sylvan resources

Professional Forestry and Environmental Consultancy

Tree Health & Safety Report

The Tree House, Camden

Client: William Samuel & Vivienne Wordley

June 2023

Contents

1 Introduction

1.1 Instructions

1.1.1 I am instructed by Mr William Samuel of The Tree House, Camden Mews, Camden, London NW1 9BY:

a) to survey a tree within a courtyard of the Tree House; and

b) to report upon the health and safety of the tree and to make recommendations for its future management.

1.2 Surveyor

1.2.1 The tree was surveyed by Jonathan C Terry, MSc, MICFoR, MRICS, CEnv, MArborA, MEWI, MAE.

1.2.2 The specification for the work proposed in this report is at **Appendix 1**.

2 Report

2.1 The Tree House

2.1.1 The Tree House is an early 1980s property built around a mature Ailanthus tree. The building is located within a terrace of buildings dating from around the same time although Camden Mews itself dates from around the 1860s-1880s.

2.1.2 The tree is situated within a central courtyard accessed from the building's ground and first floors. A steel staircase rises from the ground floor to a roof terrace. It is accessed from the first floor via a sliding glass door. Most of the building's structure around the courtyard is glazed to allow light to enter the building. The glazing also provides interesting perspectives of the tree from neighbouring rooms. The design of the building embraces the tree and makes it an integral living part of the building.

2.1.3 Most of the well through which the tree grows is glazed over to form a roof with an opening through which the tree reaches skyward. This glazing is below the height of the building's roof level. Its height has been dictated by the tree's three scaffold limbs which emerge from its stem at a point below the building's roof line. Viewed from the roof terrace, the tree's scaffold limbs appear to emerge from inside the building. They extend approximately six metres above the building's roof terrace and provide shade and privacy to its users. Scaffold limbs are the major branches which emerge from the trunk of a tree. They support the tree's canopy.

2.1.4 The appended photographs indicate the relationship between the tree and the building (**Appendix 2**).

2.1.5 I have no information about the construction of the building's floors and foundations and am unable to rule out the possibility that the tree's rooting environment is very constrained.

2.2 The tree

2.2.1 The tree is a mature Ailanthus. This species is noted for its resilience and drought tolerance. Both features make it ideally suited to its present environment.

2.2.2 Ailanthus readily sucker as evidenced by the presence of basal suckers in the courtyard.

2.2.3 Because of their invasive nature and aggressive growth, the species is classified as a noxious weed.

2.2.4 Many trees of this species occur within this part of Camden. It is likely that most will be the progeny of earlier trees planted there.

2.2.5 Ailanthus are typically short-lived; lifespans of 30-50 years are quoted. Trees are also referred to as living for 100 years. Given the tree's likely restricted rooting environment it is possible that it will not be as long lived as might otherwise be expected.

2.2.6 The tree was recently found to be resting on part of the roof and the top of the north-east wall of the well in which it is growing. The tree has caused some structural damage to the building at this point. The building's owners thought the damage might be occurring because of dry weather and the tree's root plate being unable to withstand the forces exerted upon it. During my inspection, I could find nothing to indicate movement in its root plate.

2.2.7 The damage to the building results from one of the tree's scaffold limbs resting on and pressing into the building's fabric. The branch is shown in the images at **Appendix 2, 2.1 and 2.2**.

2.2.8 Although not visible in these images, axillary growth occurs within the fork formed by the junction of the scaffold limb with the tree's trunk (**Appendix 2, 2.3**). This growth presents as a lump rather like a blister. It is a reaction to the mechanical load at this junction. It is additional wood which the tree has laid down in order to try to overcome the leverage which the scaffold limb is imposing on its junction with the trunk. At this point, the branch union and its axillary growth are unable to overcome the load imposed upon them. As a result, the branch has dropped and come to rest upon the building's structure. It is possible that the axillary growth has caused or contributed to the branch dropping by acting like a wedge being driven into the union between the tree's stem and the limb.

