AXIOM
STRUCTURES

84A WEST END LANE
LONDON

STRUCTURAL ENGINEERS PLANNING REPORT AND BASEMENT IMPACT ASSESSMENT (SCREENING)

INDEX

Prepared by	Issued
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1.0 INTRODUCTION

1.1 Axiom Structures Limited have been asked to consider structural issues in relation to the proposed under-croft lowering and refurbishment works to the property. This document is in support of the planning application to be made shortly.

1.2 The proposed subterranean development comprises lowering of the rear part of the lower ground floor in line with SMD Architects proposals. The works are part of the refurbishment an and construction of a rear extension to the above property.

1.3 A walk over and desk studies have been carried out in June 2015 and findings are enclosed to this reports.

1.4 The existing superstructure has been reviewed by Axiom Structures to assist structural designs for the alteration works.

1.5 This basement impact assessment was prepared for planning purposes for and on behalf of the Client. It is for their use and the use of their professional advisors only and should not be relied upon by others. The scope of work is defined on SMD Architects' planning drawings.

1.6 In preparing this BIA reference has been made to the following London Borough of Camden documents:

- Camden Local Development Framework (LDF) Policy DP27
- Camden Planning Guidance – Basement and Lightwells CPG4
- Camden Geological, Hydrogeological Study – Guidance for Subterranean Development' prepared by ARUP

1.7 Various stages of the BIA have been undertaken by fully qualified structural engineers:
Axiom Structures Limited – Andrzej Plocieniak MSc CEng MIStructE

2.0 EXISTING CONSTRUCTION AND ADJOINING BUILDINGS

2.1 The existing property is a two-bedroom flat in a converted Victorian detached property. The building is located in West End Lane close to the junction with West Hampstead Mews. The building has been divided to separate flats and is being used as private residential properties. The site is not listed but lies within the South-Hampstead Conservation Area (CA).

2.2 The ground is generally flat in the area with slightly raised by a few steps front of the building in relation to the rear garden.

2.3 The building is traditionally construction and comprises masonry external walls and timber floors generally. We envisage that most of the floor joists and internal studs are thought to be original. There were some modification to the existing structure to open up the rear area but they are not recent.

2.4 There is an existing conservatory raised up the under-croft that is proposed for lowering.

3.0 GROUND CONDITIONS AND EXISTING FOUNDATIONS

3.1 Following desk study of Geological Maps for the above site there is London Clay formation.

3.2 A shallow trial pit investigations are to be commissioned to ascertain the depth of existing footings however, we do not expect unusual construction based on information from adjacent sites.

3.3 The ground water was not recorded in the trial pit and shallow window samples to adjacent sites.

4.0 DETAILS OF PROPOSED DEVELOPMENT AND COMMENTS

4.1 **Introduction:** The proposed underground works comprise the lowering of the rear under-croft located under the conservatory area and to provide improved headroom. Underpinning to the existing foundation is to be carried out in short sections in hit and miss sequence as detailed in the enclosed drawings within Appendix B

4.2 **Soil-structure interaction:** The underpinning works to the existing foundations will provide robust foundations on a denser natural soil than original. New structure will be supported on new foundations however in similar manner to existing footings. Preliminary estimates suggest that the weight of the lowered basement will be less than the weight the soil removed. The stiff reinforced concrete box structure, designed with some propped walls, would limit the horizontal movement and consequent impact to the adjacent structures during construction and its life.

4.3 **Grade of Basement - Water Resistance / Proofing:** Reinforced concrete basement structure with sealed joints would provide barrier against moisture and water ingress. Secondary drain cavity system is proposed as belt and braces measure in case any nominal leak in the concrete joint would happen.

4.4 **Retaining Walls:** The permanent structural works will involve the construction of relatively short reinforced concrete walls in short sections. New reinforced concrete walls will be monolithically connected to the new reinforced concrete basement slab to provide robust and watertight construction. The walls could be formed as the underpinning structure subject to Party Wall agreements. The underpinning will be constructed in a hit and miss sequence to minimise ground movements. The new basement is a naturally rigid structure and will be designed to accommodate the horizontal ground forces imposed via the underpins to the perimeter, potential for upwards and lateral water pressures as well as the vertical loads from above.

4.5 **Proposed Structure in relation to NHBC Standards 4.2 - Building Near Trees:** The proposed works will be approximately 1.6m deep below ground level at the rear of the site. There are no trees in the vicinity that would be impacted by the proposed works or impact on the proposed works.

