REMARKS

Inspection pit dug to 1.00 m
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All dimensions in metres Scale 1:50	Method/ Plant Used CFA sampling rig	Logged By GC

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Figure 5 – Borehole BH2 log at 25 Oakhill Avenue (continues from page above)

2.5 BOUNDARIES AND ADJOINING STRUCTURES

No 25 Oakhill Avenue forms with No 27 a symmetrical semi-detached house of the same style. A planning permission was granted for No 27 in 2014 for new single storey basement extension, which will be consider during the design process. No 27 also has new accommodation formed withing the existing loft space. No 25 Oakhill Avenue abuts the side passage with No 23 to north-east side. There are fence walls at the front and to the side with No 23. Rear garden fence is shared with both No 10B Greenway Gardens and 28 Bracknell Gardens (refer to Figure 6 and 7).

Figure 6 - Map showing the location and surrounding areas of the property

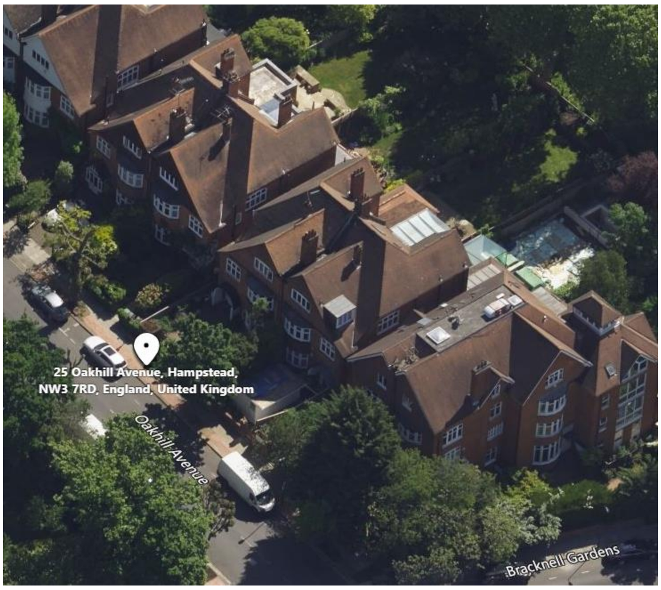


Figure 7 – Bird's eye view from Bing map

3.0 OVERVIEW OF THE PROPOSED SCHEME

MBP is appointed to provide a structural scheme design for extension and refurbishment of the property at 25 Oakhill Avenue including converting the existing two self-contained flats into a single family dwelling as well as replacing the existing rear extension with new structure, construction of a new single level of basement beneath the rear section of the house, levelling of the existing floors to accommodate new layouts and converting the loft space to a bedroom with ensuite bathroom.

The existing loadbearing masonry walls and internal vertical elements will be retained or resupported if required on the new structure elements. The existing Ground Floor extension will be demolished and replaced with a new, two story extension with a lower level partly extending below the footprint of the existing building. Lower section of a new extension will be constructed as a RC box with a loadbearing slab and walls. Upper level of the extension will be constructed using a new loadbearing masonry wall build of the RC slab. Steel frame will support timber flat roof. The layout of the Ground Floor will be altered and modernized, and rear floor at every level raised to match the level at the front of the house. Windows at the rear elevation will be raised to align with comparable windows in the semi-detached pair at No 27.

New foul water drainage will be designed so that the existing gravity philosophy for the super structure is retained. A new pumped system will be installed in the basement to remove foul and surface water from lower level. A new 'one way' valve will be installed at the outlet of the system and storage is provided at basement level to reduce the risk of flooding from foul water. A SuDs, 'Sustainable Urban Drainage' statement has been produced in accordance with London Borough of Camden.

A hydrogeological study and flood risk analysis has been carried out and is included to this application as part of the Desk Study in Appendix A.

3.1 BASEMENT CONSTRUCTION GENERALLY

Removing soil to accommodate the extension will relieve some of the pressure on the underlying London Clay: However, there will be a weight of the new construction imposed around the perimeter including the basement slab and this relief will not have a significant impact on the surrounding buildings and foundations. It has been our experience empirically and theoretically in similar developments in this area of London.

The material removed will be made ground and silty clay and it is estimated that the excavation of 3m of soil will lead to an initial unloading of 80kN/m2. Such heave that may occur will mostly, i.e >50%, happen immediately on excavation, much of the remainder during the works leaving a small residual pressure that the new construction will accommodate.

GEA's site investigation report notes that there is slight seepage of groundwater in all trial pits and one of the boreholes and therefore groundwater control measures will likely be required during construction and that in the permanent case, the basement structure will need to be designed and suitable contingencies put in place, if required.

To achieve Grade 3 Performance we propose that a combination protection is installed by using a waterproof concrete and a cavity drain system installed internally. However, advice must be sought from a specialist waterproofing contractor who can confirm and design the suitable waterproofing system specifically for the site.

A detailed and considered temporary works strategy is required to ensure the piles or in-situ retaining concrete walls are adequately supported in the temporary case until the new basement slab and roof are constructed.

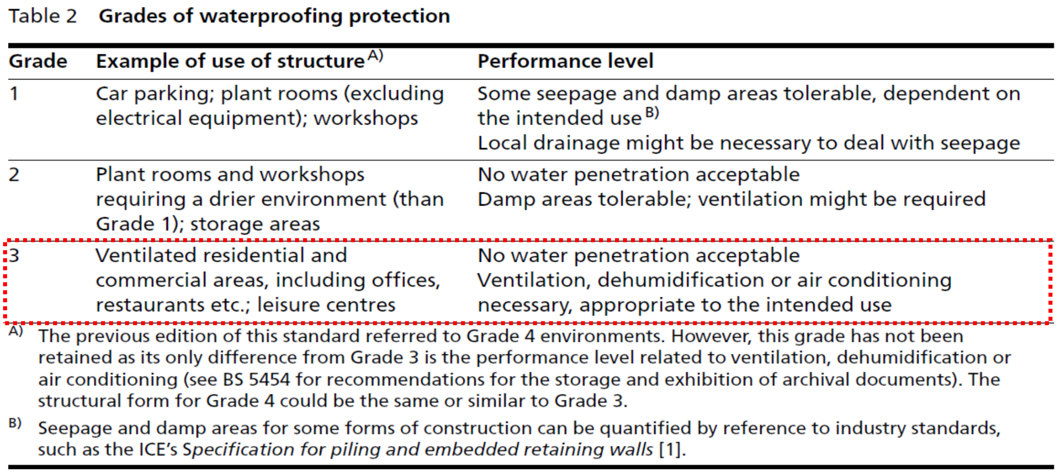


Table 2 **Grades of waterproofing protection**

Grade	Example of use of structure [A)]	Performance level
1	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp areas tolerable, dependent on the intended use [B)] Local drainage might be necessary to deal with seepage
2	Plant rooms and workshops requiring a drier environment (than Grade 1); storage areas	No water penetration acceptable Damp areas tolerable; ventilation might be required
3	Ventilated residential and commercial areas, including offices, restaurants etc.; leisure centres	No water penetration acceptable Ventilation, dehumidification or air conditioning necessary, appropriate to the intended use

[A)] The previous edition of this standard referred to Grade 4 environments. However, this grade has not been retained as its only difference from Grade 3 is the performance level related to ventilation, dehumidification or air conditioning (see BS 5454 for recommendations for the storage and exhibition of archival documents). The structural form for Grade 4 could be the same or similar to Grade 3.

[B)] Seepage and damp areas for some forms of construction can be quantified by reference to industry standards, such as the ICE's *Specification for piling and embedded retaining walls* [1].

3.2 SUPERSTRUCTURE ALTERATIONS

Proposed alterations to the upper floor include replacing a section of the existing floor joists with a new at the higher level to align with the main part of the house. The layouts will be altered to suit new floor arrangement however the existing loadbearing structure elements will remain the same. The existing structure is expected to undergo refurbishment with various measures of strengthening if necessary. New roof supporting structure to be design and load path be considered for the existing roof to allow for the loft conversion. New staircase together with supporting structure to be design between existing second floor level and loft.

3.3 GROUND MOVEMENT CONTROL

The critical factor in controlling ground movement and effects on adjoining properties is the degree of propping of the walls during excavation and transfer of this action from the temporary props to the permanent structure.

The external perimeter of the ground floor walls will generally be restrained by retained floors before the underpinning commences. The new RC concrete slab at higher Ground Floor level will provide a permanent prop to the bases of the existing walls as well as the top of the lining walls cast against the piles.
Further propping will be considered when the reduced level of dig progress. The temporary props will be located at agreed spacing to limit lateral and vertical movements of the surrounding ground to acceptable levels.

Michael Barclay Partnership has considerable experience of the design and construction monitoring for basements of the type proposed. Recent projects include 44 Flask Walk, London NW3, 31 Queens Grove and 33 Ranulf Road NW2 where a similar approach to the basement construction has been adopted.
For these projects we engage with specialist consultants to advise on the analysis, design and detailing of the below ground structure to minimise the effect on adjacent buildings.

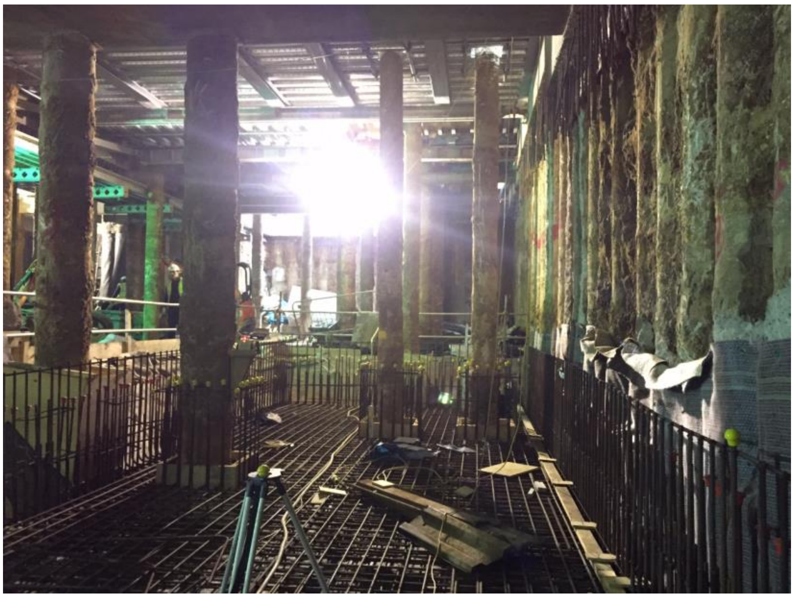


Figure 8 - Basement construction at MBP site

The works for the new basement will affect the adjoining properties, however they will be monitored for movement and damage during the installation of the basement structure, during excavation and at transfer of load to the permanent floors and walls. All measures will be subject to agreement with the owners and occupiers of these premises under the requirements of the Party Wall Act.