2.2.9 In the building's absence, the branch union might have failed completely and the limb broken off from the tree. Further damage might be avoided by removing the limb, but this would leave a large wound vulnerable to pathogens. The tree's response to the limb's removal would likely be the emergence of numerous adventitious shoots from the area near to the wound. These would likely result in future maintenance issues.

2.2.10 Although the tree was defoliated at the time of inspection, I could see no signs of physiological stress. Apart from the structural

weakness in the failing branch union I have described, there is nothing to indicate the tree is in decline.

2.3 Supporting the tree's failing limb and bracing its overall structure

2.3.1 The weak limb may be managed by propping or by bracing it to other limbs and by pruning its canopy to reduce the load it imposes on the weakened branch union. A combination of both methods is recommended because of the location of the weak limb and the constrictions imposed by the building's enclosure of the tree.

2.3.2 Normally, weak limbs are braced by rigging them to other more stable limbs. Cables and rods are conventionally used for bracing. These require invasive anchor points to enable them to be fitted to the tree. Such anchor points include feeding rods through holes bored through branches and fixing them in place with bolts or screw plates. Recent developments in bracing techniques enable weak limbs to be braced by roping them to other stronger limbs. Roping systems do not require invasive anchors.

2.3.3 Rigging with ropes allows a weakened limb to move and to be supported. This form of bracing is more dynamic in that it allows movement in the tree's canopy. In this way, the tree can react to the stresses it is exposed to by continuing to adapt its pattern of growth. Rope rigging systems include indicators which alert tree owners to loads the trees are unable to resist. If this occurs, the system must be replaced. A disadvantage of these systems is their life span. For example, the Cobra system has a lifespan of 12 years.

2.3.4 The location of the failed limb and the shape of the tree's canopy are likely to make it difficult to rig the limb to another more secure one. It is likely that ropes will need to be fixed above the weakened union and then either fixed to another limb at a higher point or one close to the anchor point of the weakened limb. An

alternative might be to rig the weakened limb to steel work which rises into the tree's canopy.

2.3.5 Mr Christopher Grey of Concept Consultancy has designed a steel structure whose purpose is to support the tree and its weakened limb. His proposed structure, together with the location of proposed piles, is shown on the drawings in **Appendix 3**.

2.3.6 The steel structure comprises posts anchored to helical screw piles inserted into the ground close to the tree's base. To mitigate damage to the tree's roots, the locations of these piles must be determined by a ground radar survey. The purpose of this is to establish the sizes and densities of the tree's roots within the courtyard. If the ground survey indicates that they cannot be installed without causing unacceptable damage to the tree's roots, an alternative method of securing the steel work must be found.

2.3.7 Where steel work meets or is close to the tree, it should be formed to allow for the tree's future radial growth and match the curvature of the tree.

2.3.8 Mr Grey's design shows the weakened limb being propped by steel work beneath and close to its union with the tree. The prop might offer more efficient support if it could be placed further up the limb. This is not possible given the restricted space within the building's well and the location of the tree's weakened limb. In my opinion, the limb is best supported by a combination of propping and bracing with a roped system.

2.3.9 Cushioning between the tree and the steel work prop is needed to reduce abrasion of its bark and exposure of the tissue beneath it. I am not aware of a product manufactured for this purpose. Heavy duty UV stabilised rubber matting is likely to be appropriate.

2.3.10 The risk of the branch failing after removal of the part of the building it is resting on is a consideration. This may be mitigated by installing temporary props and by installing the roped bracing system before the demolition of the part of the building the tree rests on.

2.3.11 Canopy reduction will also reduce the loading imposed on the tree's scaffold limbs. It should seek to reduce the tree's overall canopy's dimensions by no more than 25%. This is likely to result in the tree producing numerous suckers which will have to be removed by staged pruning 5 year period after reduction. Tree surgery shall comply with BS 3998 "Recommendations for Tree Work."