4.6 **Groundwater:** Significant groundwater is not expected to be encountered during excavation of the new basement as the proposed formation level is within London clays. Any perched water will be dealt with by local water pumps.

5.0 DESIGN CRITERIA

5.1 Code of Practise:

Structural use of Concrete BS 8110-1:1997
Structural use of Concrete BS 8110-3:1985
Code of practice for foundations BS 8004
Structural use of Steel BS 5950-1:2000
Structural use of Timber BS 5628-2:2002
Structural Use of Masonry BS 5628-1:2005
Loading for Buildings BS 6399: Part 1:1996, Part 2:1997

5.2 Loading – Imposed loadings to BS 6399;

Domestic areas (internal)= 1.5 kN/m2
External areas (footpath)= 3.0 kN/m2
Garden / Roof (flat with access) = 2.5 kN/m2

6.0 TEMPORARY WORKS

6.1 **Temporary Works**; The contractor will be responsible for the design, erection and maintenance of all temporary works in accordance with all relevant British Standards. The contractor is to provide adequate temporary works and supervision to ensure that the stability of the existing structure, excavations and surrounding structures are maintained at all times. The proposed works are nominal and will generally require only nominal amount of propping, refer to enclosed drawings for proposed location subject to contractors proposals.

6.2 **Monitoring;** The scale of this development and nominal interface with adjacent structures would not make monitoring appropriate.

6.3 **Submissions**; The contractor will be contracturally required to submit full works programme, temporary works designs, method statements and calculations to the engineer and all other interested parties (such as party wall surveyors) for approval prior to the start of any works on site. The contractor will also be required to appoint a Temporary Works Co-ordinator for the duration of the contract in accordance with the specification and British Standard for demolition and temporary works – BS 5975

7.0 METHOD STATEMENT / SEQUENCE OF WORKS

Outline construction sequence and temporary works assumed in the design as described below and on drawings 15089-GA 100 will be superseded by the contractor's proposals.

7.1 The existing rear garden paving is to be removed and area cleared for ground-works. Check exact depth of existing footings at the rear.

7.2 The retaining wall sections are to be constructed in an underpinning sequence along the boundaries and towards the front. The underpinning is to be carried out in maximum lengths 1.0-1.2m. Create foundation bases and tie them together so sliding due to lateral loadings is resisted by passive pressure of opposite RC walls. The underpins are to be backfilled with compacted arisings or back-propped on completion to contractors choice.

7.3 On completion of the underpinning, reduce level dig to formation level. Consider temporary cross props as noted GA-100 as excavation progresses. Blind the ground and cast basement slab.

8.0 BIA (BASEMENT IMPACT ASSESSMENT) STAGE 1 - SCREENING

8.1 The first stage of the BIA is the identification of any matters of concern which should be investigated. Screening is a process of determining whether or not a full BIA is required.

8.2 The screening process has been undertaken as outlined in the Camden Planning Guidance – Basement and Lightwells CPG4

8.3 Refer to Appendix A for screening flow charts based on Camden Planning Guidance – Basement and Lightwells CPG4 covering three main issues:

- Groundwater flow
- Land stability
- Surface flow and flooding

8.4 The screening flow charts have identified no areas that need to be investigated further during the scoping of the BIA.

8.5 Slope stability screening Q5: *Is the London Clay the shallowest strata at the site?*

The screening identified that Clays are the shallowest strata. Proposed works will not adversely affect the existing house as the new foundations are to be extended to stronger soil than existing and well away from influence of trees.

