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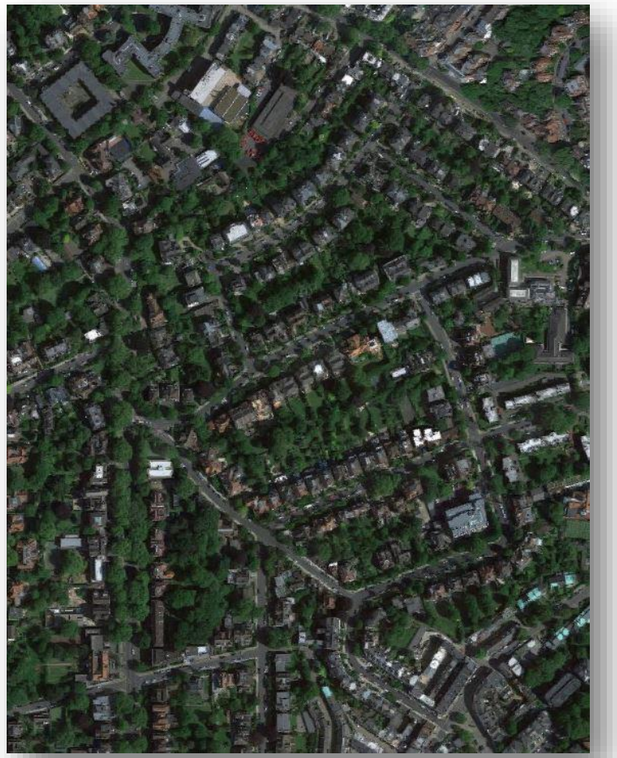

PROPOSED FRONT SECTION - A

76 FITZJOHN'S AVENUE LONDON NW3

Construction Method Statement for Subterranean Development

MBP-7009-February 2017

PREAMBLE

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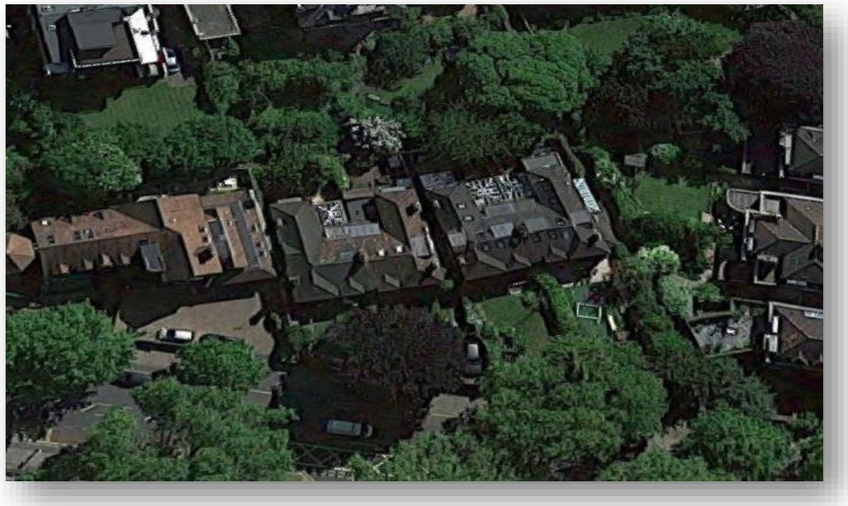
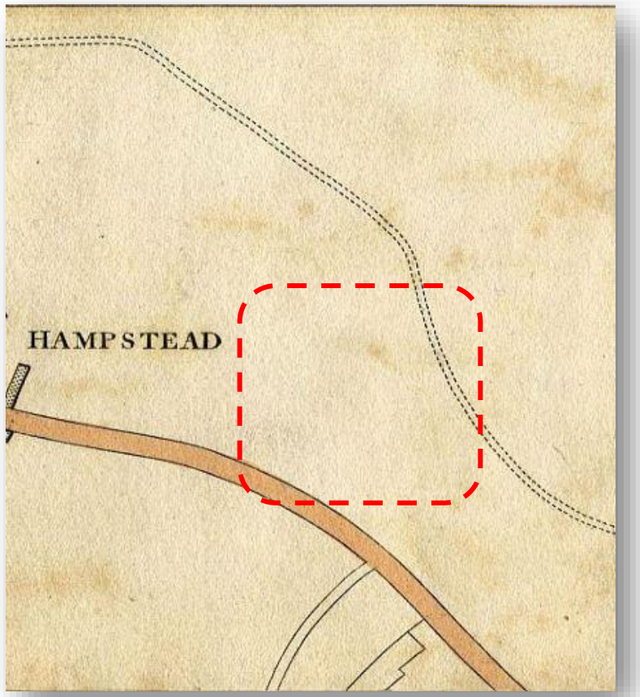




Cary's Map of London 1837

1.0 PREMISE

Nº. 76 Fitzjohn's Avenue is a detached residential property, typical of large houses in this and other areas of London. The dwelling, as are others on the avenue, is arranged over three levels, from ground to second with the top level within the cut timber roof: the property has no existing basement or cellar. Its construction is as traditional as its appearance being loadbearing masonry supporting timber floor joists spanning front to rear and timber rafters & framing in turn supporting roof boards and clay roof tiles.

Under the development proposed a new single-level of basement will be constructed beneath the footprint of the house, from the back wall to the front with a short extension into the front garden to provide a lightwell to the new lower level

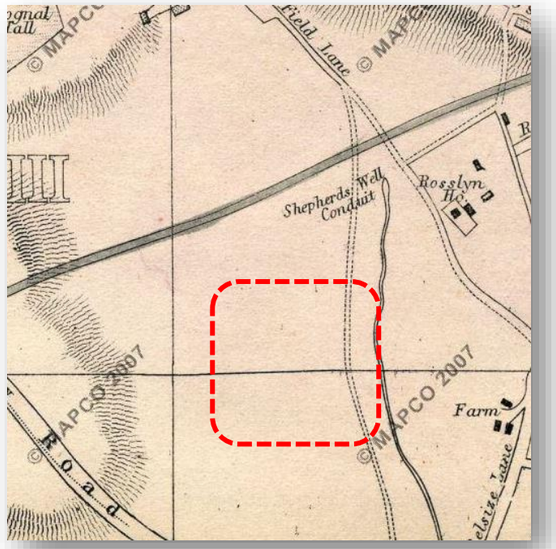
This report describes the likely structural solution for constructing this development, the interaction of the subterranean extension to the lower ground floor with the local geology and hydrogeology and its impact on surrounding buildings. Construction techniques are highlighted along with particular requirements for temporary works and excavations.

2.0 THE SITE AND AREA

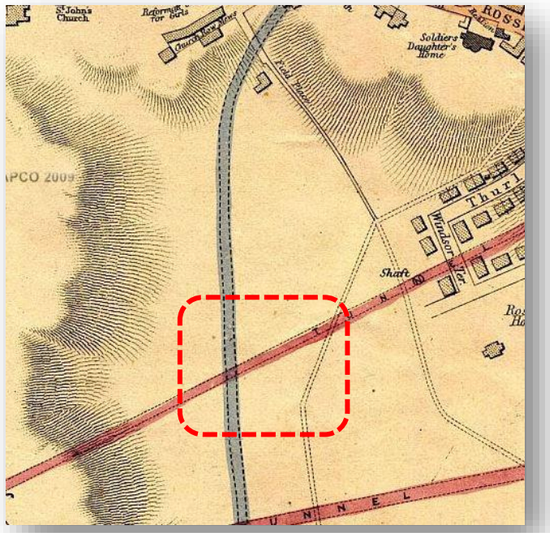
Pigot & Co.'s Metropolitan Guide for 1820 records that the area was undeveloped and largely agricultural: Chalk Farm is, for example identified at this time. Cary's New Plan of London from 1837 records the Hampstead Village with, what is now Rosslyn Hill/Hampstead High St recorded as Pancras Vale, on both sides of which small dwellings are noted: this map also records a number of nurseries (a long-term use for the area until its development) as is an early railway tunnel further south, '*The London & Birmingham Railway Tunnel.'*

Little development of the area took place over the next 20 years and the Post Office Directory of 1857 records the area south of Hampstead Village still agricultural: West End Lane is recorded where it is today. By 1861, when Cross's New Plan of London was published, Field Lane is recorded on the line of what will become Fitzjohn's Avenue but the area is still undeveloped, which remained the case for the remainder of the decade, as recorded in maps from 1864 & 1868. Stanford's map of 1872 has the emergence of Thurlow Road & Lyndhurst Road; Field Lane has become Field Place and property development has expanded. The OS Map of 1894, however, records extensive development in the area and the establishment of Fitzjohn's avenue

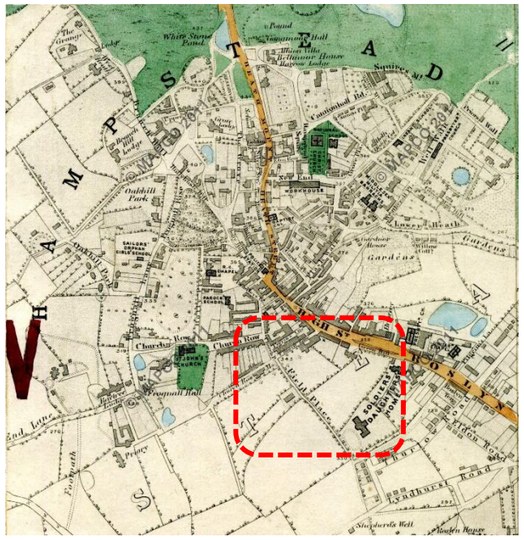
Booth's poverty map of 1898 records the residents of this area, understandably, as "Upper-Middle Class, Upper Class & Wealthy" and the layouts of the area and the surrounding streets much as they are today. Given the intention of the houses, i.e. homes for the upper classes, the build would have been to a very good-to-high standard using high-quality materials (e.g. well-seasoned timber, better-manufactured brick and stone source from a good quarry) and experienced tradesmen and craftsmen.