2.3.12 Given the tree's age and the owner's wish to preserve it, the tree will benefit from decompaction of its rooting area. This will be done by boring into its root zone with an air spade. Normally the area beneath the tree's canopy is decompacted. Since this is not possible, the ground within the courtyard which is not hard surfaced shall be treated. Bores shall be 600-900mm deep and uniformly spaced 600mm apart. After completion, the bores shall be filled with a 50:50 mixture of leaf mould and composted wood chip.

J C Terry, MSc, MICFor, MRICS, CEnv MArborA, MEWI, MAE
Sylvan Resources Ltd.
4 June 2023

Appendix 1 The Tree House, Camden specification for Tree Work

1 Ground radar survey

1.1 Complete a ground radar survey of the Courtyard in which the tree is sited. The purpose of this survey is to identify the locations, depth and density of the tree's roots greater than 25mm in diameter. Its findings shall be used to inform the locations of helical screw piles which are to be inserted into the tree's rooting environment.

1.2 **Price £1,500** *or* **£2350** if the ground floor of the building is also surveyed. (This will not be possible if the floor is suspended or if it is a concrete slab with a void beneath it.)

1.3 This work will be carried out by a specialist contractor.

2 Tree surgery and other tree works

2.1 Work shall be done to BS3998 "Tree Work Recommendations".

2.2 All arisings shall be removed and disposed of offsite.

2.3 Care shall be taken to ensure that the work causes no damage to the building's structure.

2.4 The contractor shall provide a risk assessment. This shall include measures to protect people and property.

3 Tree surgery pre-installation of the steel props

3.1 Reduce the tree's canopy by 25%. Pay particular attention to areas which might be impacted by falling branches. Either lower prunings or direct their fall onto hard or protected surfaces.

3.2 Price **£3,000 plus VAT**.

4 Bracing

4.1 Using a rope-based system, brace the weakened limb to steel anchor points. This work is to be completed before removing the wall which the limb is resting on.

4.2 Price including supply of A Drayer Tree Save 40KN Static Rope Kit **£1980 plus VAT**.

5 Ground decompaction

5.1 Within the courtyard's soft landscaped area, use an air spade to form 25 x 600mm deep x 75-100mm diameter bores per nine square metres.

5.2 Remove arisings from the bores and dispose of offsite. Backfill the bores with a 50:50 mixture of stable, well-rotted leaf mould and wood chip which is uniform in size and free of contaminants. The compost shall:

(i) be composted, stable and weed free organic matter;
(ii) have a pH of 5.5. to 8;
(iii) have a moisture content 35 to 55 percent by weight;
(iv) pass through a 25-mm sieve;
(v) have a soluble salt content of 2 – 5ds/m;
(vi) contain no more than 0.5% inert contaminants;
(vii) be free of substances toxic to plants.

5.3 Work shall be completed in three stages. The first in September, following installation of the props. The two subsequent stages shall be completed 12 and 24 months thereafter. At each stage, a third of the area shall be treated.

5.4 Price per treatment **£1200 plus VAT**.

6 Fertiliser treatment

6.1 For three years after the installation of the props, inject the tree with Enerbite. Apply at the rates specified by the manufacturer. One treatment per year.

6.2 Price per treatment **£600 plus VAT**. (Based on 370mls of fertiliser. The price will be reduced by £185/treatment if 185mls of fertiliser is sufficient).

6.3 All tree work to be completed by Border Tree Services Ltd.

7 Supervision and other work to be completed by Sylvan Resources Ltd

7.1 Interpretation of the root survey findings and advising structural engineer. **£240 plus VAT**.

7.2 Apply to Council for consent to prune the tree **£240 plus VAT**.

7.3 Site visit to supervise reduction of the tree and advise contractor and

engineer on bracing and propping the weak limb. **£980 plus VAT**.