9.0 CONCLUSION

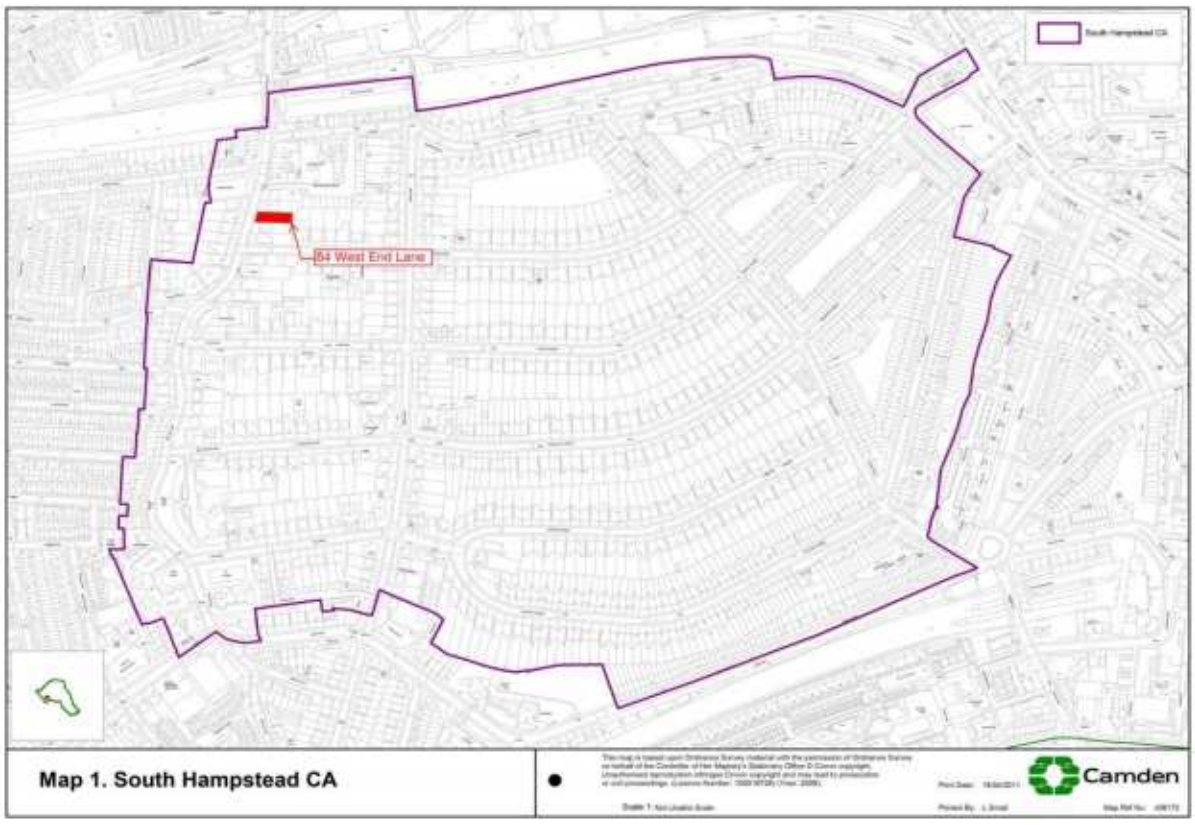
9.1 The screening study demonstrated that a full BIA is not required.

9.2 The proposed subterranean works are minor and comprise the lowering of existing vaults. The proposals will not be detriment to the local ground floor regime, slope stability and surface water regime.