The basement raft slab will be designed to take account of potential uplift due to ground water levels and clay heave due to the excavation. This will be achieved by the basement slab spanning between the perimeter walls and, if necessary, the introduction of piles that can act in tension.

3.4 MANAGEMENT OF GROUNDWATER

According to the information made available from nearby sites and from the site investigation carried out by GEA in February 2022 groundwater has been found at about 6.0m below existing ground level at the top of the London Clay formation. The new basement will be above this level; however groundwater inflows were encountered in 2.5m deep boreholes at the depth of 0.4m. These shallow inflows are associated with high proportion of surface water infiltrating into the shallow soil through the garden. The structural design and the contractor will have to make provisions for water seepage during excavation and construction.

4.0 DESIGN AND PERFORMANCE PARAMETERS

4.1 OCCUPANCY LOADS

The new structure elements have been designed in accordance with current British Standards, Codes of Practice and Building Regulations. The general design imposed loads for the buildings are as follows:

Category	Use	Uniformly distributed load* (kN/m^2)	Concentrated load* (kN)
A	All usages within self-contained Single Family dwelling	1.5	1.4

* defined by BS6399: PT 1

4.2 ENVIRONMENTAL LOADS

The building new basement structure has been designed to support loads from the wind in combination with the occupancy loads scheduled above.

4.3 SURCHARGE LOADS

The surcharge load for the design of the proposed retaining walls was considered:

- A nominal live load of 5kN/m^2 onto the garden area and pavements around, to the side of the retaining structure.
- A calculated surcharge load from the adjoining properties.

4.4 PERMISSIBLE DEFLECTIONS

The design of new constructional steel and reinforced concrete elements will limit deflection and displacement in accordance with the following criteria:

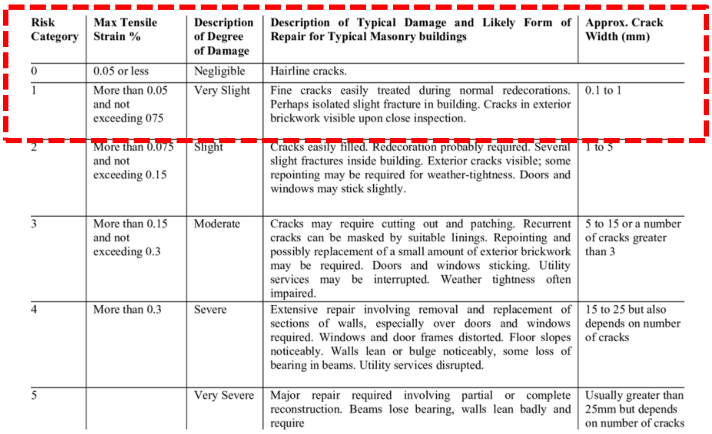
Concrete Elements	Limit – under full load	Limit- under full load for stone finishes	Limit- under full load where supporting walls
Beams	Span/ Depth < 20	Span/750	Span/500
Simple Slabs	Span/ Depth < 20	Span/750	Span/500
Continuous Slabs	Span/ Depth < 26	Span/750	Span/500

Steel Elements	Limit – under full load	Limit- under full load for stone finishes	Limit- under full load where supporting walls
Simple Beams	Span / 360	Span/750	Span/500
Cantilever Beams	Span / 360	Span/750	Span/500

The above criteria must be read in conjunction with any performance specifications produced by MBP for individual works packages.

4.5 PROTECTION OF ADJACENT PROPERTIES

During the underpinning and construction stages, some vertical movement is likely to occur to the existing party wall. MBP's design will be such as to reduce the impact of the new works to the adjoining structure to a minimum; also, a site monitoring regime will ensure that all the underpinning, propping and construction procedures are performed as specified by MBP, we will target to achieve Building Damage Category 0 -1 of BRE damage classification (Figure 9). A Ground Movement Assessment will be prepared for planning by specialist.



Risk Category	Max Tensile Strain %	Description of Degree of Damage	Description of Typical Damage and Likely Form of Repair for Typical Masonry buildings	Approx. Crack Width (mm)
0	0.05 or less	Negligible	Hairline cracks.	
1	More than 0.05 and not exceeding 075	Very Slight	Fine cracks easily treated during normal redecorations. Perhaps isolated slight fracture in building. Cracks in exterior brickwork visible upon close inspection.	0.1 to 1
2	More than 0.075 and not exceeding 0.15	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible; some repointing may be required for weather-tightness. Doors and windows may stick slightly.	1 to 5
3	More than 0.15 and not exceeding 0.3	Moderate	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Repointing and possibly replacement of a small amount of exterior brickwork may be required. Doors and windows sticking. Utility services may be interrupted. Weather tightness often impaired.	5 to 15 or a number of cracks greater than 3
4	More than 0.3	Severe	Extensive repair involving removal and replacement of sections of walls, especially over doors and windows required. Windows and door frames distorted. Floor slopes noticeably. Walls lean or bulge noticeably, some loss of bearing in beams. Utility services disrupted.	15 to 25 but also depends on number of cracks
5		Very Severe	Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require	Usually greater than 25mm but depends on number of cracks

Figure 9 - Classification of Potential Damage

4.6 FIRE RATING

The new structure is to be designed and detailed to achieve the minimum period of fire resistance required by Approved Document B, Table A2, i.e. 60 minutes for load-bearing, structural elements (beams columns framing). A separate Fire Safety Strategy will be prepared by Specialist.

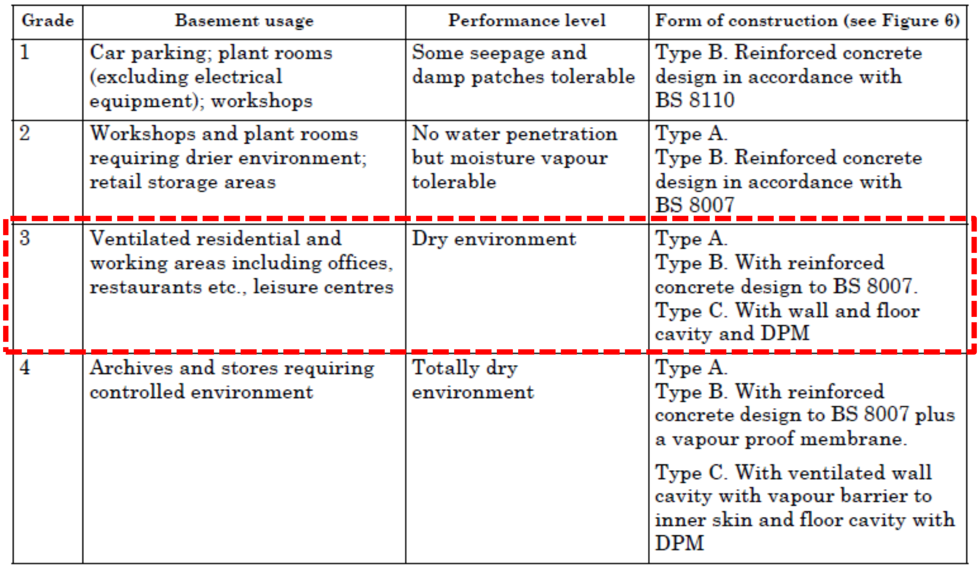
4.7 DURABILITY

The design life of the new building is taken as a minimum period of 60 years. This falls into category 4 in Table 1 of BS 7543/1992: Durability of Buildings and Building Elements, Products and Components, and corresponds to a ‘normal’ category of building, which includes new housing and high quality refurbishment of public buildings.

4.8 BASEMENT WATERPROOFING

To assist in the waterproofing of the underground structures the reinforced concrete basement construction is to be formed using water-resistance concrete, which is possible by the use of admixtures in the concrete mix produced by a specialist manufacturer. This form of construction will give a Grade 3 basement, which is suitable for the habitable areas as described in BS 8102/2009: Code of Practice for the “Protection of Structures against Water from the Ground”. The architect will also be specifying a drained cavity waterproofing system that sits inside the RC walls.

In order to avoid moisture penetrating the construction joints between the slabs and walls, we have specified hydrophilic waterstops. These contain compounds which swell when they come into contact with water thereby filling any gaps to cut of moisture pathways. Prior to fixing the waterstops the surface of the concrete must be retarded and then jet washed to expose the aggregate. The waterstops are then pushed into a specially prepared 10mm x 10mm rebate and fixed using a proprietary adhesive.



Grade	Basement usage	Performance level	Form of construction (see Figure 6)
1	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp patches tolerable	Type B. Reinforced concrete design in accordance with BS 8110
2	Workshops and plant rooms requiring drier environment; retail storage areas	No water penetration but moisture vapour tolerable	Type A. Type B. Reinforced concrete design in accordance with BS 8007
3	Ventilated residential and working areas including offices, restaurants etc., leisure centres	Dry environment	Type A. Type B. With reinforced concrete design to BS 8007. Type C. With wall and floor cavity and DPM
4	Archives and stores requiring controlled environment	Totally dry environment	Type A. Type B. With reinforced concrete design to BS 8007 plus a vapour proof membrane. Type C. With ventilated wall cavity with vapour barrier to inner skin and floor cavity with DPM

Figure 10 - Classification of waterproofing level for different basement usage (From BS8102: Code of practice for the protection of structures against water from the ground: 2009)

4.9 DISPROPORTIONATE COLLAPSE

The building matches the criteria for Disproportionate Collapse set out in Approved Document A, July 2004 and will be designed and detailed to accommodate the requirements of a Class 2A building, i.e. four storeys plus basement. The robustness of the existing masonry structure will be improved by tying them together via the floor plates. The basement is designed as category 2B and will not reduce the overall robustness of the existing structures.

4.10 SITE CONSTRAINTS

The Oakhill Avenue is a two-way road which runs in between Redington Road and Bracknell Gardens.
The materials will be stored inside the site, the access will be through the front. Management of the works will be a key point.

4.11 DESIGN CODE AND STANDARDS

The following documents are used:

- BS648 - Schedule Of Weights Of Building Materials
- BS6399 Pt 1 - Code of Practice for Dead and Imposed Loads
- BS6399 Pt 2 - Code of Practice for Wind Loads
- BS6399 Pt 3 - Code of Practice for Imposed Roof Loads
- BS8002: Pt 1 - Code of practice for Earth Retaining Structures
- BS8004: Pt. 1 - Code of Practice for Foundations
- BS8110: Pt 1 - Structural Use of Concrete
- The Building Regulations 1991 - Approved Documents A, B, C, E, H, K & N

5.0 STRUCTURAL PROPOSAL

5.1 SUB – STRUCTURE

The existing loadbearing walls to be underpinned using traditional techniques to take the wall loads down to the new basement level. The section of the basement extending beyond the footprint of the original house to be piled and 250mm thick lining wall will be constructed to retain the soil behind.
New ground bearing 350mm thick raft will be founded at a depth about 2m below ground level in the Claygate Member formation. Piled walls will help to anchor the structure down against uplift loads and to provide a stiff support to the slab which will span between them. Excavation for the proposed basement structure will require temporary support to maintain the stability and prevent any excessive ground movements.