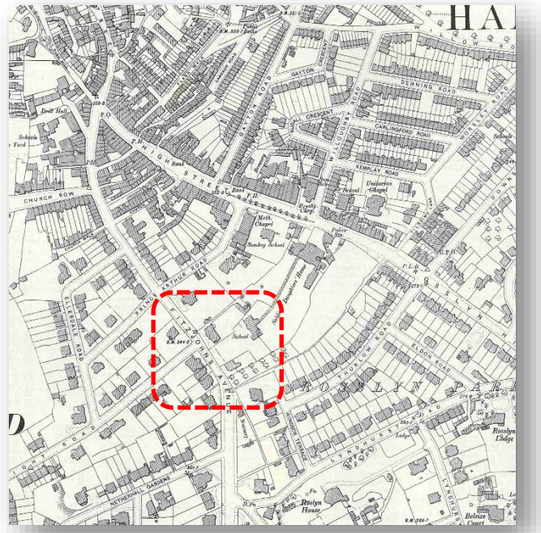
Map of London by Joseph Cross 1861



Map of London by Weller 1868



Map of London by Stanford, 1872



OS Map 1894

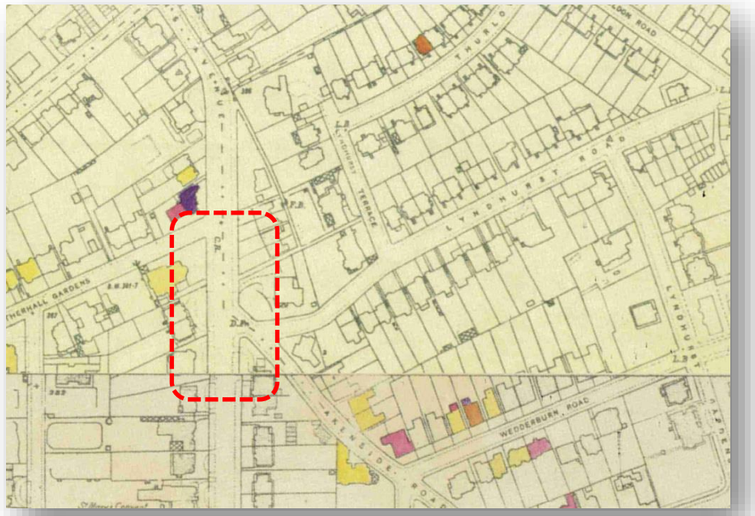
Booth's Map of Poverty 1898-99

London was heavily bombed during WWII and many areas suffered ordnance damage though few were in this area, according to the LCC Records from the time: a few properties suffered minor blast damage, (denoted by the yellow shading in the extract from the LCC Survey map of Bomb Damage form WWII).

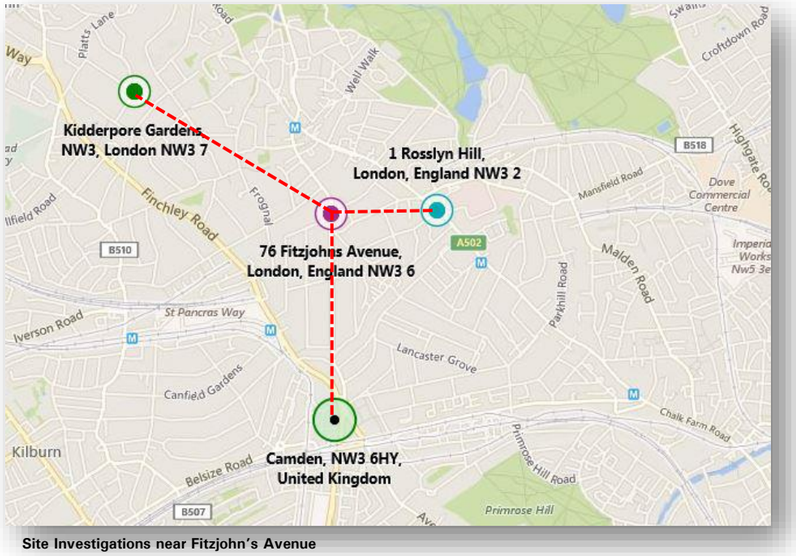
It was common when the railway network was built to disperse arisings from cutting excavations over adjacent land, which was often poorly compacted and led to settlement problems when that land was developed: the railway established to connect London with Birmingham, previously known as the Midland Railway Line and now accommodating London Overground trains, runs beneath the house so it is likely the near surface-soils are imported or re-used material from an excavation for the tunnel.

Records suggest then that the development of this area was within the last 125 years and, generally, was undertaken with some consideration and deliberation, using good practices and competent materials. The area was light agricultural, grazing or perhaps hunting land before it was developed and has not been used in the past for industrial purposes, nor has it been repeatedly developed so the ground is likely to be relatively free from contamination and obstruction such as old foundations and cellars.

There are a significant number of mature & substantial trees in this area, both in gardens and on the avenue, all of which are capable of influencing and affecting the design of the proposed basement which, in turn, must be detailed to avoid distressing the trees or their roots.



Bomb Damage Map



Site Investigations near Fitzjohn's Avenue

3.0 LOCAL GEOLOGY & HYDROGEOLOGY

The near-surface soil profile in this, the Hampstead Heath area of London are well known to be Bagshot Formation underlain by the Claygate Member of the London Clay and a number of nearby investigations provide more detail:

From an MBP Borehole in Rosslyn Hill:

- **0.5m OF MADE GROUND over CLAYGATE MEMBER, increasing in stiffness to depth**

From an MBP Borehole in Kidderpore Gardens:

- **0.9m OF MADE GROUND over LONDON CLAY, increasing in stiffness to depth**

From an MBP Borehole in Cresta House

- **0.3m OF MADE GROUND over LONDON CLAY, increasing in stiffness to depth**

Each of these investigations is within 750m of Fitzjohn's Avenue and all are representative of the near-surface geology in the area and can be expected with a high degree certainty at the site.

A site-specific investigation completed by **GEA in November 2016** confirmed the near-surface to be similar with the profile retreived from an 18m borehole described as '....Claygate Member generally comprising interbedded horizons of stiff orange-brown mottled grey and pale brown silty sandy clay and clayey silty sand. Groundwater we established 7m below ground level in one borehole. The logs from tat investigation are provided as Appendix A to this report while the full *Interpetive Report* and *Basement Impact Assessment* are provided separately.

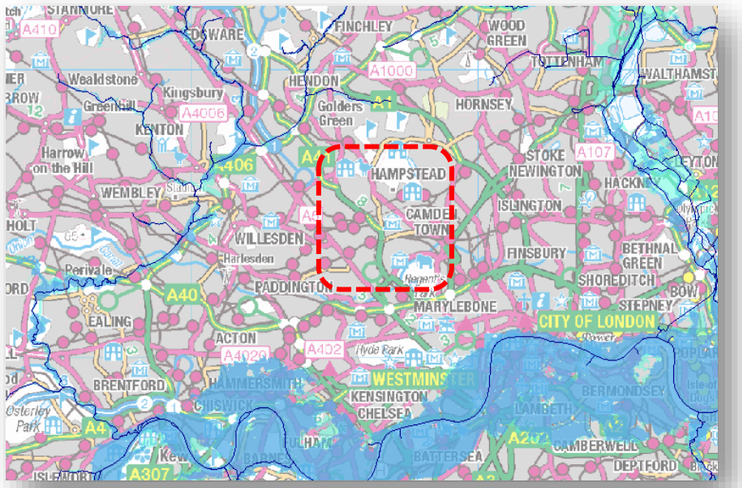
None of these investigations encountered groundwater of significance though slow inflow was encountered in the Kidderpore Gardens borehole around 5m below ground level, which is to be expected. Active groundwater will not be a primary design feature for the depth of basement proposed for this site, though it will be designed for a head of pressure, as required by current design standards.

The London basin contains an aquifer which lies deep below ground within the Thanet Sands and Chalk. It is fed from the chalk outcrops to the north and south of the Thames Valley. However, because of the impermeable London Clay which lies beneath the gravel terraces there is a local perched water table which is fed by precipitation within the Thames Valley, known as London's Upper Aquifer and a significant contributor to the water in the upper aquifer is burst or leaking water mains. The water on this upper aquifer tends to flow slowly across the surface of the London Clay depending on the permeability of the overlying sands and gravels. London's development has altered what were natural open ditches which flowed into tributaries of the River Thames; Counters Creek and the River Westbourne. However, the upper aquifer water levels do not vary significantly as water drains away into the Thames basin. The flows across the surface of the London Clay have historically eroded shallow channels in the surface of the clay which tend to be filled with sand and gravel. These can have an influence on local ground water levels and ground water flows. The combination of the topography and geology around Notting Hill, for example, is particularly unusual and in places causes unusually high ground water flows which the design and construction-method of the proposed basement will take consideration of.

The topography of LB Camden typically falls from the north to south toward the River Thames. The area with the greatest elevation is around the Hampstead Heath area which has a maximum elevation of approximately +134 maOD (metres above Ordnance Datum). To the south of the Borough the elevation reduces to approximately +23 maOD. Prior to the culverting of the Fleet and Tyburn Rivers, the river valleys would have represented topographic low points running roughly north-south into the Thames. Since a significant part of LB Camden is now completely covered by buildings and roads, the topography is likely to be altered somewhat from original pre-development levels.

Several surface water features have shaped the topography of LB Camden. In particular, the sources of four large river systems are on Hampstead Heath. The course of the River Fleet, one of these four rivers, shapes the eastern boundary of LB Camden. North of King's Cross the Borough boundary follows the watershed between the land which drains west into the Fleet and that that drains east into the

Lost Rivers of London



EA Flood Zone Map

There are numerous 'lost' rivers running below the ground in London, however, it can be seen that the site is situated approximately 2000m from the Westbourne to the east, and approximately 700m from Counters Creek to the west, which is not close enough to raise concern with regards to the proposed basement excavations.It can be seen from the Environment Agency Flood Map that the site lies outside Flood Zone 3, and therefore is not considered to be at risk of flooding from the river or sea, and that the are is not prone to high levels of flooding from surface water.

The depth of the proposed basement will not affect The London Aquifer which is to be found around 100m below the London Clay. The design of the foundations will be to the current design standards (British or Euro) which require the water table to be considered to a reasonable height, so allowing for the impact and influence of burst water mains etc. and the basement will be designed for a ½ depth of water for similar reasons.