APPENDIX B

LOCATION PLAN, PROPOSED PLANS AND SECTIONS

Site Plan and Ground Conditions



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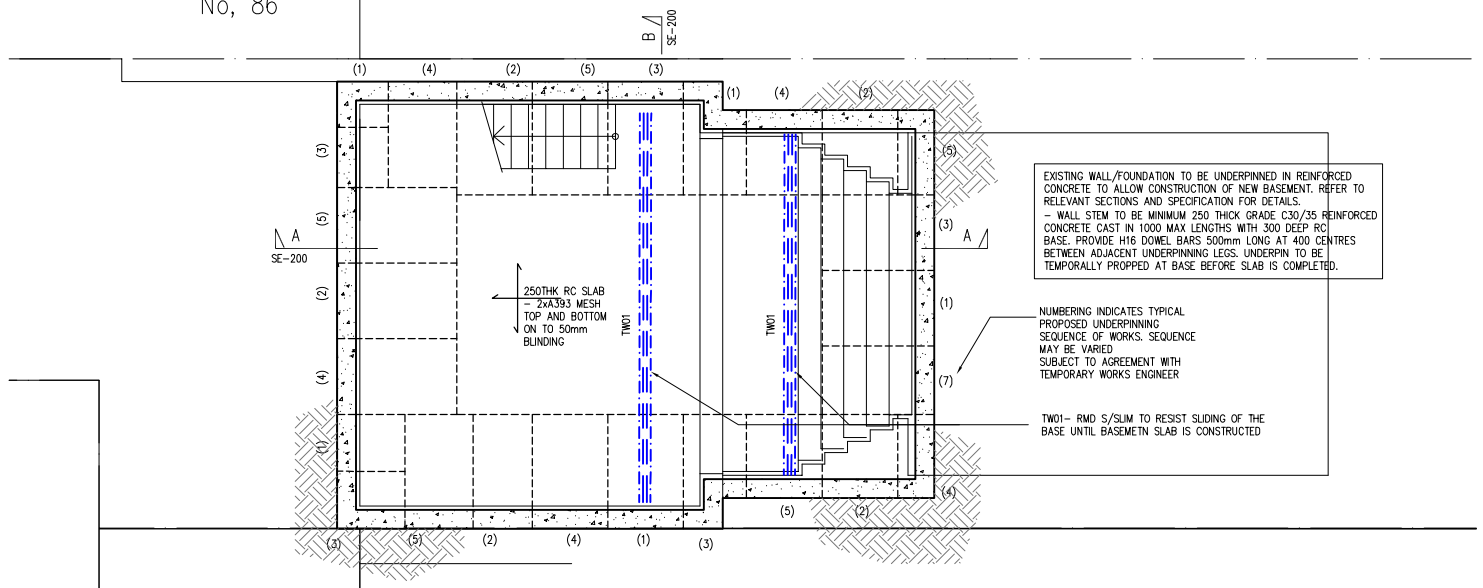
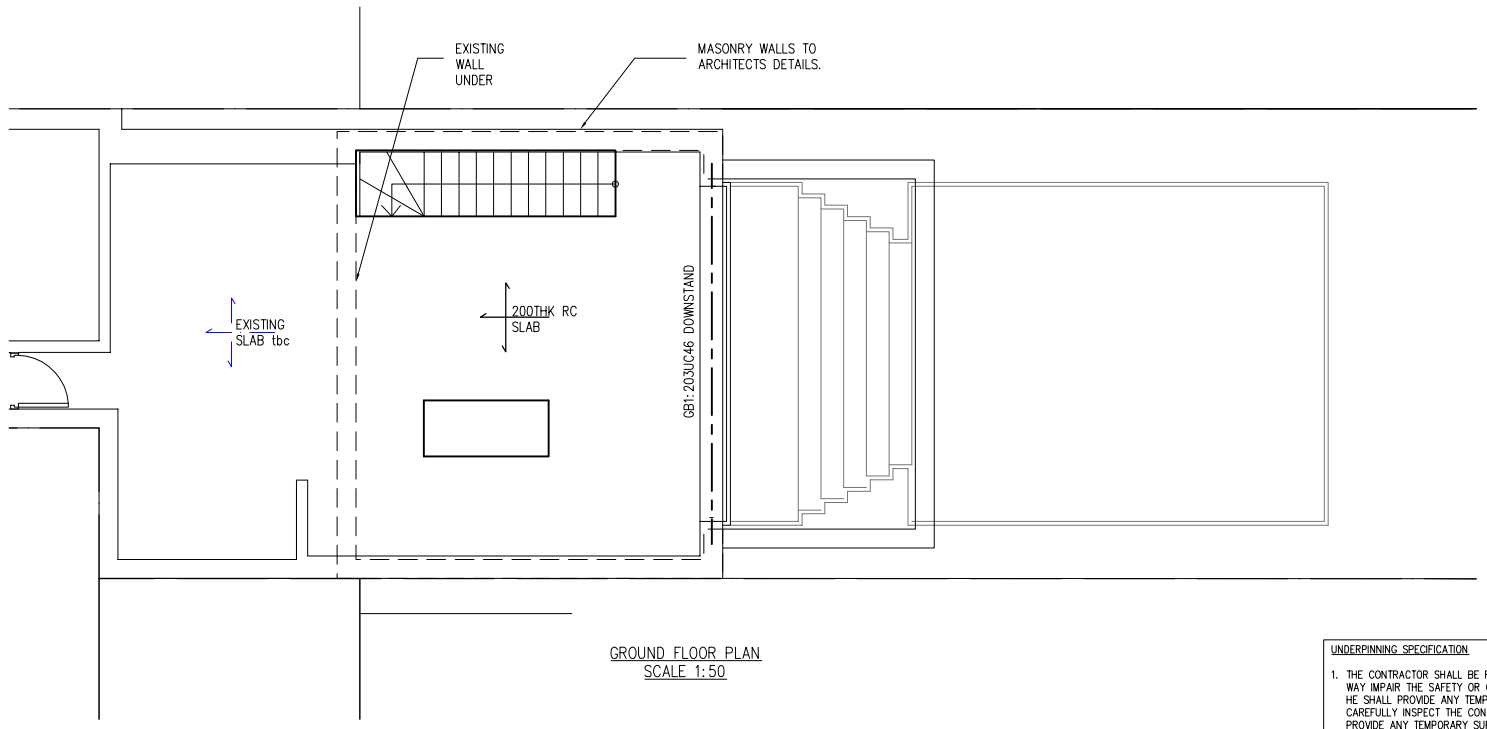