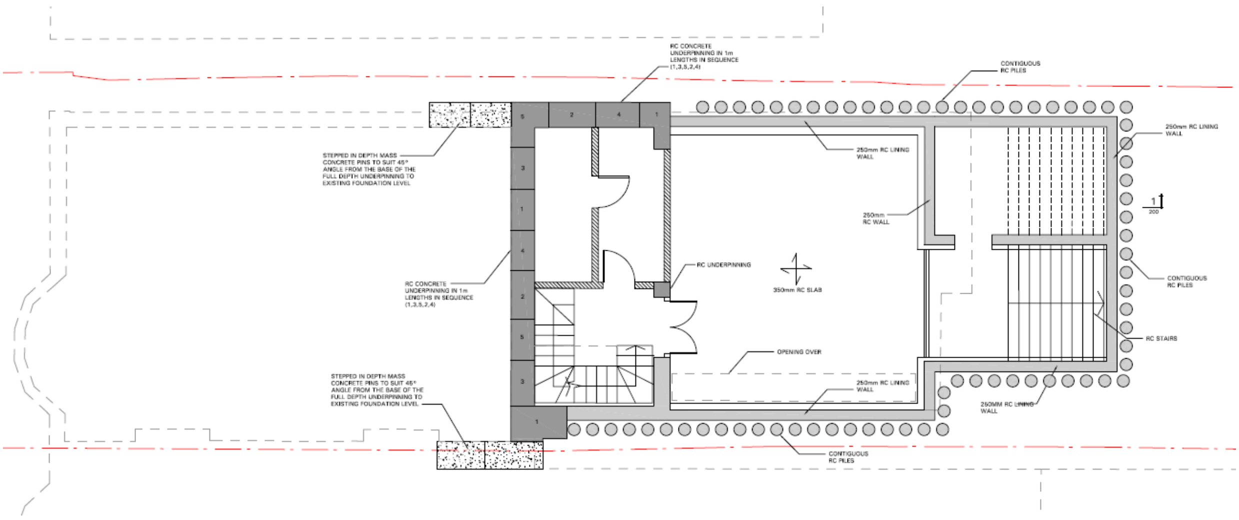


Figure 11 – Proposed Basement Plan

5.1.1 UNDERPINNING

The existing loadbearing walls will be underpinned using traditional techniques to take the wall loads down to the new basement level. These underpins will be carried out in a 1-3-5-2-4 sequence with pins approximately 1m in length. The underpinning will be formed in RC concrete to retain the soil behind.

The underpinning is likely to be carried out in one stage. Figure 12 shows typical underpinning sequence for the existing loadbering walls. Perched water may be encountered towards the base of the Made Ground or the Claygate Member, but significant groundwater inflows are not anticipated.

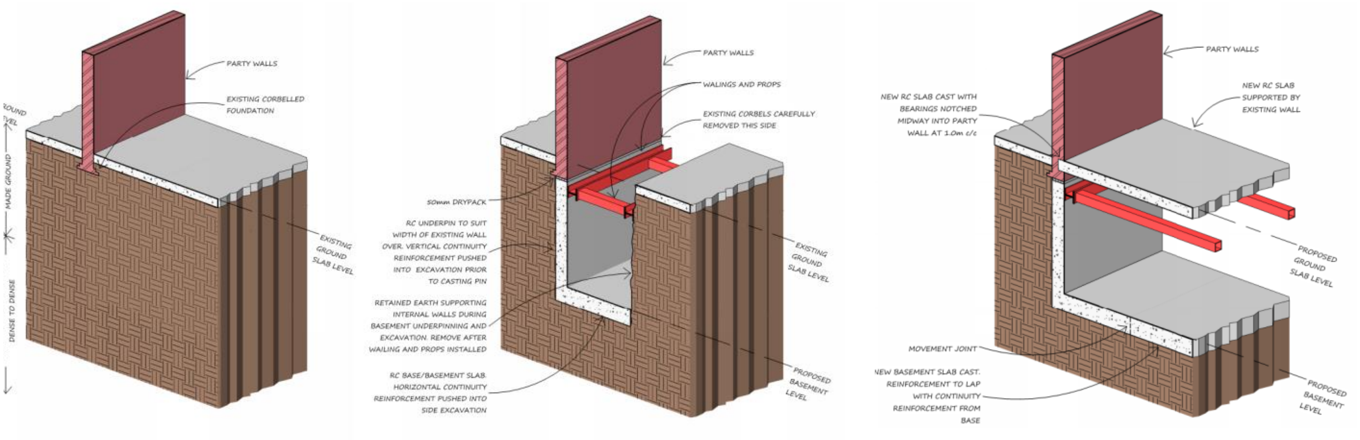


Figure 12 – Typical construction sequence for underpinning of loadbearing walls

5.1.2 PILING

Reinforced concrete liner wall will be constructed in board of the perimeter piling walls along party wall. The liner wall will be a minimum of 250mm thick propped at the top with the new RC ground floor slab. Figure 13 shows typical piling wall sequence for the section of the basement beyond the existing building line.

The basement box is capped by the new reinforced concrete, RC, ground floor slab, spanning between the external walls and existing internal loadbearing structure. The new RC slab will improve the stability reduce the propping and create support for the flat roof structure of the new extension.

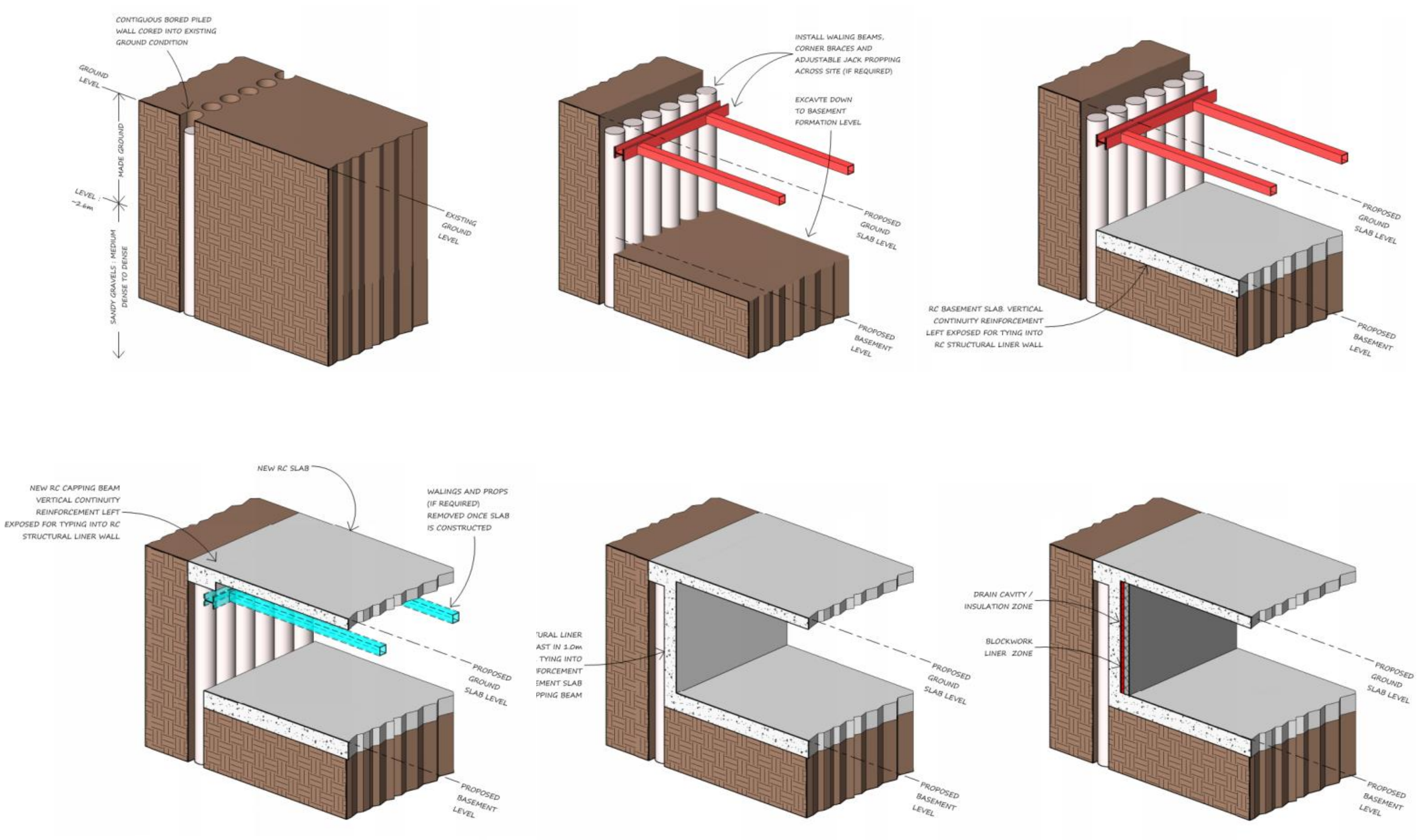


Figure 13 – Typical construction sequence for piled walls

5.2 SUPER – STRUCTURE

5.2.1 FLOORS AND FRAMING

The existing masonry loadbearing structure to be retained, the existing rear section of the upper floors to be replaced with new timber floor level to match the front of the house. Support structure for the new joists to be confirmed during site investigation works. Temporary propping will be required to stabilize the existing structure during the works. Loadbearing masonry structure will be inspected and required repairs will be carried to allow new steel and padstone to be installed to spread the load onto the existing wall. To create a new liveable space at the loft level, steel beams with timber joists will be installed. New steel frames will replace the existing timber posts to resupport the existing roof (subject to further investigation).

5.2.2 STABILITY

The horizontal force will be resisted by the existing walls, the over ground loadbearing structure will not be changed. The construction techniques and proposed sequences of works to be developed to minimise the risk of instability.

5.3 DRAINAGE AND SUDS

5.3.1 BELOW GROUND DRAINAGE - EXISTING

The existing building's drainage survey was carried out by Drainsmart in September 2022, and it was confirmed that foul and surface water is collected above ground and discharges it into the local sewer network under gravity. There are four manholes shown on the survey drawing (Figure 14), two in the side passage, one in the courtyard, and one internal. It was concluded in the Report that some repair works are necessary to the existing drainage system including replacing interceptor trap.