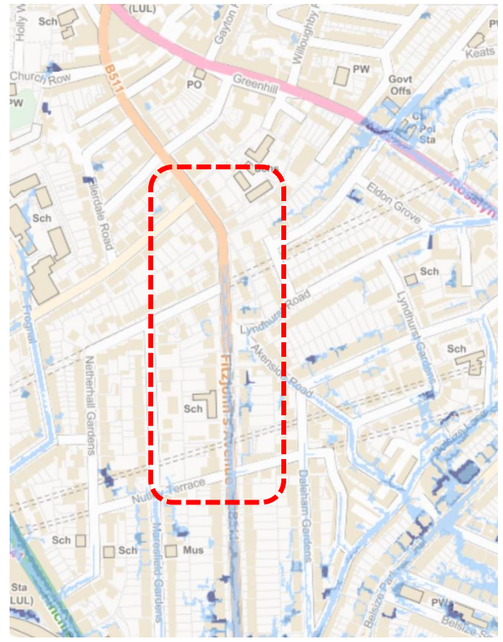
The proposed development will not discharge more run-off from the site, in volume or flow-rate than was the case in the past and could, in effect, reduce that run-off through the provision of planting and water management systems as SuDs measures in the scheme

neighbouring Hackney Brook catchment. South of King's Cross the Borough boundary closely follows the course of the River Fleet. The sources of the four rivers are all in the north of LB Camden at the clay/sand junction of the Bagshot Formation and London Clay. At this junction springlines form and groundwater flows into various drainage channels throughout the Heath, which form tributaries and then form the rivers. The rivers within LB Camden include:

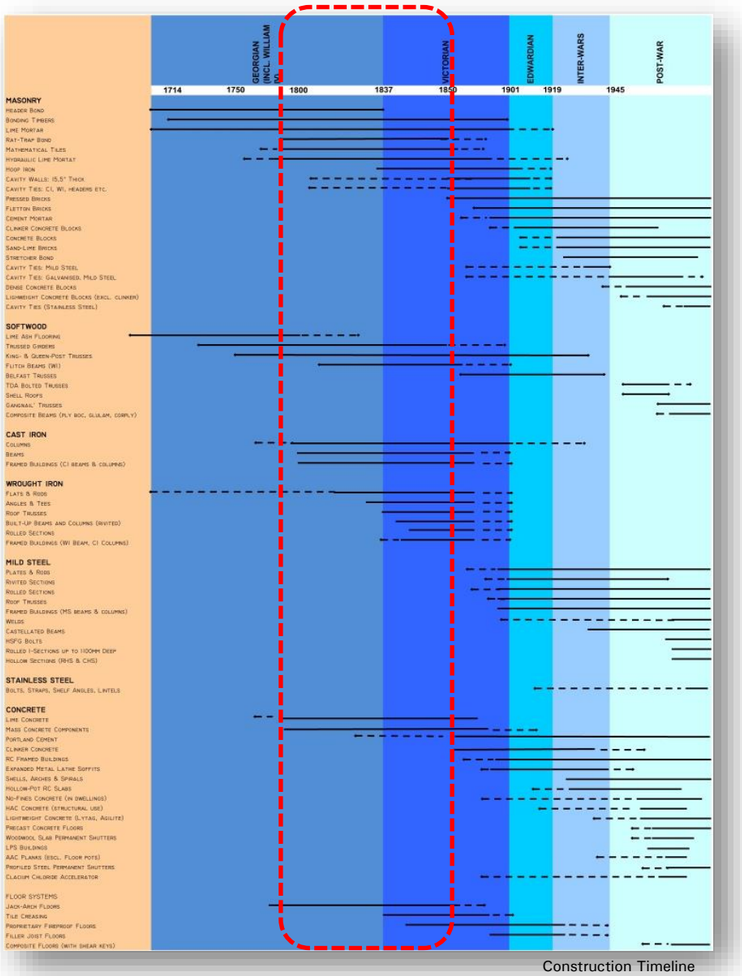
- River Fleet and a number of its tributaries running from Hampstead Heath south south-east toward the central and east of the Borough
- River Tyburn running from south of Hampstead Heath in a southerly direction before passing out of the Borough to the north-west of Regent's Park
- River Westbourne and a number of its tributaries run from the south-west of Hampstead Heath in a southerly direction before passing out of the Borough near Kilburn
- The source of a number of streams in the north of the Borough which flow north westerly into the river Brent and Brent Reservoir.

On Hampstead Heath there are more than 25 ponds which form four chains of interlinked water features (Figure 13). The majority of the ponds were constructed in the late 17th century to dam the rivers flowing across the Heath, and their tributaries, in order to provide clean water supply to London. Today, the rivers still flow through the dammed ponds. South of Hampstead Heath, the Fleet, Tyburn and Westbourne rivers are artificially channelled along their route through manmade culverts and into the local storm drainage network, eventually discharging to the River Thames. The ponds no longer serve as reservoirs for water supply, but now have a mixture of uses including recreational swimming and wildlife habitats. In hydrological terms the ponds continue to provide flood storage and they are subject to control and protection under the Reservoirs Act.

To manage the Heath, parts are underlain by artificial drainage pipes and channels designed to remove water from footpaths, sports pitches or waterlogged areas. In general the ponds are considered to pose medium risk due to the volume of water they hold, but there is limited likelihood of failure. Run-off into the ponds has to be regulated/controlled and the reservoir pond structures maintained.



EA Surface Water Flood Map

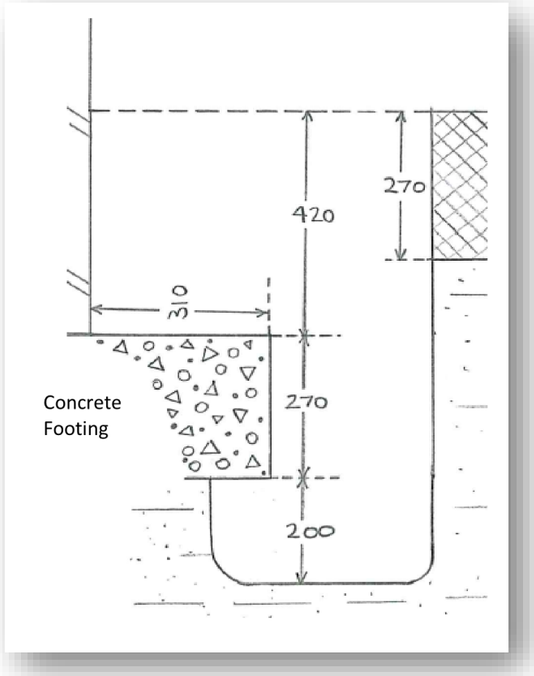


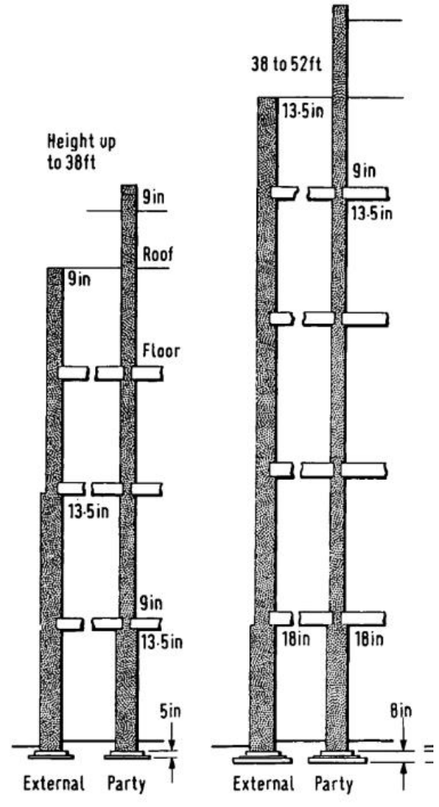
Construction Timeline

4.0 THE EXISTING BUILDING

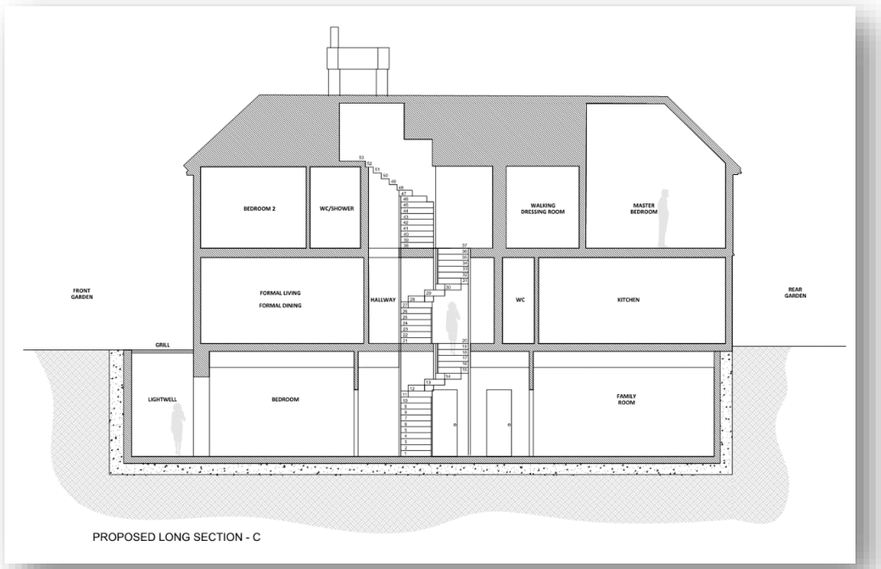
The existing building is more than likely the first and only on this site, and if not then is certainly the most substantial. It has, like the surrounding period properties, loadbearing masonry walls, with concrete strip foundations formed off the underlying clay, which support timber upper floor joists and pitched roofs built from cut-timber rafters rather than trusses and finished in clay tiles.

The building is in good condition and benefits from recent internal improvements although the original loadbearing walls are still in place. There is no evidence of distress or damage to the construction or fabric of the building, such as bulges, cracks, dampness or decay, the floors are level and the walls are plumb and sound. There is therefore no evidence or suggestion that its construction cannot tolerate the proposed works, both in their execution or when complete.





Common Wall Constructions of London Houses



PROPOSED LONG SECTION - C


Underpinning To A Party Wall

5.0 THE PROPOSED DEVELOPMENT

The proposed development will construct a single level of basement beneath the existing footprint of the current building, including a new groundbearing slab at level -1. Although the construction and stability of this property is not shared with its neighbours, i.e. party walls and continuous front and rear elevation walls that are the case with semi-detached or terraced properties, the construction of this basement will have to be undertaken with care and due consideration to the surroundings. The ground floor (original or new) could be retained throughout the works so maintaining the support and stability that currently provides to the side, front and rear walls.

BELOW GROUND LEVEL

The proposed development will construct a single level of basement beneath the existing footprint of the entire house. Removing underlying soil to accommodate the basement will relieve some of the pressure on the underlying London Clay: however, there will the weight of the new construction imposed around the perimeter and we estimate that this relief will not be significant, will not lead to noticeable swelling of the clay and so will not impact significantly on the surrounding buildings and foundations, which has been our experience empirically and theoretically in similar developments in this area of London. There are no known services in the rear gardens but a survey before works commence will be required to identify, established and protected if necessary during the construction process.

The new basement, along with the ground slab it will support, will be constructed in reinforced concrete. Although considerably above the prevailing groundwater level the new construction will be provided with either *Type A (barrier)*, *Type B (structurally integrated)* or protection against ingress of water, as defined by BS 8102:2009 and constructed and detailed to achieve a Grade 3 Level of Performance, as defined by BS 8102:2009.