LOWER GROUND FLOOR PLAN
SCALE 1:50

Flat 84B



GROUND FLOOR PLAN
SCALE 1:50

UNDERPINNING SPECIFICATION

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT HIS OPERATIONS DO NOT IN ANY WAY IMPAIR THE SAFETY OR CONDITION OF THE EXISTING STRUCTURE OR THE ADJACENT PROPERTIES. HE SHALL PROVIDE ANY TEMPORARY SUPPORTS REQUIRED FOR THIS PURPOSE, AND SHALL CAREFULLY INSPECT THE CONDITION OF THE STRUCTURE OR THE ADJACENT PROPERTIES. HE SHALL PROVIDE ANY TEMPORARY SUPPORTS REQUIRED FOR THIS PURPOSE, AND SHALL CAREFULLY INSPECT THE CONDITION OF THE STRUCTURE BOTH BEFORE AND DURING THE EXECUTION OF THE WORK AND IMMEDIATELY INFORM THE ENGINEER IF HE CONSIDERS THAT ANY MORE STRINGENT PROCEDURE THAN THAT SPECIFIED IS NECESSARY.
2. UNDERPINNING IS TO BE CARRIED OUT IN SHORT SECTIONS NOT EXCEEDING 1000mm LENGTHS AS SPECIFIED ABOVE, IN A SEQUENCE TO BE APPROVED BY THE CONTRACT ADMINISTRATOR.
3. THE UNDERSIDE OF THE FOOTINGS ARE TO BE CLEANED AND HACKED FREE OF ANY DIRT, SOIL OR LOOSE MATERIAL BEFORE UNDERPINNING.
4. THE BODY OF THE UNDERPINNING IS TO BE CONSTRUCTED IN CONCRETE GRADE RC30/35 (READY MIX). SULPHATE RESISTING USING 20mm MAX AGGREGATE, AND IS TO BE CAST TO THE WIDTHS AND DEPTHS SHOWN ON THE DRAWINGS. AS FAR AS PRACTICABLE EXCAVATION AND CONCRETING OF ANY SECTION OF UNDERPINNING SHALL BE CARRIED OUT ON THE SAME DAY. UNCONCRETED SECTIONS SHALL BE KEPT COVERED TO PREVENT THE INGRESS OF WATER.
5. THE MASS CONCRETE IS TO BE STOPPED OFF APPROXIMATELY 75MM BELOW THE UNDERSIDE OF THE EXISTING FOOTING, AND THE FINAL PINNING UP OVER THE WHOLE EXTENT OF THE LATTER IS TO BE CARRIED OUT WITH A SEMI-DRY SAND CEMENT PACKING, WELL RAMMED IN AS SOON AS POSSIBLE AFTER THE FOUNDATION HAS SET HARD. THE PINNING-UP CONCRETE IS TO CONSIST OF 1 PART BY VOLUME OF SULPHATE RESISTANT CEMENT TO 3 PARTS OF SHARP SAND (WELL GRADED FROM 10MM MAXIMUM SIZE DOWN TO FINE SAND) WITH A WATER/CEMENT RATIO BY WEIGHT OF 0.35. EXPANDING ADMIXTURE SUCH AS CEBEX 100 BY FOSROC IS TO BE USED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION.
6. EXCAVATION TO ANY SECTION OF UNDERPINNING SHALL NOT BE COMMENCED UNTIL AT LEAST 48 HOURS AFTER COMPLETION OF ANY ADJACENT SECTION OF THE WORK.
7. THE JOINT BETWEEN ADJACENT SECTIONS OF UNDERPINNING IS TO BE FORMED BY CREATING A ROUGH SURFACE AGAINST WHICH THE FIRST SECTION IS CAST INCORPORATING SHEAR KEYS ("JOGGLE JOINTS"). THEN, HAVING THOROUGHLY CLEANED THE EXPOSED CONCRETE FACE, THE ADJACENT SECTION MAY BE CAST. INSERT HYDROPHILIC STRIP AT ALL CONSTRUCTION JOINTS
8. THE CONTRACTOR SHALL PREPARE A SEQUENCE OF WORK AND SUBMIT IT TO THE ENGINEER FOR HIS COMMENTS PRIOR TO THE COMMENCEMENT OF THE WORK.