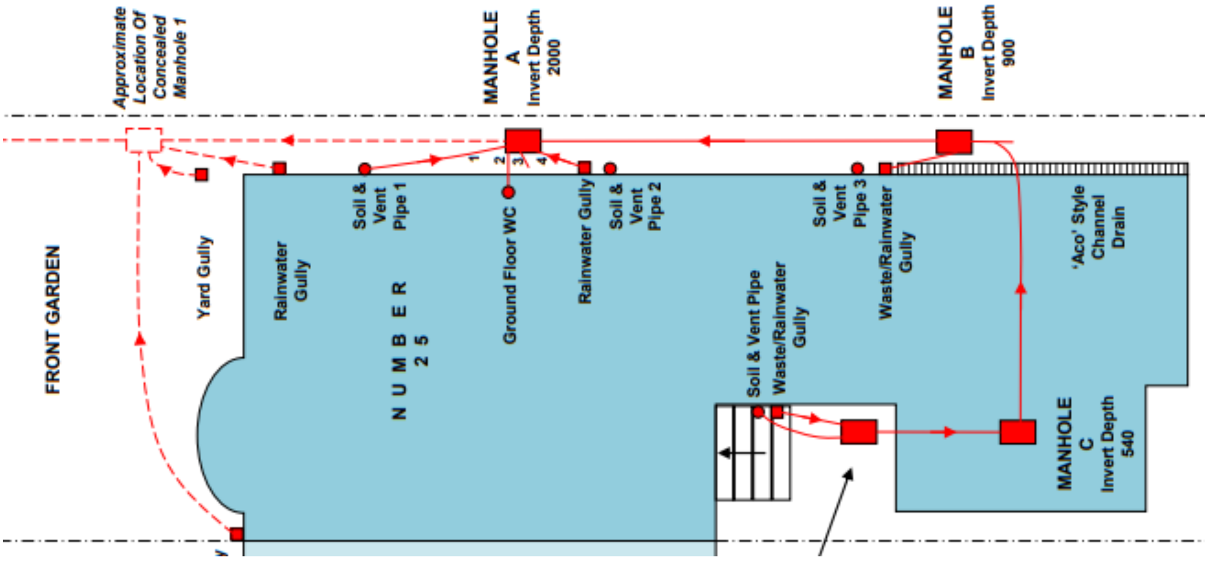


Figure 14 – Extract from survey drawing made by Drainsmart.

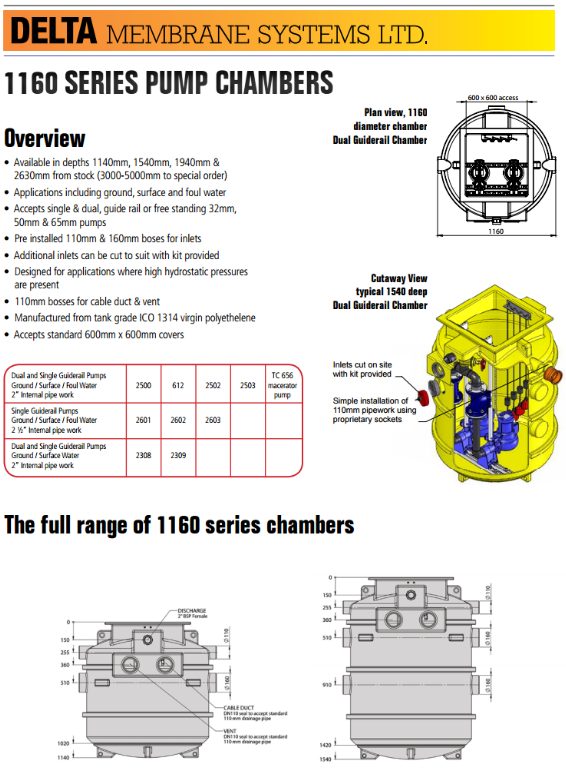
5.3.2 BELOW GROUND DRAINAGE - PROPOSED

The existing ground floor drainage network at ground floor level will be adjusted to suit the new layout with new drainage that connects to the existing SVP's (Soil Vent Pipes) and RWP's (Rainwater Pipes), all the foul and surface water below the ground floor level will be collected in separate pumping chambers and then pumped up to Ground Floor level to be discharged through the last manhole into the sewer network. There will be an attenuation tank at low level that will reduce the run off of rain water, two pump chamber types will be included in the scheme:

Type 1: To collect and manage the Foul Water from the installations below Ground Floor level and to collect and manage any Surface Water that passes below Ground Floor level.
Type 2: To collect and manage any Ground Water that passes into the drained cavity secondary waterproofing system adopted in the basement construction.

Both these chambers have storage capacity, to attenuate the flow into the sewer system, and operate on a "backup" dual pump arrangement. They are also normally attached to the Building Management Systems, BMS, and included in the alarm system for the property. Both these systems have their own integrated non-return valve flood protection. The sizes of the chambers vary with Type 1 being the largest, and Type 2 being the smallest as any flow through a waterproof reinforced concrete liner wall is unlikely.

Figure 15 and Figure 16 indicate the Type 1 and Type 2 chambers that provide a positive pumped device as part of the flood management system.



DELTA MEMBRANE SYSTEMS LTD.

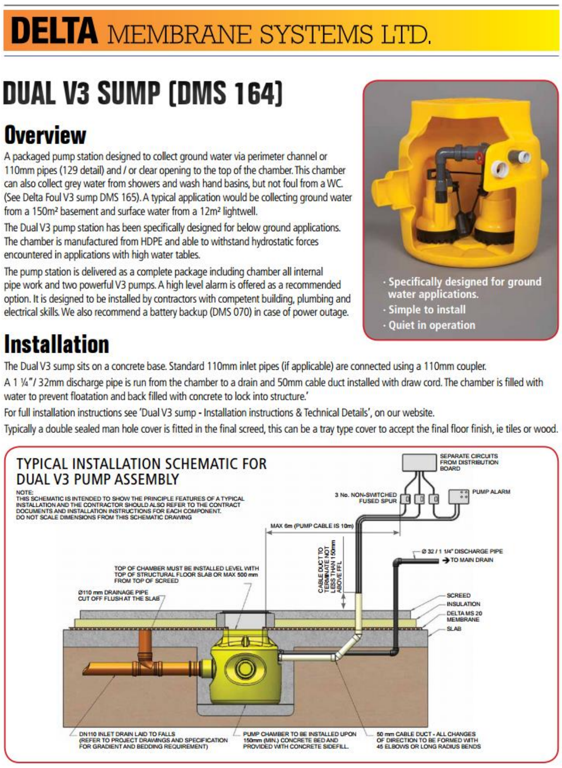
1160 SERIES PUMP CHAMBERS

Overview

- Available in depths 1140mm, 1540mm, 1940mm & 2630mm from stock (3000-5000mm to special order)
- Applications including ground, surface and foul water
- Accepts single & dual, guide rail or free standing 32mm, 50mm & 65mm pumps
- Pre installed 110mm & 160mm boses for inlets
- Additional inlets can be cut to suit with kit provided
- Designed for applications where high hydrostatic pressures are present
- 110mm bosses for cable duct & vent
- Manufactured from tank grade ICO 1314 virgin polyethelene
- Accepts standard 600mm x 600mm covers

Dual and Single Guiderail Pumps Ground / Surface / Foul Water 2" Internal pipe work	2500	612	2502	2503	TC 656 macerator pump
Single Guiderail Pumps Ground / Surface / Foul Water 2 ½" Internal pipe work	2601	2602	2603		
Dual and Single Guiderail Pumps Ground / Surface Water 2" Internal pipe work	2308	2309			

The full range of 1160 series chambers



DELTA MEMBRANE SYSTEMS LTD.

DUAL V3 SUMP [DMS 164]

Overview

A packaged pump station designed to collect ground water via perimeter channel or 110mm pipes (129 detail) and / or clear opening to the top of the chamber. This chamber can also collect grey water from showers and wash hand basins, but not foul from a WC. (See Delta Foul V3 sump DMS 165). A typical application would be collecting ground water from a 150m² basement and surface water from a 12m² lightwell.

The Dual V3 pump station has been specifically designed for below ground applications. The chamber is manufactured from HDPE and able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package including chamber all internal pipe work and two powerful V3 pumps. A high level alarm is offered as a recommended option. It is designed to be installed by contractors with competent building, plumbing and electrical skills. We also recommend a battery backup (DMS 070) in case of power outage.

- · Specifically designed for ground water applications.
- · Simple to install
- · Quiet in operation

Installation

The Dual V3 sump sits on a concrete base. Standard 110mm inlet pipes (if applicable) are connected using a 110mm coupler.

A 1 ¼"/ 32mm discharge pipe is run from the chamber to a drain and 50mm cable duct installed with draw cord. The chamber is filled with water to prevent floatation and back filled with concrete to lock into structure.'

For full installation instructions see 'Dual V3 sump - Installation instructions & Technical Details', on our website.

Typically a double sealed man hole cover is fitted in the final screed, this can be a tray type cover to accept the final floor finish, ie tiles or wood.

TYPICAL INSTALLATION SCHEMATIC FOR DUAL V3 PUMP ASSEMBLY

NOTE:
THIS SCHEMATIC IS INTENDED TO SHOW THE PRINCIPLE FEATURES OF A TYPICAL INSTALLATION AND THE CONTRACTOR SHOULD ALSO REFER TO THE CONTRACT DOCUMENTS AND INSTALLATION INSTRUCTIONS FOR EACH COMPONENT.
DO NOT SCALE DIMENSIONS FROM THIS SCHEMATIC DRAWING

Figure 15 - Type 1 – Typical positive pumping chamber for SVP's and RWP's to be incorporated in the basement at 16 WM

Figure 16 - Type 2 – Typical positive pumping chamber for drained cavity waterproofing to be incorporated in the basement at 16 WM

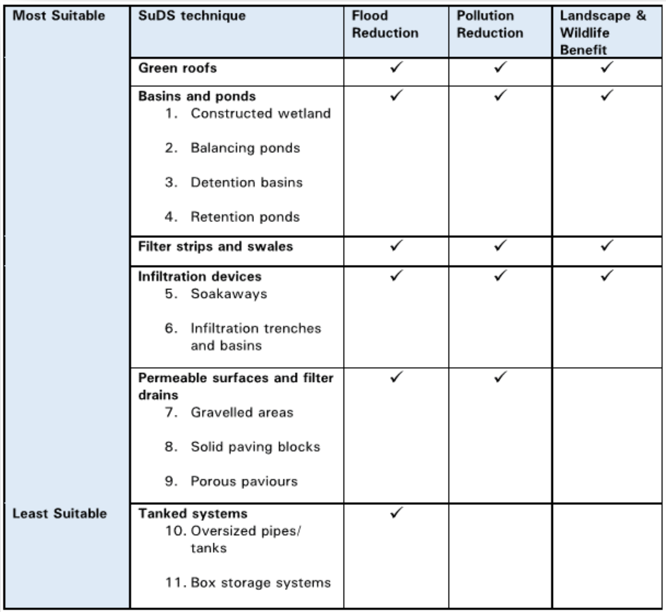
5.3.3 DRAINAGE AND SuDS

The proposed basement will extend the plan area forward by about 4.2m replacing the existing extension and part of the existing paved terrace, the width will match the existing extension. While the new double story extension creates additional living space, intention is to change the current use of the existing house from two separate flats into single family dwelling, which may reduce discharge to the public sewer.