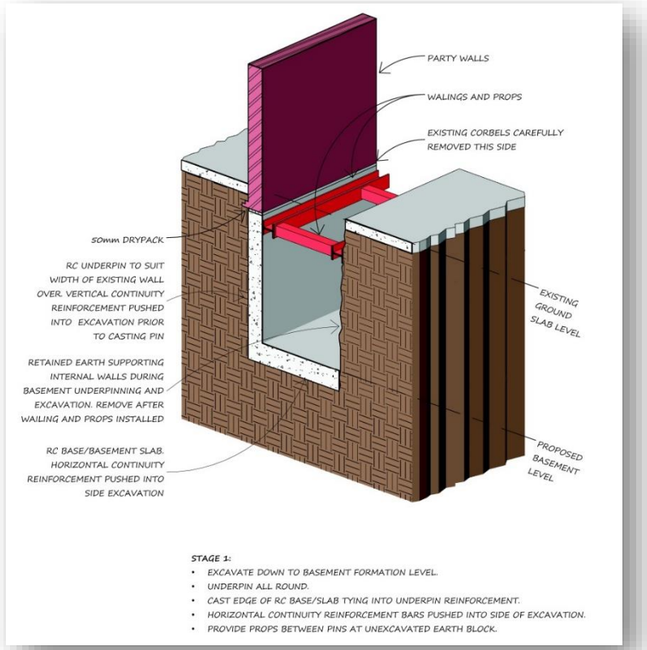
Table 2 **Grades of waterproofing protection**

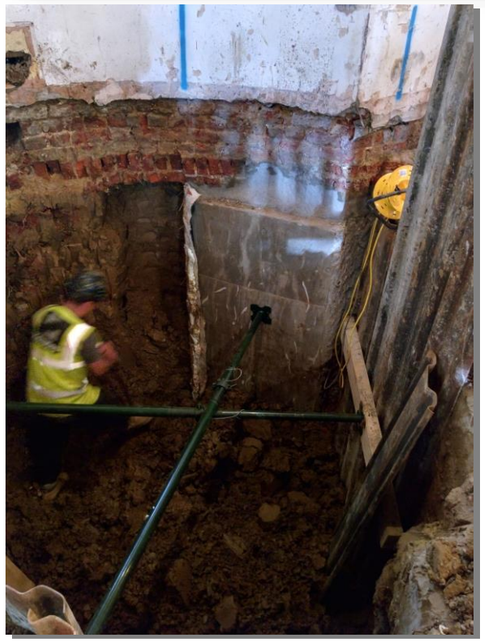
Grade	Example of use of structure [A)]	Performance level
1	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp areas tolerable, dependent on the intended use [B)] Local drainage might be necessary to deal with seepage
2	Plant rooms and workshops requiring a drier 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].

We propose that this construction is achieved using a combination of retained excavations and underpinning techniques and sequencing to build in the walls in stages, horizontally and vertically. The walls of the house will be directly underpinned while the lightwell wall will be cast in open excavation, with the ground banked back from the house to ground level at an angle of repose so forming a ramp which will also serve as access ramp to the works below ground level.





Although a lengthy process, underpinning by hit-&miss-sequencing is a low-impact technique that permits the maximum space to be achieved and has the least impact on existing constructions, boundaries and the like. Casting the wall in pins controls the extent of soil exposed, avoids extensive temporary works and they can be controlled in size and sequence to reflect and accommodate the condition and capability of the walls they will be built beneath.

The material removed will be fill and sandy clays and while their excavation will relieve pressure on the underlying, stiffer London Clay, our determination and expectation is that this relief will not be significant, will not lead to noticeable swelling of the clay and so will not impact significantly on the surrounding buildings and foundations. Such heave that may occur will mostly, i.e >50%, occur immediately on excavation, much of the remainder during the works leaving a small residual pressure that the new construction will accommodate and.

There is no active groundwater within the proposed construction zone but to achieve Grade 3 Performance we propose a bentonite-impregnated membrane is installed between the back of the concrete wall elements and the retained soil, and have specified VOLCAY supplied by CETCO.

The basement slab will be a reinforced concrete raft cast on a suitable sub-base and will be formed off the underlying London Clay. While neither pad nor strip foundations are intended the slab will be thicker beneath the lines of the walls that will be built in loadbearing masonry and support the floors above.

ABOVE GROUND LEVEL

Non- related works are planned to remodel and renew the house above ground level, but these are not part of this consideration and will have no impact of significance on the design, detailing and construction of new basement.

6.0 DRAINAGE & SuDs

The proposed development will occupy the same area as the existing and provide a similar level of accommodation and occupancy so the site will not generate any greater discharge to the public sewer that it had the potential to currently and in the past. Similarly, the proposed roof area is no greater than it is presently and there is no more hard-standing area so the run-off to the public storm water sewer will be no different as it currently is and has been.

The scale and scope of the of the development works will not require a new below ground drainage system to be provided, but will combine existing gravity flow from the upper floors and roof 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 sewer(s). The system will be designed to cope with local surface flooding (even though the site is in an Environment Agency Zone of low-to-medium risk of flooding from surface water) as well as the required uplift for climate change. The site currently has no soft landscaped areas.

The underlying soil profile does not support natural percolation of surface water nor is there land on or near the site for soft landscaping or to accommodate soakaway drainage so all run-off will discharge to the public system, based on a roof area just under200m^2 and a discharge rate of 5 l/s for 100year storm + 30% for climate change. The basement will be pumped via a **Flygt Compit Pump Station f**itted with a non-return check valve.

Damage Category	Description of Typical Damage	Approximate Individual Crack Width
Negligible (0)	Hairline cracks	< 0.1 mm
Very Slight (1)	Very slight damage includes fine cracks which can be easily treated during normal decoration, perhaps an isolated slight fracture in building, and cracks in external brickwork visible on close inspection.	1 mm
Slight (2)	Slight damage includes cracks which can be easily filled and redecoration would probably be required, several slight fractures may appear showing the inside of the building, cracks which are visible externally and some repointing may be required, and doors and windows may stick.	< 5 mm
Moderate (3)	Moderate damage includes cracks that require some opening up and can be patched by a mason, recurrent cracks that can be masked by suitable linings, repointing of external brickwork and possibly a small amount of brickwork replacement may be required, doors and windows stick, service pipes may fracture, and weather-tightness is often impaired.	5 mm to 15 mm or a number of cracks > 3 mm
Severe (4)	Severe damage includes large cracks requiring extensive repair work involving breaking-out and replacing sections of walls (especially over doors and windows), distorted windows and door frames, noticeably sloping floors, leaning or bulging walls, some loss of bearing in beams, and disrupted service pipes.	15 mm to 25 mm but also depends on the number of cracks
Very Severe (5)	Very severe damage often requires a major repair job involving partial or complete rebuilding, beams lose bearing, walls lean and require shoring, windows are broken with distortion, and there is danger of structural instability.	> 25 mm

Table 1: Severity of Cracking Damage[4, 5]

7.0 RISKS TO & IMPACT ON SURROUNDING BUILDINGS

The proposed development is a relatively low-level, low-density construction and it will occupy the same overall footprint and will incorporate the existing boundaries in its envelope.

The surrounding buildings fall in to Group 1a defined by BS ISO 4866:2010, i.e. **Ancient, Historical** or **Old**; the foundations to the new building fall in to Classes B & C and the soil as Type e: from Table B1 of BS ISO 4866 the surrounding buildings fall within Category 6 and can be considered to have a medium resistance to vibration. From Table B.2 of BS ISO 4866 the surrounding buildings fall in to Class 8, which are deemed to have a medium level of resistance to vibration and, conversely, to require no or little protection against vibration for the types of works intended.

- Although the construction will be further below ground level than the existing building it will not be significantly deeper than the lowest level of the surrounding buildings.
- The basement construction will not be lower than the prevailing groundwater level in this area so will not interfere with the natural flow of the groundwater.
- The building will be formed off of dense gravels, which have a significant bearing capacity, and the foundations will be designed to reflect the recommended permissible pressures and ensure they will not be compressed by more than 15mm
- Removal of the existing construction will generate little or no relief and consequent heave in the London Clay that underlies the band of gravels.
- The boundary walls on four sides can be retained safely and easily following industry-standard practices and, by following a pre-determined sequence will allow the basement wall to be constructed without detriment to the existing, surrounding construction.
- Excavations for the pins that will form the new basement walls can be undertaken using a small excavators, which will be low-impact technique and known not to generate excessive vibration.

Adopting a controlled and sequenced work process will limit any damage to surrounding buildings to Category 1 or 2 on The Burland Scale, Hairline or Very Slight cracks, easily repaired with filling & decoration.

Conveyor to Remove Excavation Arisings

8.0 CONSTRUCTION METHODS & SEQUENCE

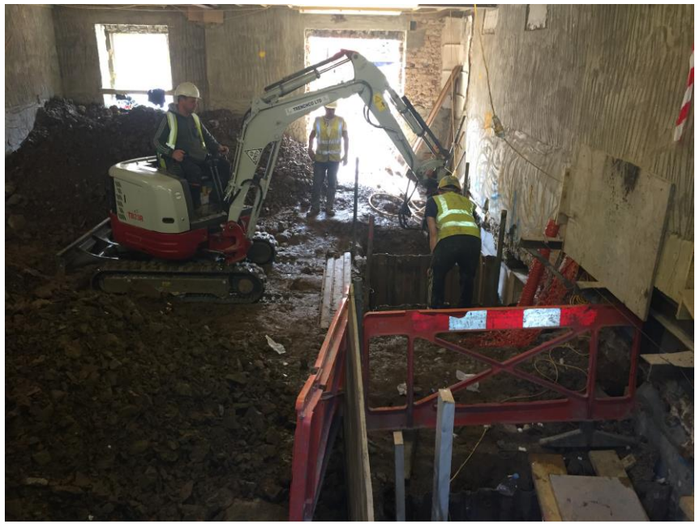
The excavation for, and construction of the basement will need to be completed without involving or disturbing the existing ground and upper floors and finishes throughout the building. The sequence of the works for the demotion and construction phases of this project will, ultimately, be prepared by the contractor who will undertake the works but we expect, and will guide them towards a sequence similar to the following:

- Excavating for and preparing a ramp from ground level to formation level at the front of the house
- Installation of temporary supporting works beneath the front elevation
- Construction of the side walls to the lightwell
- Installation of lateral props between the house walls above ground floor level
- Removal of ground floor construction
- Sequenced construction of the retaining walls beneath the main house starting from the front and working down from ground floor
- Pins to start at four or five locations reducing to one at completion
- Arisings removed by conveyor to skips or wagons on the property's driveway