IF IN DOUBT PLEASE ASK

1. DO NOT SCALE THIS DRAWING. ANY DISCREPANCY IS TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECTS OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
3. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
4. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
5. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
6. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.
7. REFER TO SPECIFICATIONS FOR FURTHER NOTES

GENERAL KEY :

- EXISTING MASONRY WALLS
- NEW MASONRY WALLS
- DEMOLITION
- STRUCTURAL WALLS UNDER
- MASS CONCRETE FOUNDATIONS FND2 CONCRETE.
- NEW REINFORCED CONCRETE READY-MIX RC30/35
- EX. SPAN OF EXISTING FLOOR
- SPAN OF NEW TIMBER/ CONCRETE SEE NOTES
- NEW STEEL BEAMS
- NEW TIMBER BEAMS
- TIMBER STUD PARTITIONS UNLESS NOTED OTHERWISE, DOUBLE UP JOISTS / PROVIDE SOLID NOGGINS UNDER
- (SH) 12THK PLY SHEATHING FIXED WITH MIN.40IA SCREWS AT 150 PERIMETER/300 INTERNALLY
- LRS1 RESTRAINT STRAPS AS PER SPEC AND DETAILS
- (S) SOLID MASONRY INFILLS TO MATCH EXISTING, TOOTHED IN TO THE EXISTING WALL AND DRY PACK OVER.

READ IN CONJUNCTION WITH SPECIFICATION NOTES DRAWING GN-001

THIS DRAWING HAS BEEN PREPARED TO ASSIST PLANNING APPLICATION AND SHOULD NOT BE READ AS FOR CONSTRUCTION.

Rev	Date	Amendment
B1	24/06/2015	ISSUED FOR PLANNING

AXIOM STRUCTURES LIMITED
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SITE
84A WEST END LANE
LONDON NW6 2LX

DRAWING TITLE
PROPOSED PLANS

DATE	SCALE
JUNE '15	1:50 AT A1 1:100 AT A3
DRAWN: KL / AP	DRAWING STATUS: PLANNING
DRAWING No.: 15089/GA/100	REV: P1

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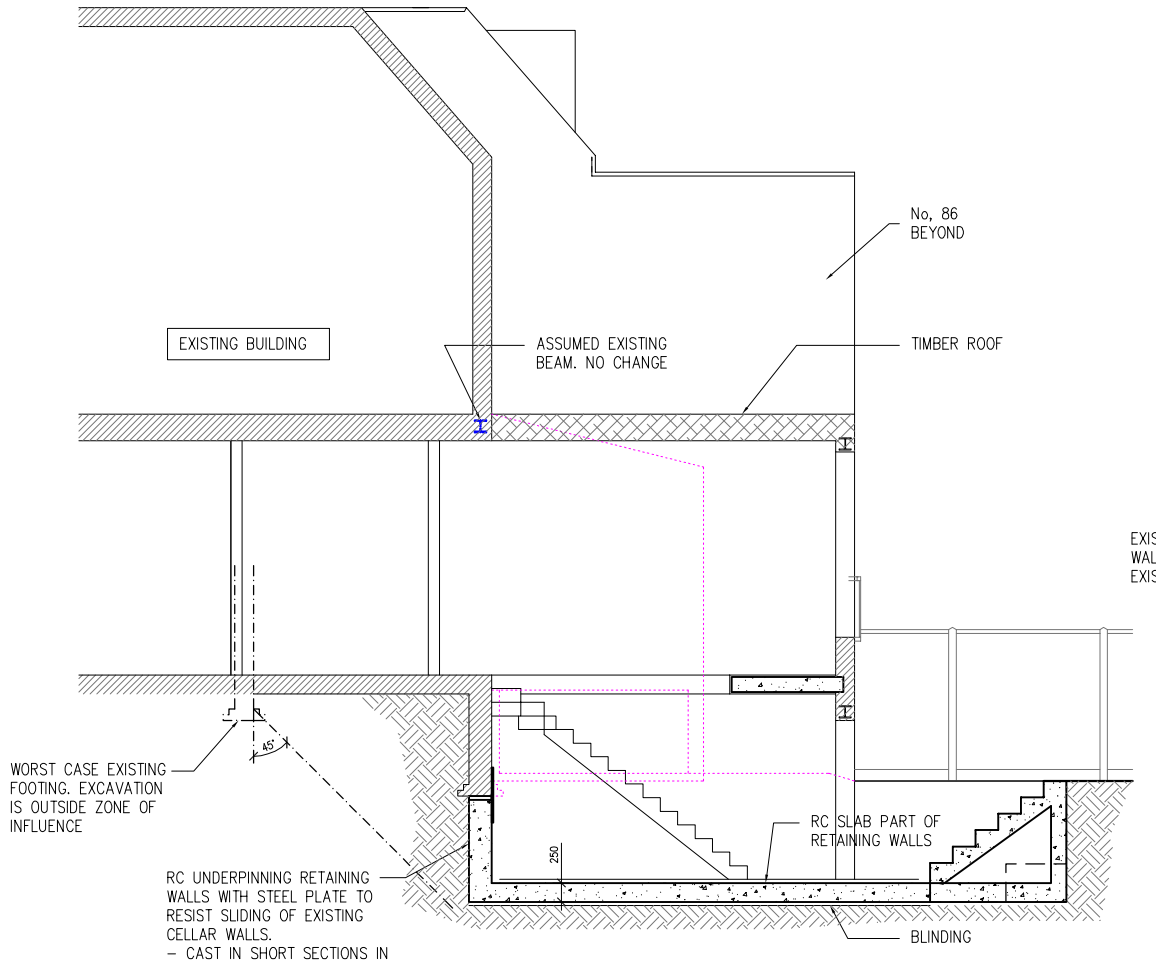