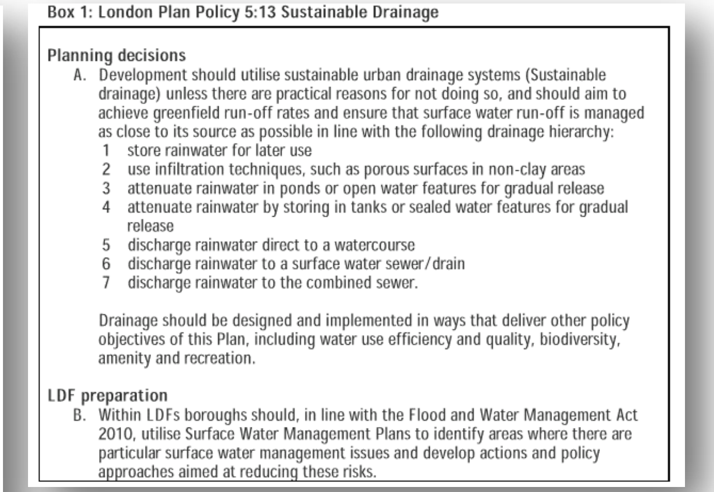
The scale and scope of the basement works will require an extension and part diversion of the existing below ground drainage system. As the new basement does include kitchenet and bathroom, which require additional drainage, the foul will be pumped to ground floor level and discharge into the public sewer.

In summary, the current below ground drainage system for foul and surface water will remain unchanged and works by combining gravity flow from the above ground structure and new pumped flow from the basement. The final connection between this system and the public sewer will include an anti-flood valve to protect the property from surcharges in the public sewers. The site has soft landscaped area which will remain unchanged, generating some natural percolation of surface water. Proposed attenuation tank will be positioned under in the rear garden to store excess rainwater and relies it to the public sewer in the controlled way.

There will also be no increase in surface water run-off and it is discharged, as it is currently, directly to the public sewer. Development should follow the drainage hierarchy in policy 5.13 of the London Plan.



Most Suitable	SuDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
	Green roofs	✓	✓	✓
	Basins and ponds 1. Constructed wetland 2. Balancing ponds 3. Detention basins 4. Retention ponds	✓	✓	✓
	Filter strips and swales	✓	✓	✓
	Infiltration devices 5. Soakaways 6. Infiltration trenches and basins	✓	✓	✓
	Permeable surfaces and filter drains 7. Gravelled areas 8. Solid paving blocks 9. Porous paviours	✓	✓	
Least Suitable	**Tanked systems** 10. Oversized pipes/ tanks 11. Box storage systems	✓		



Box 1: London Plan Policy 5:13 Sustainable Drainage

Planning decisions

A. Development should utilise sustainable urban drainage systems (Sustainable drainage) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1 store rainwater for later use
2 use infiltration techniques, such as porous surfaces in non-clay areas
3 attenuate rainwater in ponds or open water features for gradual release
4 attenuate rainwater by storing in tanks or sealed water features for gradual release
5 discharge rainwater direct to a watercourse
6 discharge rainwater to a surface water sewer/drain
7 discharge rainwater to the combined sewer.

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

LDF preparation

B. Within LDFs boroughs should, in line with the Flood and Water Management Act 2010, utilise Surface Water Management Plans to identify areas where there are particular surface water management issues and develop actions and policy approaches aimed at reducing these risks.

SuDS hierarchy (from the London SDA Plan Table 1 & Box 1)

6.0 CONSTRUCTION HAZARDS

The proposed construction has standard materials and components and is of common form within the construction industry. Nevertheless, MBP will produce a separate document that will be developed as the detailed design proceeds.

7.0 SPECIFICATION

The proposed construction materials, components, workmanship etc. will be specified using the National Building Specification documents and a separate performance specification. Those sections that MBP will schedule for planning stage are:

General Structural Requirements	B50
Demolition	C20
Excavating and Filling	D20
Piling	D30
Embedded Retaining Walls	D40
Underpinning	D50
In situ concrete construction generally	E05
Mixing, casting, and curing in situ concrete	E10
Formwork for in situ concrete	E20
Reinforcement for in-situ concrete	E30
Worked finishes to in situ concrete	E41
Structural steel framing	G10
Performance specifications for RC detailing	-
Performance specifications for piling and associated works	-

It is Michael Barclay Partnership's practice to specify materials and construction-practices that do not cause undue harm to the environment. For example, timber used in temporary and permanent works must be obtained from a certified sustainable source and be identified as such. The paint specification will avoid red lead, zinc chromate or coal-tar content and have a low solvent (VOC) content and offer manufacturers with an Environmental Policy in operation. The Contractor will be encouraged to use Portland cement replacement materials for the reinforced concrete elements.

8.0 RECYCLING

The manufacture of concrete can involve using recycled materials as well as cement substitutes and recycled aggregates. In the UK almost all reinforcement bars used in construction is made from recycled steel. While structural steel uses iron ore, which is extracted by a very energy-intensive process, the formation of reinforcement steel uses much less heat, to only melt and reform the source metal, which requires less than half the energy of that for manufacturing structural steel.

Concrete arising from demolished structures is 100% recyclable, although the extraction process means only 70-90% is recovered. Reinforcement is separated to be recycled in 100% (often into new reinforcement) and the concrete crushed to become, amongst other things, sub-base and compacted fill beneath foundations, roads, as well as aggregate in new concrete.

MBP specified the use of recycled aggregates where possible; moreover, this building, when it comes to the end of its life, can therefore be expected to be highly recycled, i.e. the concrete, blockwork and should all be extracted and re-used in some form.

9.0 DESIGN PORTION SUPPLEMENT

The following elements of the structure and cladding will, where required, be designed by the fabricator/supplier/manufacturer and will therefore require a Design Portion Supplement:

- Piling
- All precast concrete elements including Lintels
- Steel to Steel Connections
- Scheduling of the reinforcement for the RC elements

10.0 APPENDED DOCUMENTS

The following documents are appended to this report:

A Michael Barclay Partnership Desk Study Report
B Michael Barclay Partnership Drawings
C Michael Barclay Partnership Calculations
D Michael Barclay Partnership Specifications
E Site investigation by GEA

Report Prepared by:

Name (Structural Engineer)
Agnieszka Zajac BEng (Hons) MSc
For Michael Barclay Partnership LLP

Report Approved by:

Name (Principal)
Tony Hayes BSc (Hons) CEng MIStructE
Date 17.10.2022

25 OAKHILL AVENUE, LONDON NW3 7ED

Structural Engineer’s Construction Method Statement for Planning

October 2022

Issue P1 - Planning

Appendix A – Desk Study by Michael Barclay Partnership LLP

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25 OAKHILL AVENUE, LONDON, NW3 7RD

Structural Engineer's Desk Study Report

October 2022

P1 - Planning

Status	Revision	Issued For	Date	Author
PRELIMINARY	P1	PLANNING	17.10.2022	AZ

CONTENTS

1 PREAMBLE

This report has been prepared by Michael Barclay Partnership LLP (MBP) on the instructions of, and for the sole use and benefit of the Client.

MBP shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. If the Client wishes to pass copies of the report to other parties for information, the whole of the report should be copied. No professional liability or warranty is extended to other parties by MBP as a result of permitting the report to be copied or by any other cause without the express written agreement of MBP.

2 TERMS OF REFERENCE

MBP has been appointed by the client and owners of 25 Oakhill Avenue to undertake a Desk Study and assess the feasibility of undertaking structural works including the existing structure alteration, and a new basement construction.

3 INTRODUCTION

MBP has been appointed by the client and owners of 25 Oakhill Avenue to provide design for structural alterations including general refurbishment, levelling of the existing floors, replacing of the rear extension with new partly glazed and creating the new basement under the rear section of the house.

The aim of this Desk Study is to identify issues that might impact the structural design and construction of the proposed works. Particular attention is paid to ground conditions and to identifying features below ground that could impact the development.

4 THE SITE

No 25 Oakhill Avenue is part of the Royal Borough of Camden at the postcode NW3 7ED and is located on the south-east side of Oakhill Avenue, a two-way road which runs in between Redington Road and Bracknell Gardens. The existing property is Grade II listed building and was constructed in 1909. It is two-storey above ground floor, constructed of red brick with rusticated brick quoins and tiled double gabled roof with upswept other eaves to the main façade and hipped to the rear. No 25 forms with No 27 to the south-west a pair of symmetrical semi-detached houses as shown on the cover picture above and location plan Figure 4.1 and 4.2.

4.1 Adjoining Buildings

No 25 Oakhill Avenue forms with No 27 a symmetrical semi-detached house of the same style. A planning permission was granted for No 27 in 2014 for new single storey basement extension, which will be consider during the design process. No 25 Oakhill Avenue abuts the side passage with No 23 to north-east side. There are fence walls at the front and to the side with No 23. Rear garden fence is shared with both No 10B Greenway Gardens and 28 Bracknell Gardens (refer to Figure 4.1 and 4.2).

Figures 4.1 & 4.2: Maps showing the location and surrounding areas of the property (Extract from Location Plan and Google Maps)

5 SITE HISTORY

Historical maps show that the area around Oakhill Avenue was not developed until early 20th century. Maps given in Figures 5.1, 5.2 illustrate this.