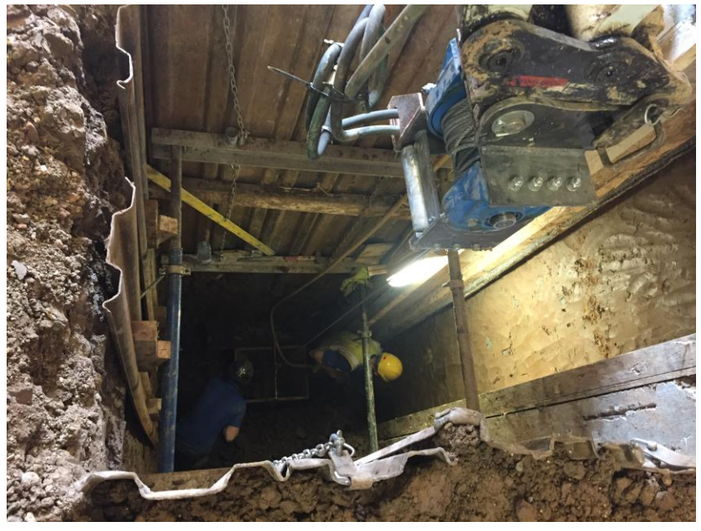
By adopting an underpinning technique and following a hit-&-miss sequence it will be possible to construct the basement without extensive temporary works; local props and sheeting may be required to support excavations and as the conclusion of the perimeter walls and before the remainder of the existing ground is removed bracing props will be installed between the boundary walls, and maintained in place until the new ground slab is constructed. These will be located near ceiling level within the house to maintain working access for the next phase of the construction, similar to the detail shown. Continuity reinforcement between the pins will allow lateral props to be provide at 2-3m c/c rather than to each pin.

Fitzjohn's Avenue is a popular and busy residential road but one that will nevertheless accommodate construction traffic. The site is provided with a planned open courtyard which will accommodate materials and vehicles when the footprint of the building cannot. A traffic management plan will be necessary for the control of construction vehicles.

Small wagon



Typical arrangement o underpinning works



Shored Excavation for an underpin

Small Excavator

9.0 NOISE & NUISANCE

Construction works generally are a source of noise and nuisance which can affect both operatives with the work site as well as neighbours and passing members of the public. Demolition and excavation works are particular sources of this potential harm so it will be necessary during these works at No. 16 for the contractor to mitigate the extent and impact of noise, dust, traffic and vibration.

Noise: Generated by the mechanical equipment used to demolish existing construction and excavate for the new basement;
Mitigated by using electrical equipment where possible and mufflers or attenuators on diesel engines or generators, by working only within agreed and designated hours;

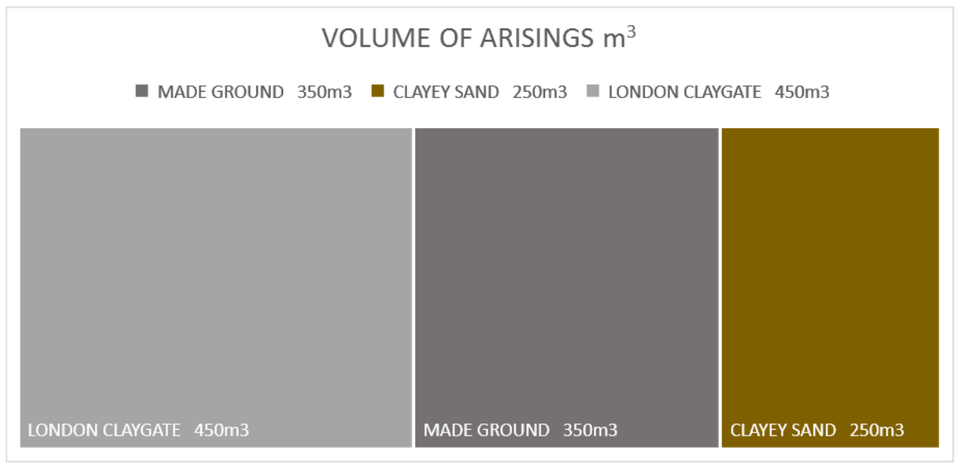
Dust: Generated by excavation works and the transfer of arisings from the works area to the disposal skip or wagon;
Mitigated by damping conveyors when in operation, by installing a weatherproof cover over the site, by washing-down vehicle wheels before leaving site;

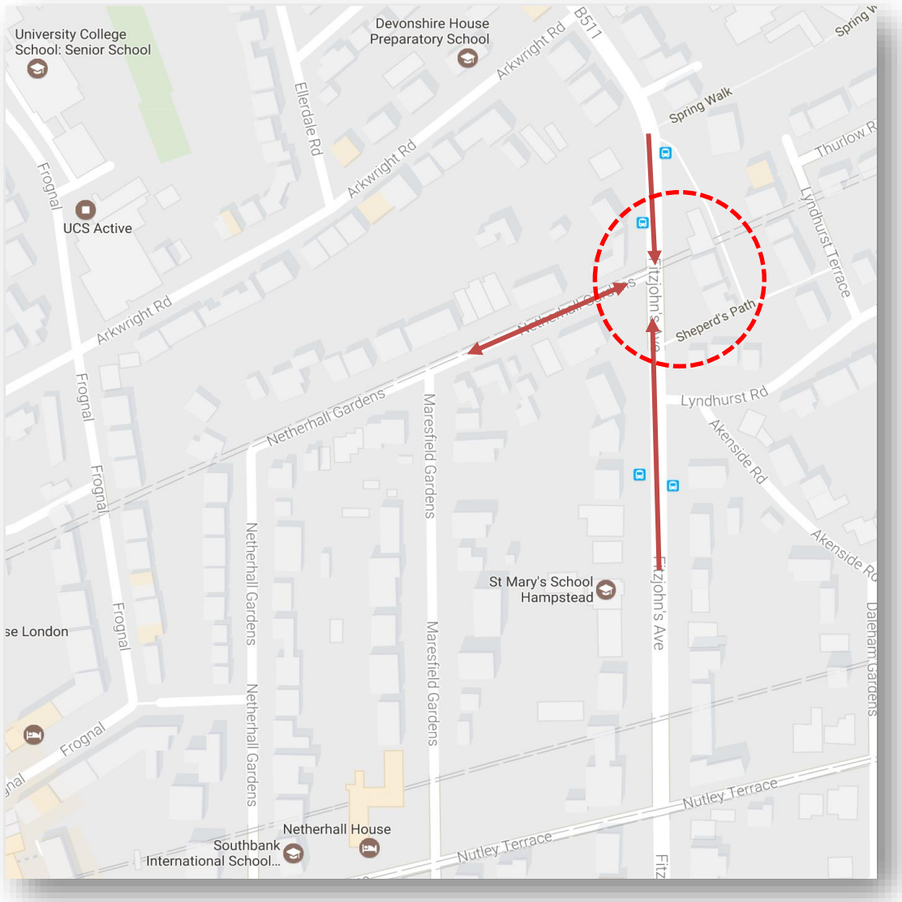
Traffic: Generated by delivery and removal vehicles travelling to and from site;
Mitigated by establishing a traffic management plan, by identifying and using routes appropriate to the vehicles, by scheduling vehicle movements to avoid peak traffic periods, by ensuring vehicles are low-emission standard

Vibration: Generated by use of heavy breakers for sustained periods and by heavy vehicles
Mitigated by using light, hand-held and electrical breakers, by avoiding excessively heavy vehicles.

Protection: Robust hoarding will be erected around the site, front rear and sides, to secure the site from intrusion as well as provide protection to neighbours and passing public from noise, dust and material arisings

The works will cover around 200m^2 and excavate to 3.3m over the, which will generate almost 1000m^3 of spoil as follows

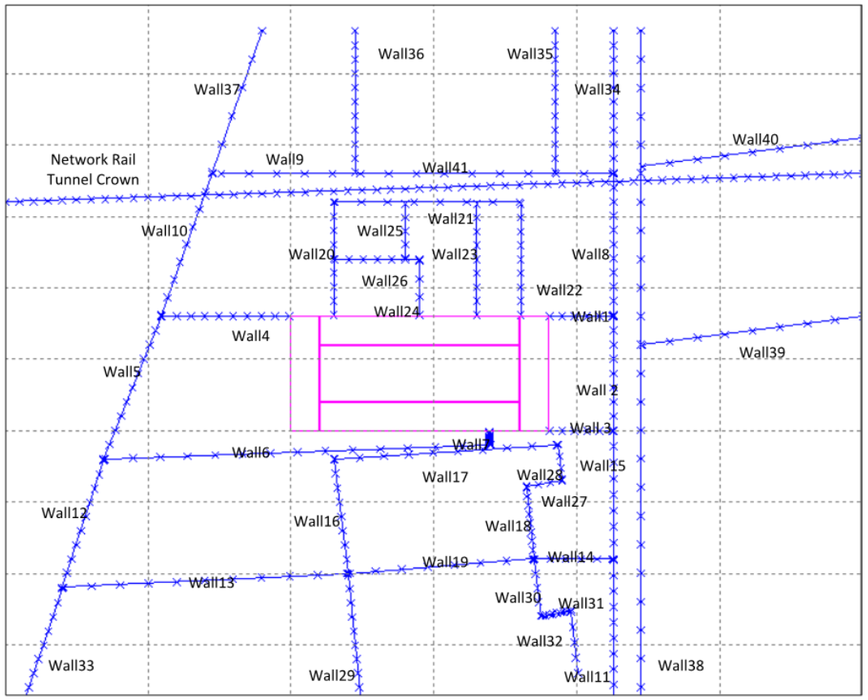




10.0 CONCLUSIONS

The proposed development of 76 Fitzjohn's Avenue can be achieved using standard construction techniques and materials. The new construction will not be beneath the prevailing groundwater level. The basement can be constructed using relatively light techniques, in controlled and pre-determined sequences and without the need for a large open excavation before construction can start and consequent extensive temporary works. Where mechanical means are necessary to construct permanent works these can be of a type that generates low vibrations to which the surrounding buildings have a form and construction that is robust and resistant to.