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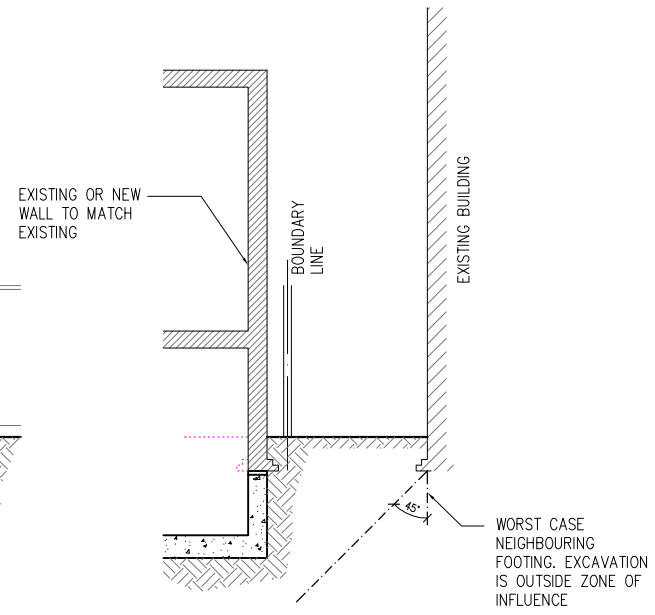
SCALE 1:50



SECTION B–B
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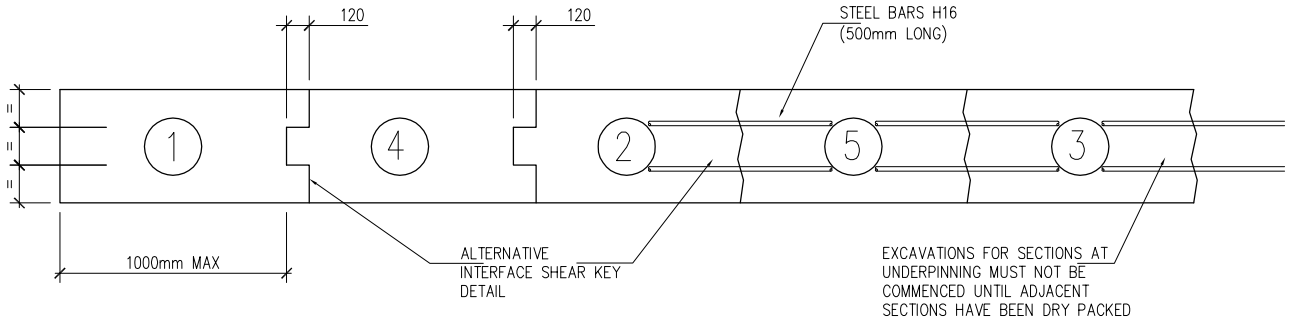

TYPICAL CONCRETE UNDERPINNING PLAN DETAIL

IF IN DOUBT PLEASE ASK

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JUNE '15	1:50 AT A1 1:100 AT A3
DRAWN: KL / AP	DRAWING STATUS: PLANNING
DRAWING No.: 15089/SE/200	REV: P1