Figure 5.1: Extract from London II.98 – OS London Town Plan 1894-96

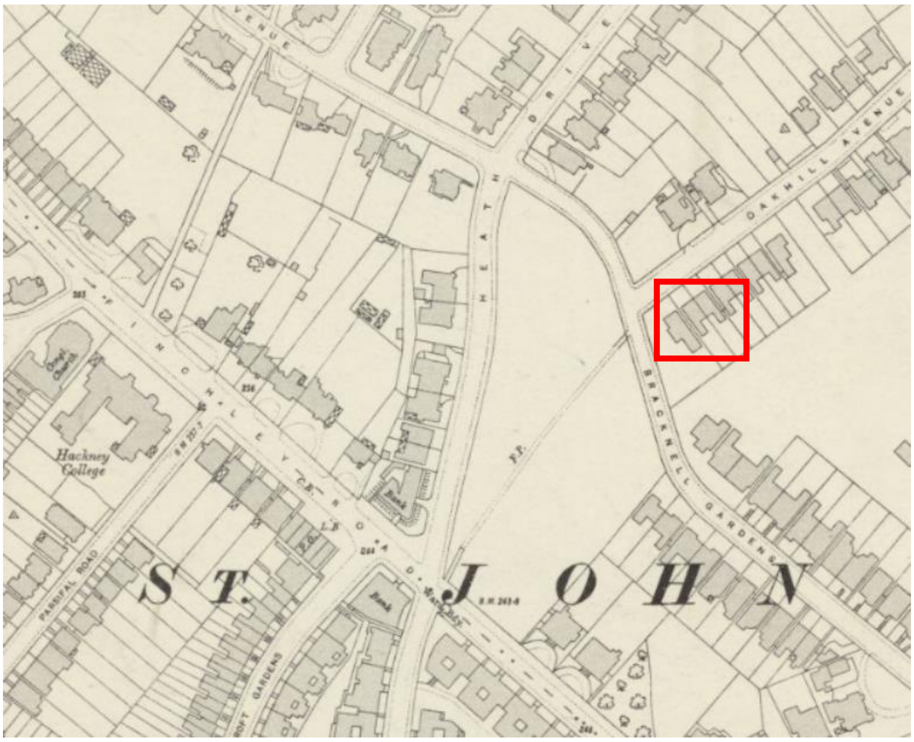


Figure 5.2: Extract from Ordnance survey 1915

The *Booth Poverty Map of 1898-1899* in figure 5.3 shows that the general condition of the inhabitants in the area ranged from ‘Middle Class to Upper Middle and Upper class’.

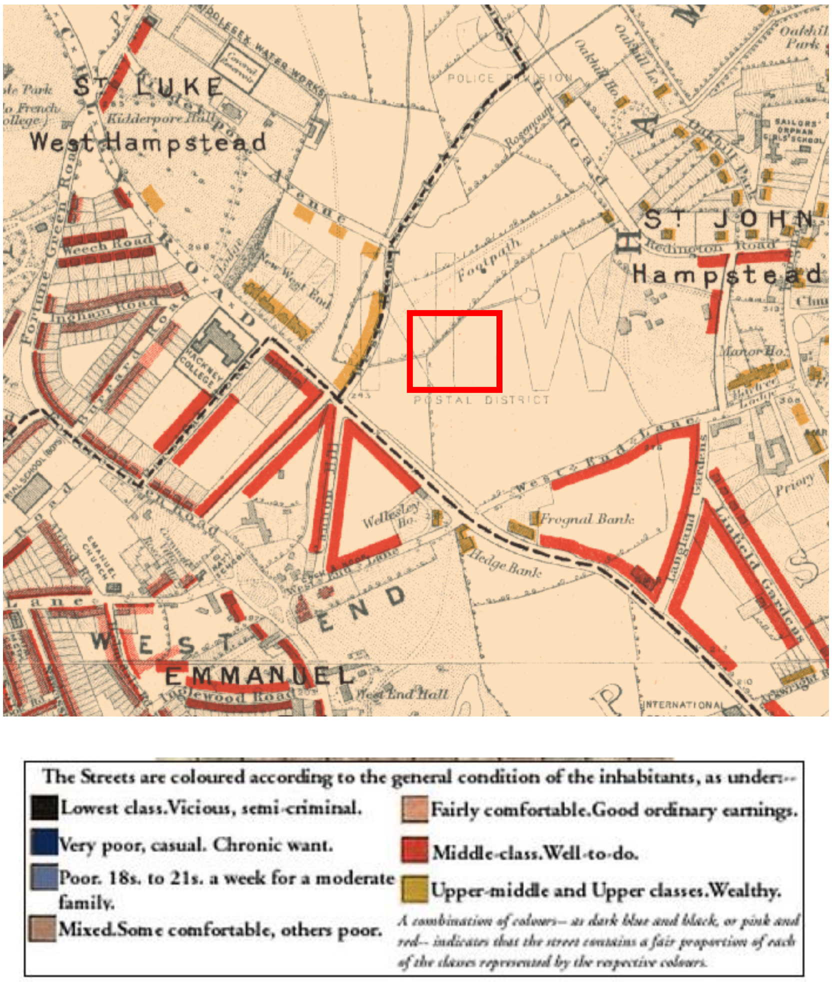


Figure 5.3: The Booth Poverty Map of 1898- 1899 (https://booth.lse.ac.uk/map)

Figure 5.4 below shows the extent of the damage from enemy action during WWII. This map indicates that 25 Oakhill Avenue and the adjacent area were not damaged during the attacks. This suggests that the current building at is original, built at the beginning of the 20th century.

Figure 5.4: Extract of Bomb Damage Map

25 Oakhill Avenue is Grade II listed building as shown on Figure 5.5 and it's located within the Frognal Conservation Area. The building was design by CHB Quennel and build by WJ King.

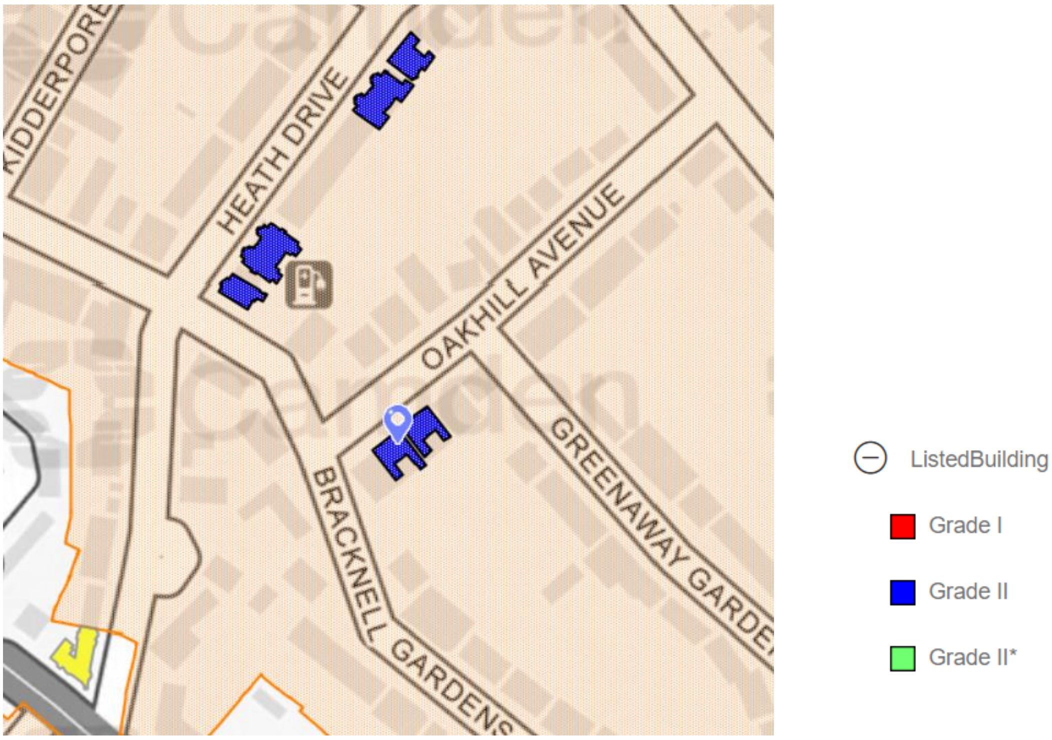


Figure 5.5: Extract Camden Listed Buildings Map

6 UNDERGROUND FEATURES

6.1 London's underground rivers

There are numerous 'lost' rivers running below the ground in London. Figure 6.1 is an extract from a map showing the site location encircled in red and its surrounding area. The map shows small stream, which run on the north west side of the Oakhill Avenue and it is a one of the tributaries of the Westbourne River. Stream is not close enough to be consider during the further site investigation.

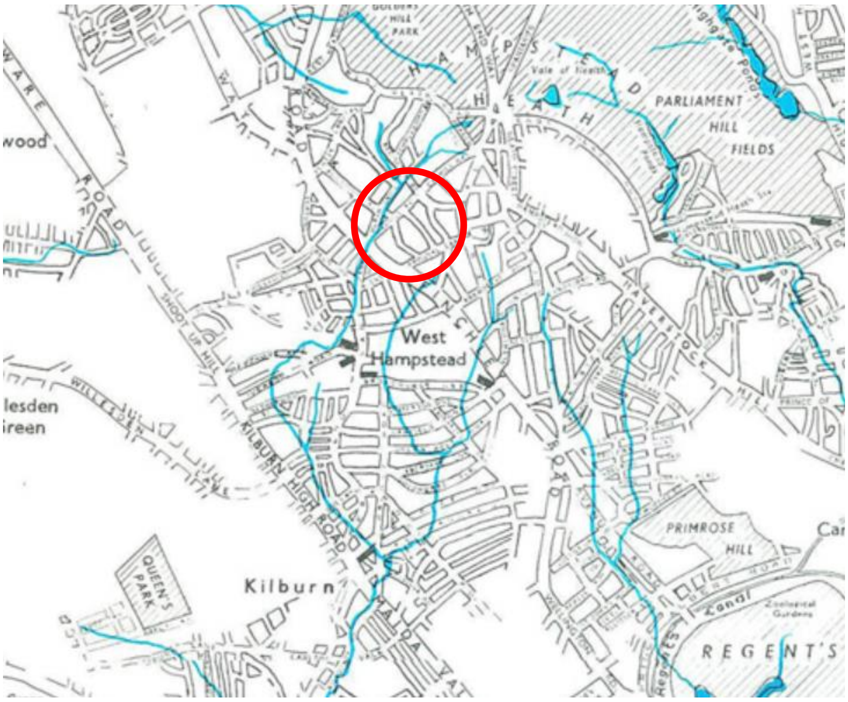


Figure 6.1: Extract from *Lost Rivers of London* by Nicholas Barton, 1982

6.2 London's underground tunnels

Figure 6.2 shows that none of the London Underground lines run in close proximity to the site and therefore will not have an effect on the proposed development, and neither does the property fall within the Crossrail 2 Safeguarding Limits.