- The site specific site investigation has established the near-surface soil profile and the construction and loadpaths calculated to ensure that the building will be adequately supported by the existing geology.
- As outlined in Section 6 above, the construction of the subterranean basement will not affect the integrity of the surrounding building stock, will not disturb underlying hydrogeology or overload the near-surface geology.
- The site is on level ground in any case but, notwithstanding this, the construction techniques and sequences proposed minimises the risk of instability, ground slip and movement.
- There are no critical utilities or infrastructure beneath the site that cannot be relocated easily to accommodate the construction and, as there is no change in use or level of occupancy proposed there will be no significant increase in foul discharge to the public sewer.
- The proposed construction will not be beneath the prevailing groundwater level. The basement can be constructed using relatively light techniques, in controlled and pre-determined sequences and without the need for a large open excavation before construction can start and consequent extensive temporary works. Where mechanical means are necessary to construct permanent works these can be of a type that generates low vibrations to which the surrounding buildings have a form and construction that is robust and resistant to.
- The excavation for, and construction of the basement will need to be completed without involving or disturbing the existing ground and upper floors and finishes throughout the building. Underpinning will commence from the middle of the party walls and will be cast in 1m-sections of mass concrete. The existing lower ground floor will, where possible, be left in place; where part or all is removed props will be installed between the party walls. Refer to sections 7, 8 and 9 above.
- The subterranean works have been positioned to avoid any impact to nearby trees.
- By adopting an underpinning technique and following a hit-&-miss sequence, as described in Section 7 it will be possible to construct the basement without extensive temporary works.
- Any temporary works will be designed by the Contractor to current British Standards.
- The surrounding roads are wide enough and without tight bends or corners that will hinder or prevent site traffic and will not cause site traffic to hinder or delay local and residential traffic



11 BASEMENT IMPACT ASSESSMENT & GROUND MOVEMENT ASSESSMENT

A Basement Impact Assessment has been carried out by GEA following the information and guidance published by the London Borough of Camden. Information from the site investigation has been used to assess potential impacts identified by the screening process. That assessment concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues. Refer to Section 11 of **GEA's Site Investigation Report, ref J16214**.

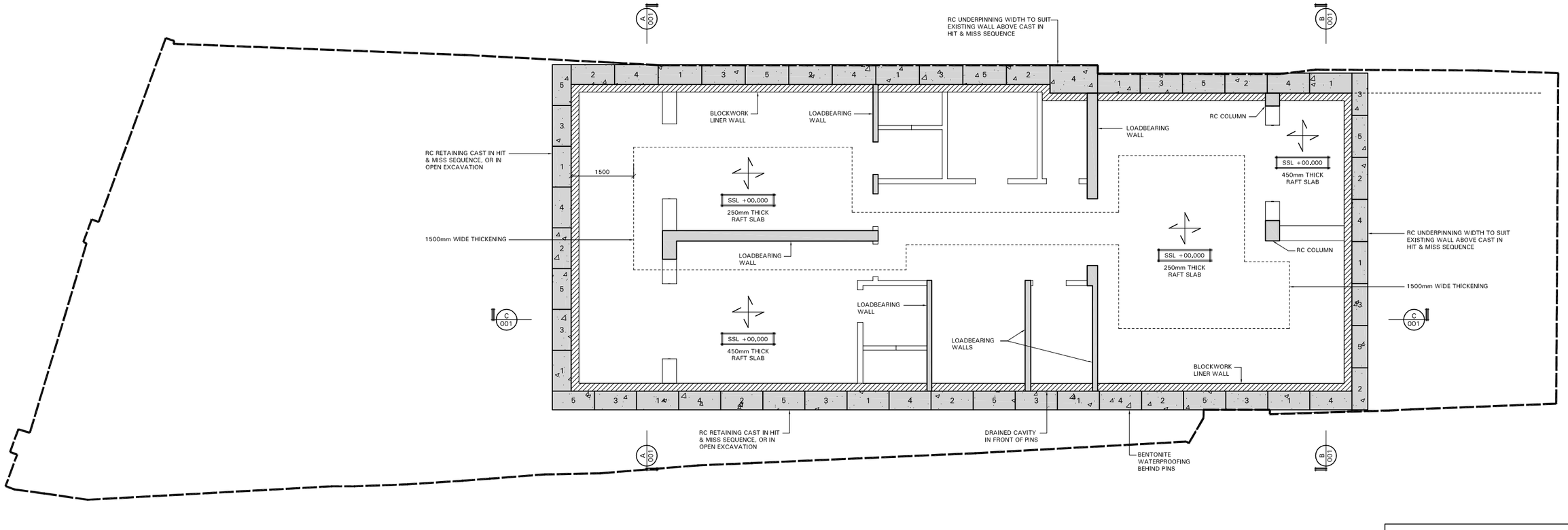
A ground movement analysis established that the likely damage to surrounding constructions as a result of the excavation for the basement and then of the basement construction's weight and occupancy will not lead to damage in surrounding walls (identified on the adjacent map) greater than Category 1 of The Burland Scale, i.e. *Very Slight*. Furthermore, the railway tunnel approximately 18m to the north of the property is unlikely to experience a small net decrease in pressure following the excavation of the new basement and there will be a net increase following the construction of the basement. However, the changes in stress and resulting predicted movements are effectively negligible and will not have any effect on the tunnel. Refer to Section 12 of **GEA's Site Investigation Report, ref J16214**.

Report Prepared By	Qualifications	Position	Signature	Date
Malcolm Brady	B.Eng C.Eng MIStructE	Principal		February 5th 2017

APPENDIX A SI BOREHOLE LOGS

APPENDIX B MBP DRAWING SET 7009

MICHAEL BARCLAY PARTNERSHIP



PROPOSED BASEMENT FLOOR PLAN
(SCALE 1:50)

LEGEND:

- NEW REINFORCED CONCRETE STRUCTURE
- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 — NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
- B1/L1 — NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
- EXISTING STRUCTURE TO BE DEMOLISHED
- C1 — COLUMN REFERENCE
- TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
- SPAN OF 200mm THICK RC SLAB
- RC LINK BRIDGE, SPAN OF 150mm THICK RC SLAB

ABBREVIATIONS:

SSL	-	STRUCTURAL SLAB LEVEL
FFL	-	FINISHED FLOOR LEVEL
TOF	-	TOP OF FLOOR
TOB	-	TOP OF BEAM
TOPC	-	TOP OF PILECAP
TOS	-	TOP OF STEEL
TOW	-	TOP OF WALL
TOJ	-	TOP OF JOIST
CB	-	COLUMN BELOW
HL	-	HIGH LEVEL

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.
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Rev	Date	Description	By
P1	22/12/09	PRELIMINARY ISSUE	JL

Job: 76 Fitzjohn's Avenue, London NW3

Drawing Status: PRELIMINARY

Title: PROPOSED BASEMENT FLOOR

Scale	Date	By	Checked
1:50	JAN 2017	JL	MB

Drawing Number: 7009 / 100

Revision: P1

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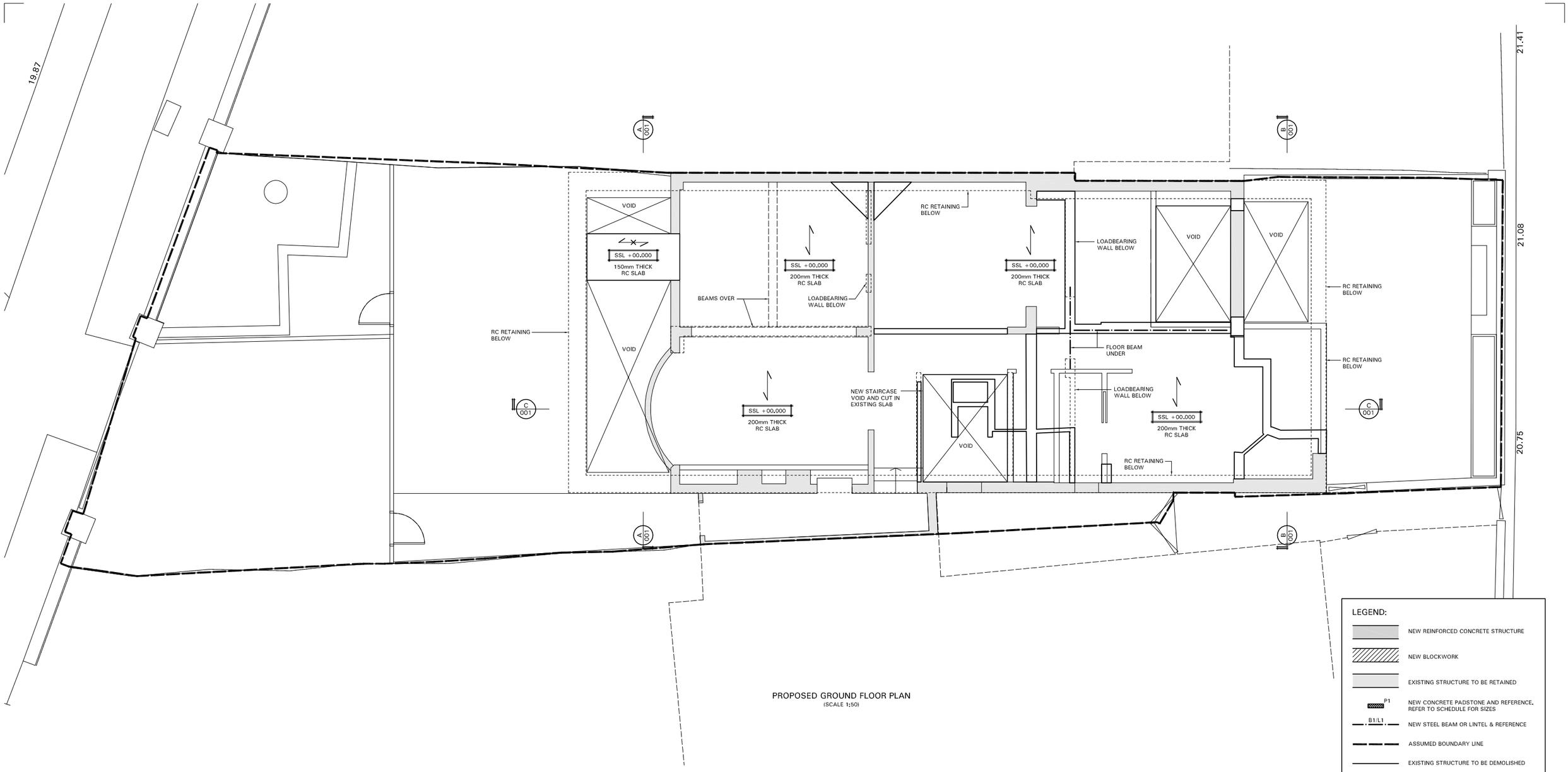

PROPOSED GROUND FLOOR PLAN
(SCALE 1:50)

LEGEND:

- NEW REINFORCED CONCRETE STRUCTURE
- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 — NEW CONCRETE PADSTONE AND REFERENCE, REFER TO SCHEDULE FOR SIZES
- B1/L1 — NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
- EXISTING STRUCTURE TO BE DEMOLISHED
- C1 — COLUMN REFERENCE
- TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
- SPAN OF 200mm THICK RC SLAB
- RC LINK BRIDGE, SPAN OF 150mm THICK RC SLAB