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APPENDIX A

BIA (BASEMENT IMPACT ASSESSMENT) SCREENING FLOWCHARTS FOR DEVELOPERS

A1. SURFACE FLOW AND FLOODING SCREENING FLOWCHART

	Question	Answer	Notes
Q1	Is the site within the catchment of the pond chains on Hampstead Heath?	NO	[1] - Figure 14 shows that the site does not sit within the catchment areas of the pond chains on Hampstead Heath
Q2	As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	NO	The lowering does not affect the surface water drainage.
Q3	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	NO	The new extension is to replace existing paved area and hence no change to the capping structure is envisaged.
Q4	Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?	NO	The lowering of lower ground floor does not affect the surface water drainage.
Q5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	NO	The lowering of lower ground floor does not affect the surface water drainage.
Q6	Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	NO	The site is not within flood risk zone or close to any referenced watercourses. No flood risk assessment is required. [2]

References:

[1] Camden Geological, Hydrogeological and Hydrological Study – 'Hampstead Heath Surface Water Catchments and Drainage'

[2] Camden Geological, Hydrogeological Study – Guidance for Subterranean Development' prepared by ARUP – maps – Figure 15

A2. SUBTERRANEAN (GROUNDWATER) FLOW SCREENING FLOWCHART

	Question	Answer	Notes
Q1a	Is the site located directly above an aquifer?	NO	[2], [3] The site is within London Clay and is not considered to be an aquifer.
Q1b	Will the proposed basement extend beneath the water table surface?	NO	The footings will sit within London Clay and there is no specific water table.
Q2	Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	NO	[4] shows that the site is not within 100m from watercourse, well or springs.
Q3	Is the site within the catchment of the pond chains on Hampstead Heath?	NO	Refer to A1 Q1
Q4	Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	NO	There is no change to the surface of pavement or ceiling of hard landscaping
Q5	As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	NO	NO change to surface water drainage is required due to proposed works
Q6	Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line.	NO	The excavation is within London Clay and well away from watercourses etc Refer to A2 Q1&Q2 for further comment.

References:

[1] Camden Geological, Hydrogeological and Hydrological Study – 'Hampstead Heath Surface Water Catchments and Drainage'

[2] Camden Geological, Hydrogeological Study – Guidance for Subterranean Development' prepared by ARUP - maps

[3] British Geological Survey maps

[4] Lost Rivers of London, [2] - figure 11 and historic source data on this subject

A3. SLOPE STABILITY SCREENING FLOWCHART

	Question	Answer	Notes
Q1	Does the existing site include slopes, natural or manmade, greater than 7o? (approximately 1 in 8)	NO	[2] Figure 16 and a site walkover confirm that the site does not slope greater than 7degree.
Q2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7o? (approximately 1 in 8)	NO	The landscaping is not proposed for alteration.
Q3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7o? (approximately 1 in 8)	NO	[2] Figure 16 and a site walkover confirm that the neighbouring sites do not slope greater than 7degree.
Q4	Is the site within a wider hillside setting in which the general slope is greater than 7o? (approximately 1 in 8)	NO	As per Q1-Q3
Q5	Is the London Clay the shallowest strata at the site?	**YES**	Proposed footings are deep and there are no trees in close proximity to impact the foundations.
Q6	Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?	NO	Works do not affect trees.
Q7	Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	NO	Following walkover the property, we have not noticed signs of a seasonal shrink-swell subsidence in the property.
Q8	Is the site within 100m of a watercourse or a potential spring line?	NO	[2] figure 11 shows that there is no watercourse or a sprig line within 100m
Q9	Is the site within an area of previously worked ground?	NO	[3] and other record information does not indicate any worked ground within the proposed development.
Q10	Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	NO	The site is within London Clay, refer to A2 Q1a
Table Continue Next Page			

	Question	Answer	Notes
Q11	Is the site within 50m of the Hampstead Heath ponds?	NO	The site is well away from the Hampstead Heath as per figure 12 [2]
Q12	Is the site within 5m of a highway or pedestrian right of way?	NO	Excavation is well away from the road
Q13	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	NO	Lowering of the under-croft will be to about 1.6m below formation level and deep footings to be formed in transitioning sequence..
Q14	Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	NO	From OS maps there are anticipated Network Rail or Underground tunnels.

References:

[1] Camden Geological, Hydrogeological and Hydrological Study – 'Hampstead Heath Surface Water Catchments and Drainage'

[2] Camden Geological, Hydrogeological Study – Guidance for Subterranean Development' prepared by ARUP - maps