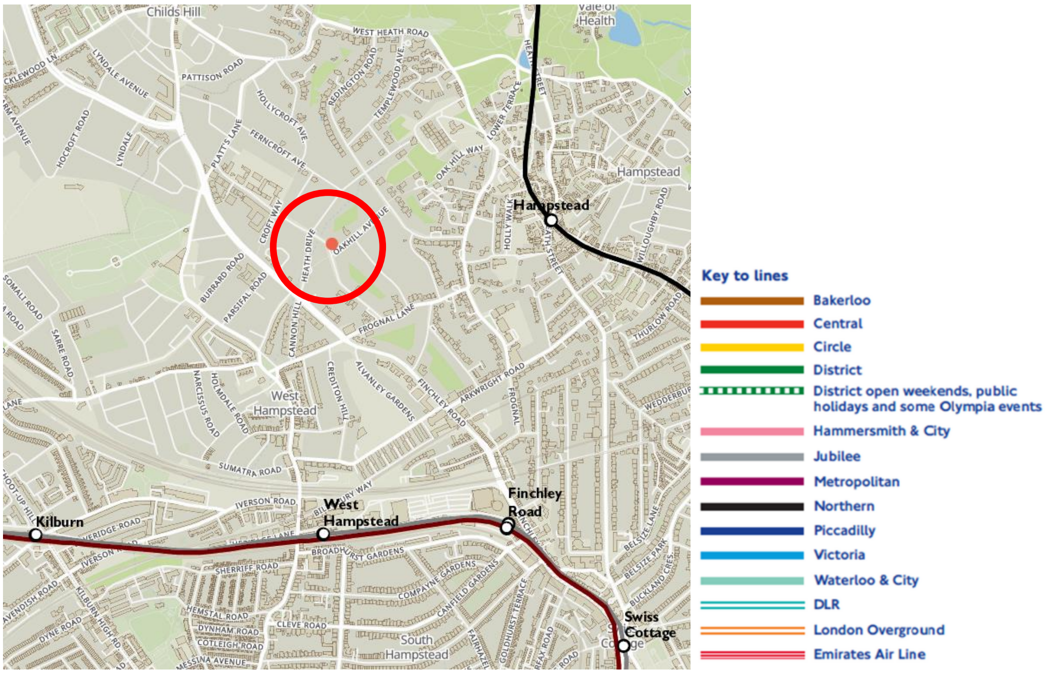


Figure 6.2: London Underground Lines

7 SITE GEOLOGY

The information from the British Geological Survey are shown in Figure 7.1 below. The survey indicates the site to be underlay by London Clay Formation with posible silt and sand deposit.

Figure 7.1: Extract from *The British Geological Survey Map* (*http://mapapps.bgs.ac.uk/geologyofbritain/home.html*)

The initial site investigations carried out at 25 Oakhill Avenue by GEA (Figure 7.2, 7.3 and 7.4) confirms the information presented on British Geological Survey map. The borehole report shows a superficial stratum of made ground to a depth of 1m with a Claygate Member encountered between 1 and 2.5m, overlaying London Clay which extend to the full depth of investigation (1.2m – 12m). During site investigation additional 3 window samples were taken to a depth of 2.5m. Groundwater seepage was observed in Borehole No 2, with shallow inflow associated with a high proportion of surface water infiltrating into the shallow soil.

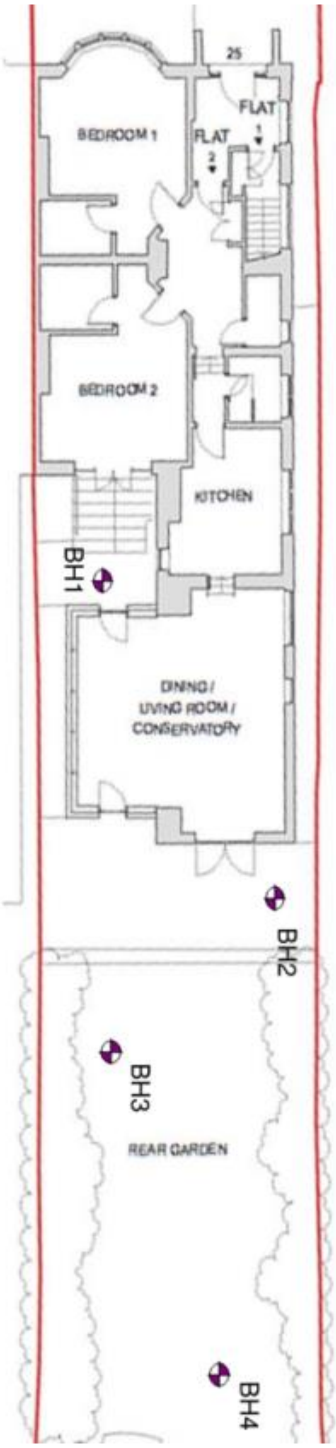
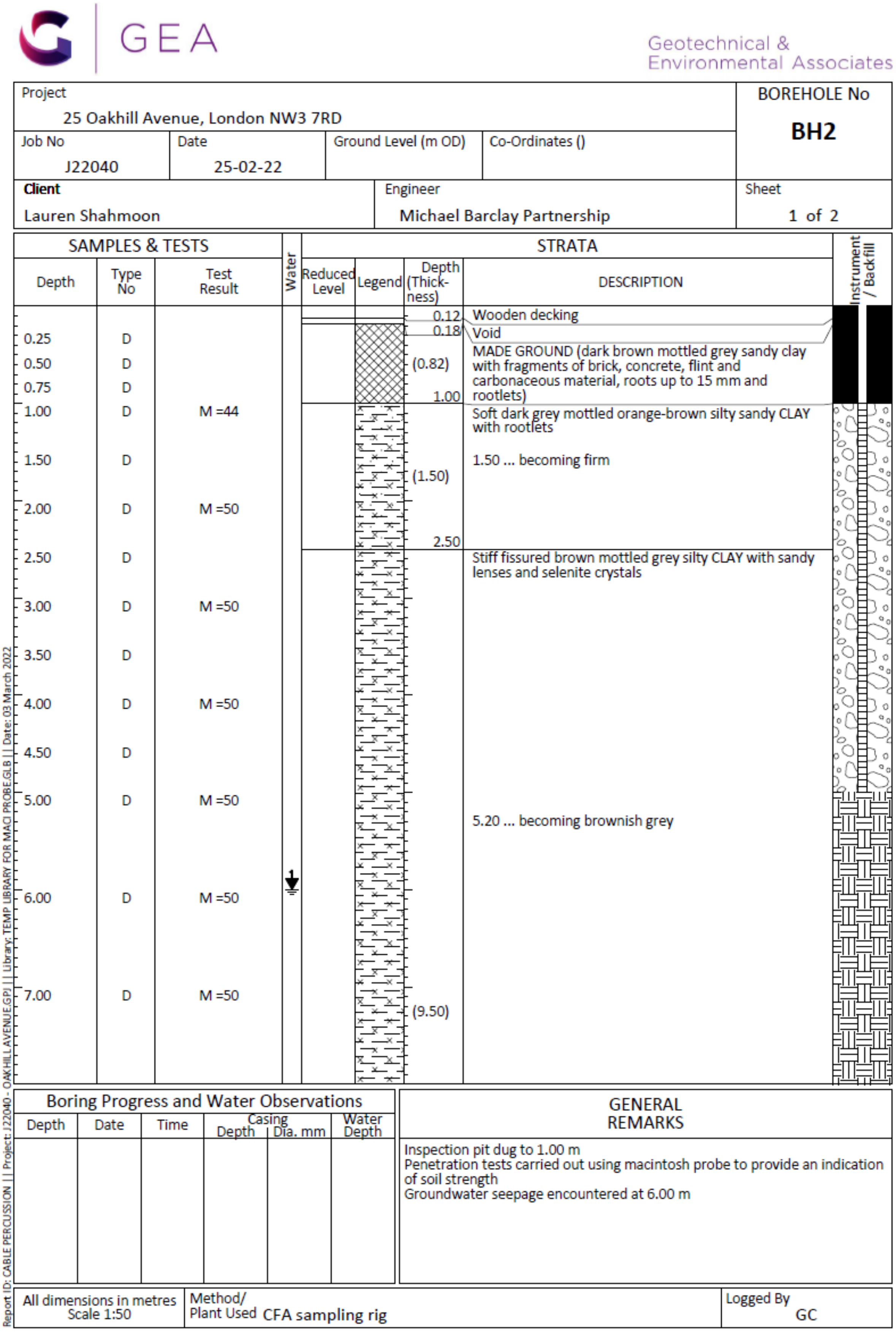


Figure 7.2: Bore hole location log extract from Factual Report by GEA



GEA
Geotechnical & Environmental Associates

Project 25 Oakhill Avenue, London NW3 7RD				BOREHOLE No **BH2**
Job No J22040	Date 25-02-22	Ground Level (m OD)	Co-Ordinates ()	
Client Lauren Shahmoon		Engineer Michael Barclay Partnership		Sheet 1 of 2

SAMPLES & TESTS

Depth	Type No	Test Result
0.25	D	
0.50	D	
0.75	D	
1.00	D	M =44
1.50	D	
2.00	D	M =50
2.50	D	
3.00	D	M =50
3.50	D	
4.00	D	M =50
4.50	D	
5.00	D	M =50
6.00	D	M =50
7.00	D	M =50

STRATA

Reduced Level	Depth (Thickness)	DESCRIPTION
	0.12	Wooden decking
	0.18	Void
	(0.82) 1.00	MADE GROUND (dark brown mottled grey sandy clay with fragments of brick, concrete, flint and carbonaceous material, roots up to 15 mm and rootlets)
	(1.50) 2.50	Soft dark grey mottled orange-brown silty sandy CLAY with rootlets 1.50 ... becoming firm
	(9.50)	Stiff fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals 5.20 ... becoming brownish grey