ABBREVIATIONS:

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TOF	-	TOP OF FLOOR
TOB	-	TOP OF BEAM
TOPC	-	TOP OF PILECAP
TOS	-	TOP OF STEEL
TOW	-	TOP OF WALL
TOJ	-	TOP OF JOIST
CB	-	COLUMN BELOW
HL	-	HIGH LEVEL

NOTES:

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Rev	Date	Description	By
P1	27/01/09	PRELIMINARY ISSUE	JJ

Job: 76 Fitzjohn's Avenue
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Drawing Status: PRELIMINARY

Title: PROPOSED GROUND FLOOR

Scale	Date	By	Checked
1:50	JAN 2017	JL	MB

Drawing Number: 7009 / 101

Revision: P1

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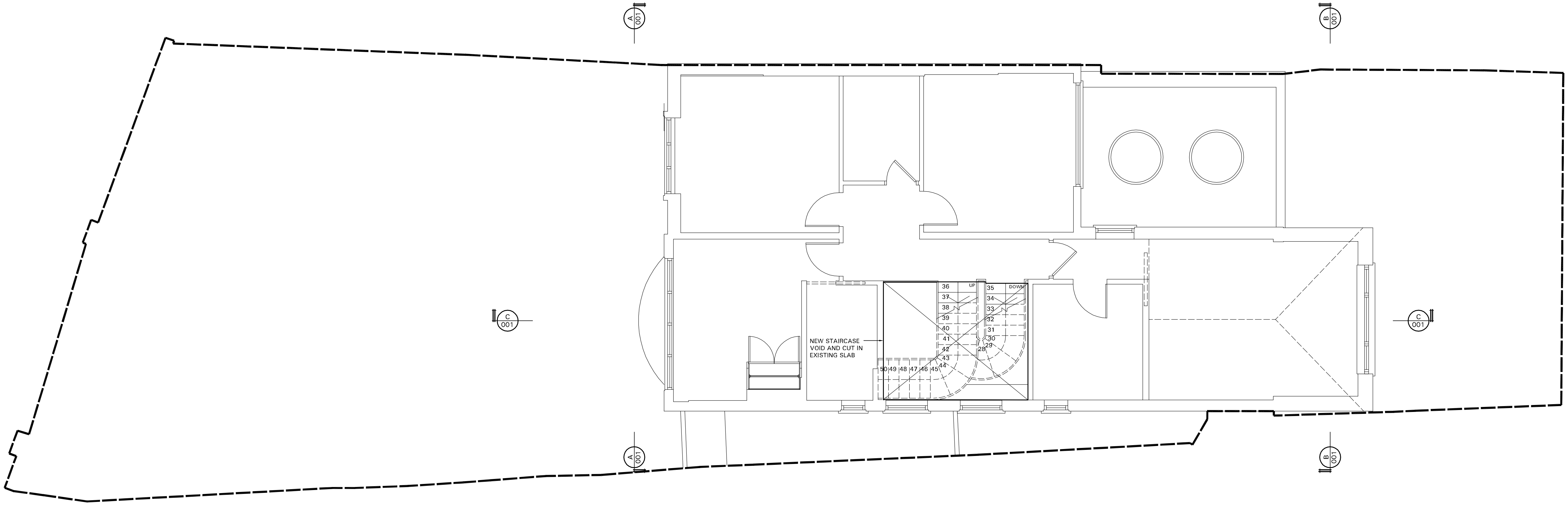

PROPOSED FIRST FLOOR PLAN
(SCALE 1:50)

LEGEND:

- NEW REINFORCED CONCRETE STRUCTURE
- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
- B1/L1 NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
- C1 COLUMN REFERENCE
- TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
- DORMER RAFTERS, SPAN OF 25x100 C24 RAFTERS @ 400 CRS.

ABBREVIATIONS:

SSL	-	STRUCTURAL SLAB LEVEL
FFL	-	FINISHED FLOOR LEVEL
TOF	-	TOP OF FLOOR
TOB	-	TOP OF BEAM
TOPC	-	TOP OF PILECAP
TOS	-	TOP OF STEEL
TOW	-	TOP OF WALL
TOJ	-	TOP OF JOIST
CB	-	COLUMN BELOW
HL	-	HIGH LEVEL

NOTES:

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F:\Projects\7000 - 7099\7009 - 76 Fitzjohn Avenue, London NW3 5LS\11 Drawings\11.3 MBP\AutoCAD\MBP-7009-102 Proposed First Floor.dwg USER: Jose Letras FILE SIZE = 0.21

Rev	Date	Description	By
P1	??/??/09	PRELIMINARY ISSUE	??

Job
76 Fitzjohn's Avenue
London NW3

Drawing Status
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Title
PROPOSED FIRST FLOOR

Scale	Date	By	Checked
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Drawing Number: 7009 / 102
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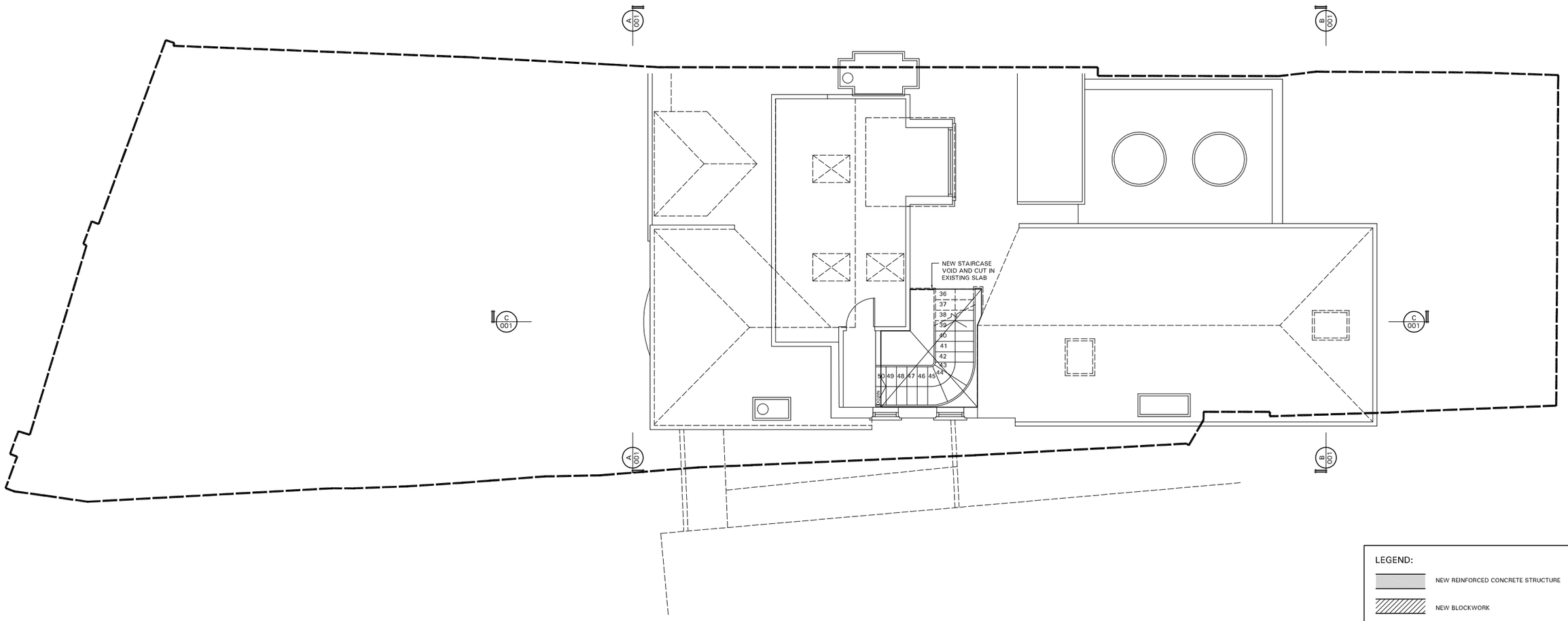

PROPOSED SECOND FLOOR PLAN
(SCALE 1:50)

LEGEND:

- NEW REINFORCED CONCRETE STRUCTURE
- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 — NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
- B1/L1 — NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
- C1 — COLUMN REFERENCE
- TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
- DORMER RAFTERS, SPAN OF 25x100 C24 RAFTERS @ 400 CRS.

ABBREVIATIONS:

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TOS	-	TOP OF STEEL
TOW	-	TOP OF WALL
TOJ	-	TOP OF JOIST
CB	-	COLUMN BELOW
HL	-	HIGH LEVEL

NOTES:

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Job: 76 Fitzjohn's Avenue, London NW3

Title: PROPOSED SECOND FLOOR

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Scale	Date	By	Checked
1:50	JAN 2017	JL	MB

Drawing Number: 7009 / 103

Revision: P1

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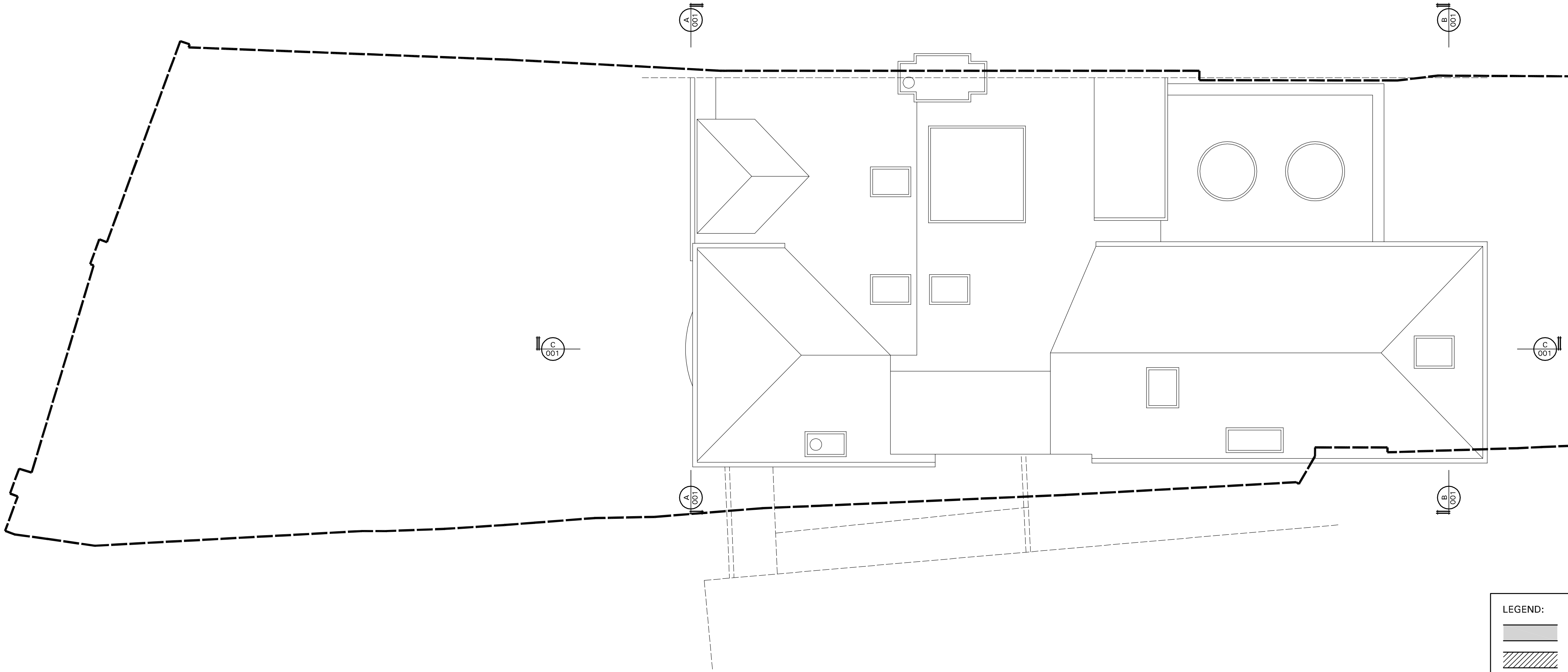