Water | Legend | Instrument / Backfill

Boring Progress and Water Observations

Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth

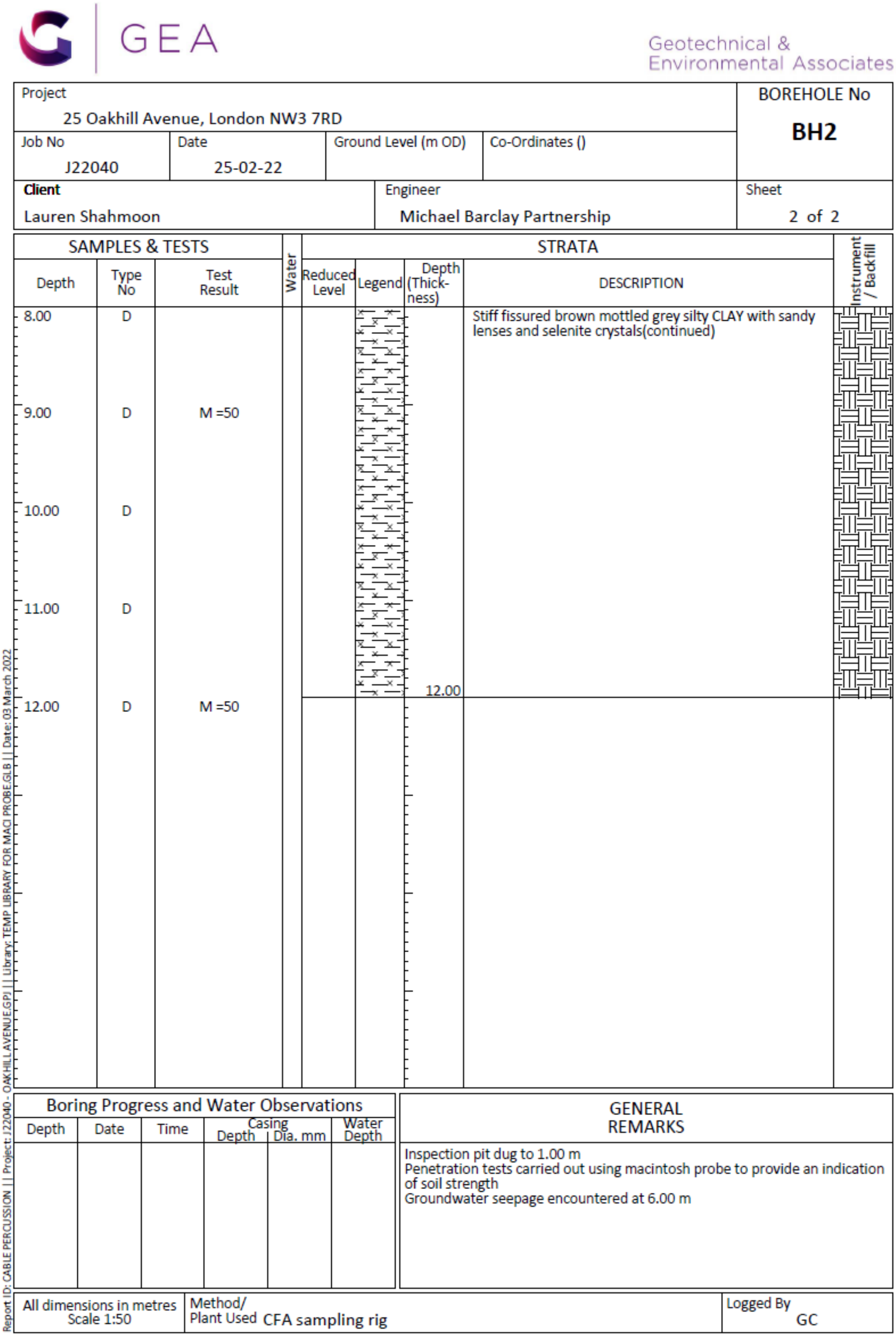
GENERAL REMARKS

Inspection pit dug to 1.00 m
Penetration tests carried out using macintosh probe to provide an indication of soil strength
Groundwater seepage encountered at 6.00 m

All dimensions in metres Scale 1:50	Method/ Plant Used CFA sampling rig	Logged By GC

Report ID: CABLE PERCUSSION || Project: J22040 - OAKHILL AVENUE.GPJ || Library: TEMP LIBRARY FOR MACI PROBE.GLB || Date: 03 March 2022

Figure 7.3: Borehole No2 log extract from Factual Report by GEA
(Continues below)



GEA

Geotechnical & Environmental Associates

Project				BOREHOLE No
25 Oakhill Avenue, London NW3 7RD				**BH2**
Job No J22040	Date 25-02-22	Ground Level (m OD)	Co-Ordinates ()	
Client Lauren Shahmoon		Engineer Michael Barclay Partnership		Sheet 2 of 2

SAMPLES & TESTS				STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Instrument / Backfill
8.00	D						Stiff fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals(continued)	
9.00	D	M =50						
10.00	D							
11.00	D							
12.00	D	M =50				12.00		

Boring Progress and Water Observations					
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth

GENERAL REMARKS

Inspection pit dug to 1.00 m
Penetration tests carried out using macintosh probe to provide an indication of soil strength
Groundwater seepage encountered at 6.00 m

All dimensions in metres Scale 1:50	Method/ Plant Used CFA sampling rig	Logged By GC

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Figure 7.4: Borehole No2 log extract from Factual Report by GEA
(Continues from above)

8 SITE HYDROLOGY AND FLOOD RISK

The information available from British Geology Survey and from the Flood Risk Summary for the area, provides initial guidance for the identification of site subject to flood risk. A flood risk map shows that there is no risk of flooding from rivers or the sea (Figure 8.1), a very low risk of the surface water flooding (Figure 8.2), together with an indication of the areas with a significant risk of drains surcharge during heavy rainfall periods.

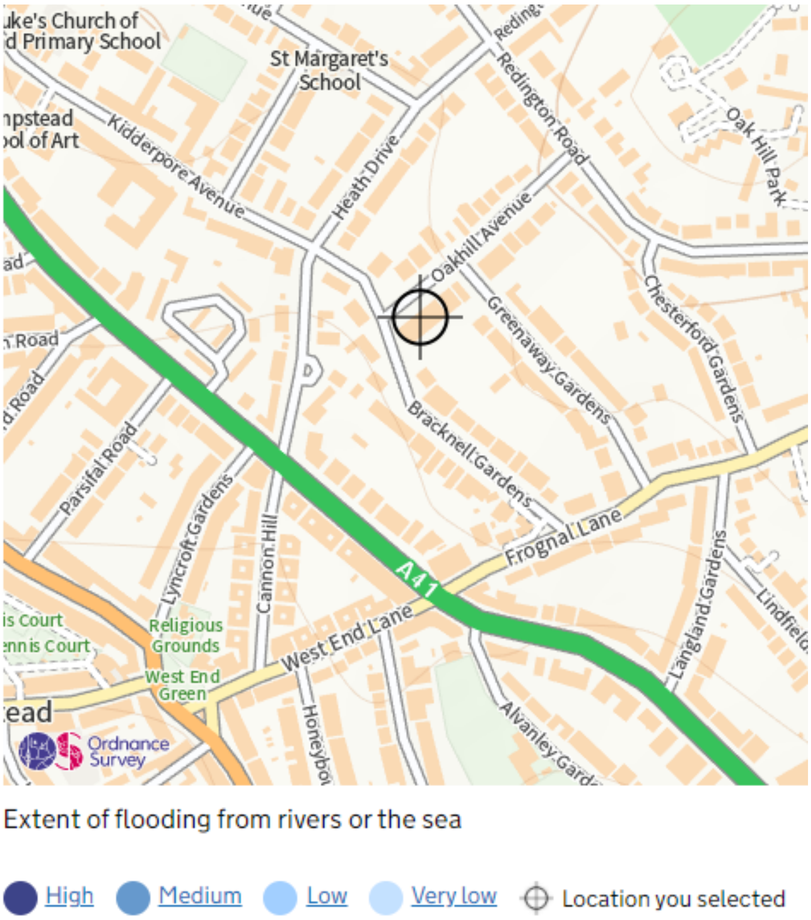

Figure 8.1: Risk of flooding from river and sea

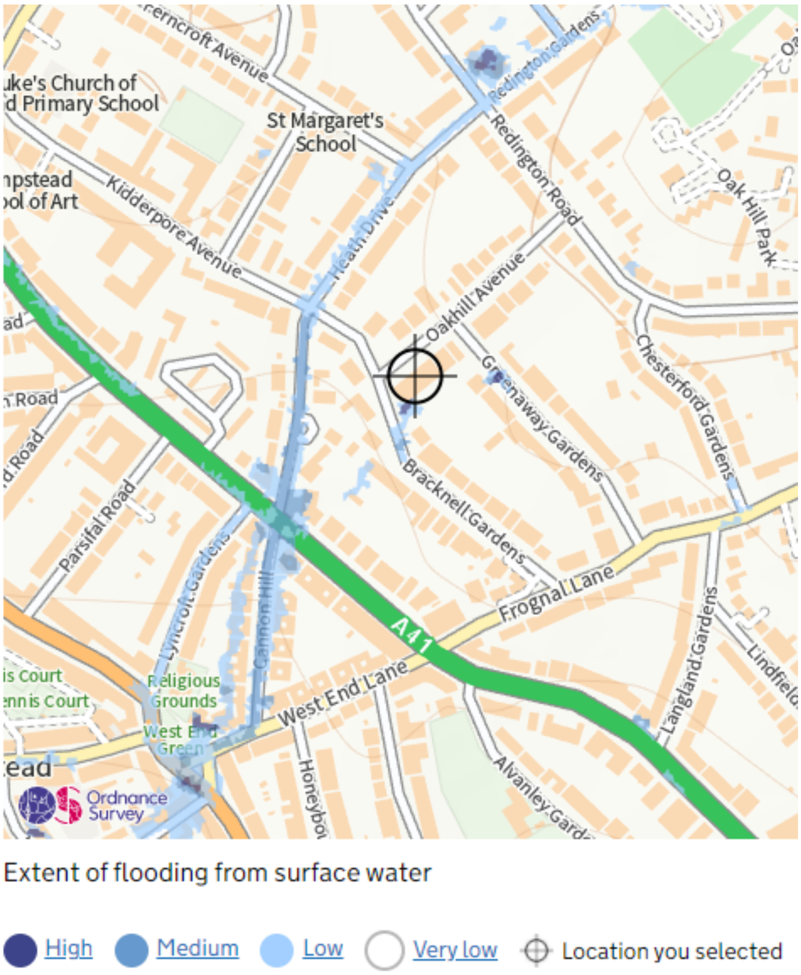

Figure 8.2: Risk of flooding from surface water

The maps in figure 8.1 and 8.2 above show the site outside the risk area, therefore the flood risk of the proposed development is not considered relevant.

The site is considered to be in a low risk critical drainage area. The risk from flooding due to blocked drains will be mitigated by a new drainage system for both rainwater and wastewater that will be designed in accordance with the latest regulations and that will include a 'one way' valve together with a new pumped system with storage in order to reduce the risk of flooding from sewage.

9 PLANNING HISTORY

There are several basements constructed in Oakhill Avenue and nearby areas of Bracknell Gardens and Greenaway Gardens. Below a list of Planning applications with basements constructed in these areas:

Address	Date of application
8 Oakhill Avenue	2020
9 Oakhill Avenue	2019
27 Oakhill Avenue	2014
10A Oakhill Avenue	2014
10A Greenaway Gardens	2012
25 Bracknell Gardens	2011

10 SUMMARY AND CONCLUSIONS

Based on this report and on previous MBP experience within the area, we anticipate that:

- The site is underlain by London Clay.
- The building is Grade II listed in Frognal Conservation Area.
- The perched water table is likely to be encountered above the water table, and at the expected formation level during the works.
- The underground river is not in proximity and will not have an impact on ground condition.
- London Underground services and Crossrail 2 plans, as well as underground are far enough from the site and will not have an impact on the proposed works.
- Flood Risk shows that the risk of flooding at 25 Oakhill Avenue is very unlikely.

Report Prepared by:

Name (Structural Engineer)
Agnieszka Zajac BEng (Hons) MSc
For Michael Barclay Partnership LLP

Report Approved by:

Name (Principal)
Tony Hayes BSc (Hons) CEng MIStructE
Date 17.10.2022