PROPOSED ROOF FLOOR PLAN
(SCALE 1:50)

LEGEND:

- NEW REINFORCED CONCRETE STRUCTURE
- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 — NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
- B1/L1 — NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
- C1 — COLUMN REFERENCE
- TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
- DORMER RAFTERS, SPAN OF 25x100 C24 RAFTERS @ 400 CRS.

ABBREVIATIONS:

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Title
PROPOSED ROOF FLOOR

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Drawing Number: 7009 / 104
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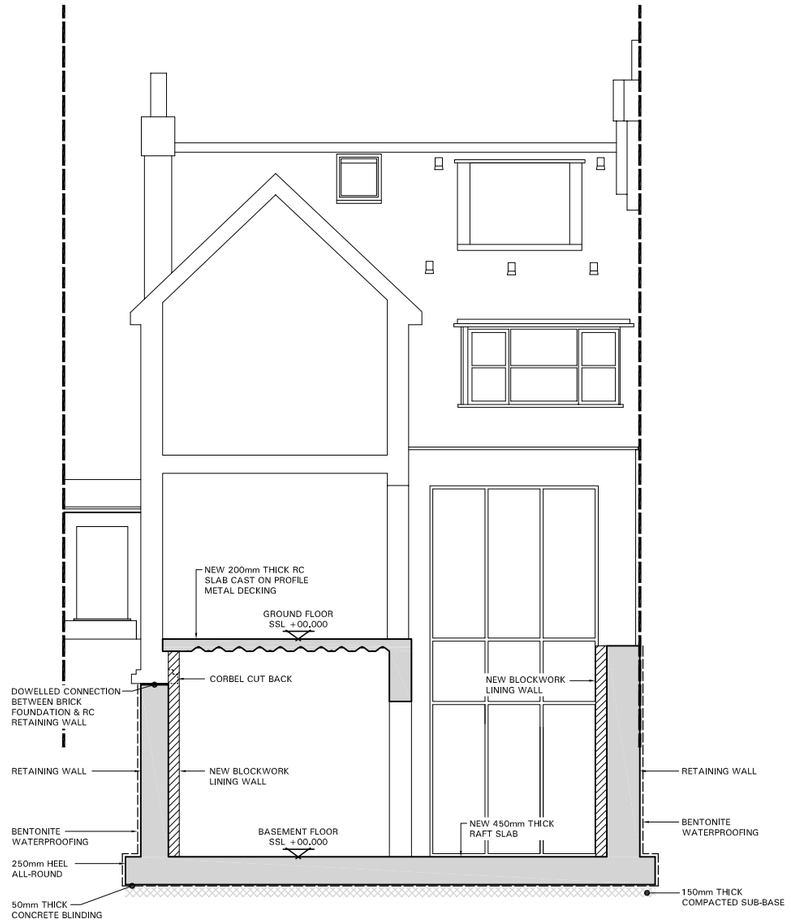
PROPOSED CROSS SECTION A-A
(SCALE 1:50)



PROPOSED CROSS SECTION B-B
(SCALE 1:50)

LEGEND:

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- NEW BLOCKWORK
- EXISTING STRUCTURE TO BE RETAINED
- P1 — NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
- B1/L1 — NEW STEEL BEAM OR LINTEL & REFERENCE
- ASSUMED BOUNDARY LINE
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Rev	Date	Description	By
P1	22.12.09	PRELIMINARY ISSUE	JL

Job: 76 Fitzjohn's Avenue, London NW3

Drawing Status: PRELIMINARY

Title: PROPOSED CROSS SECTIONS A-A & B-B

Scale	Date	By	Checked
1:50	JAN 2017	JL	MB

Drawing Number: 7009 / 110

Revision: P1

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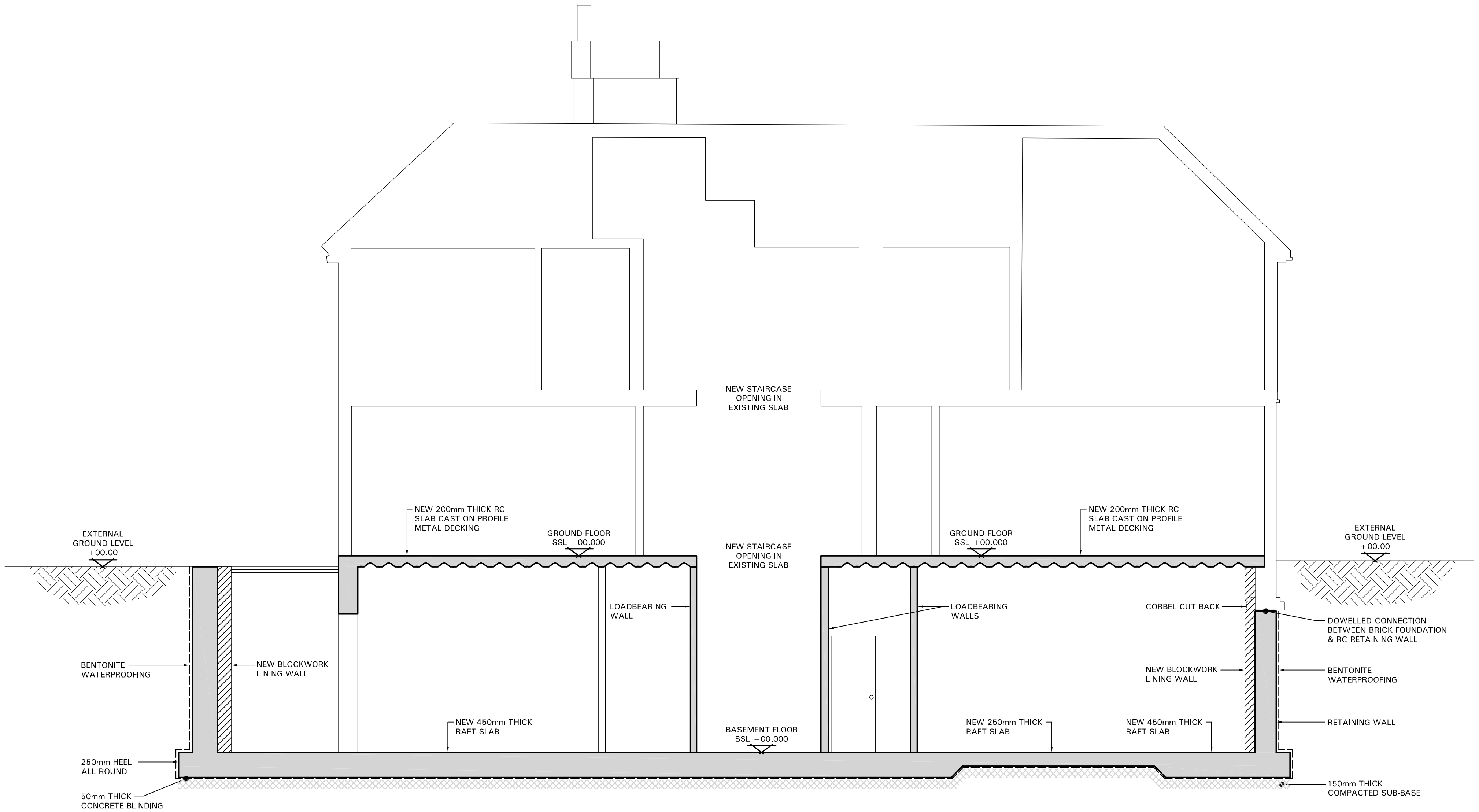

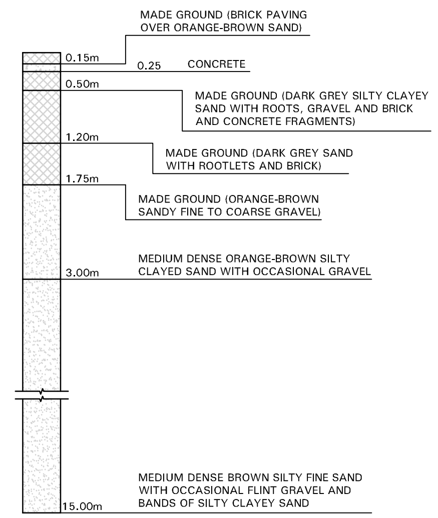

BOREHOLE INFORMATION TAKEN FROM GEA GROUND INVESTIGATION REPORT DATED 12/12/2016

PROPOSED CROSS SECTION C-C
(SCALE 1:50)

LEGEND:

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[hatch]	NEW BLOCKWORK
[light fill]	EXISTING STRUCTURE TO BE RETAINED
P1	NEW CONCRETE PADSTONE AND REFERENCE. REFER TO SCHEDULE FOR SIZES
B1/L1	NEW STEEL BEAM OR LINTEL & REFERENCE
— — —	ASSUMED BOUNDARY LINE
C1	COLUMN REFERENCE
[symbol]	TWO-WAY SPAN OF RC SLAB. REFER TO LAYOUT FOR DEPTH
[symbol]	DORMER RAFTERS, SPAN OF 25x100 C24 RAFTERS @ 400 CRS.

ABBREVIATIONS:

- SSL - STRUCTURAL SLAB LEVEL
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Job: 76 Fitzjohn's Avenue, London NW3

Title: PROPOSED CROSS SECTION C-C

Drawing Status: PRELIMINARY

Scale	Date	By	Checked
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