Appendix 2 Photographs of Ailanthus tree, 37 Camden Mews

2.1 Damage to house caused by Ailanthus tree

Owner's photograph

2.2 Damage to house caused by Ailanthus tree

2.3 First floor

Owner’s photograph

2.4 Ground floor

Owner's photograph

2.5 Looking up from ground floor

Owner's photograph

2.6 Roof

Owner’s photograph

2.7 Architect's photograph

From www.simonmillerarchitects.com

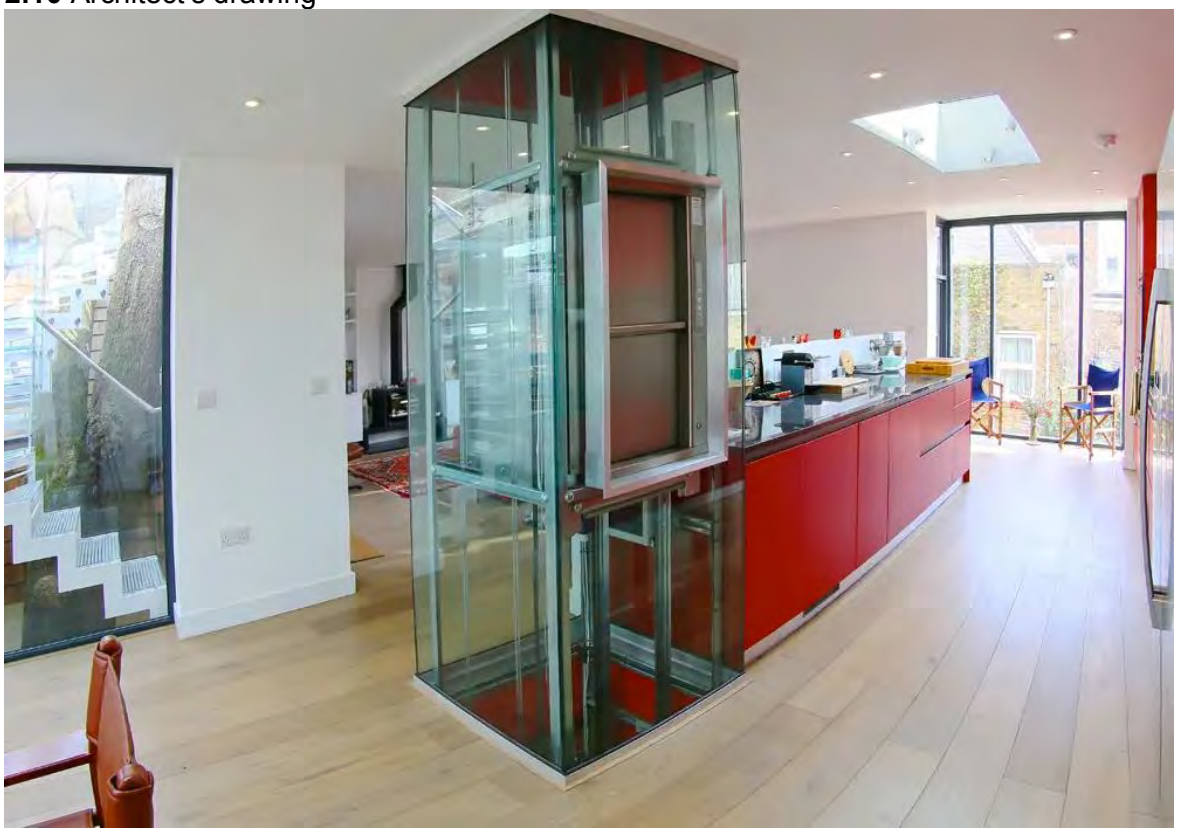
2.8 Architect's photo

From www.simonmillerarchitects.com

2.9 Architect's drawing

From www.simonmillerarchitects.com

2.10 Architect's drawing



From www.simonmillerarchitects.com

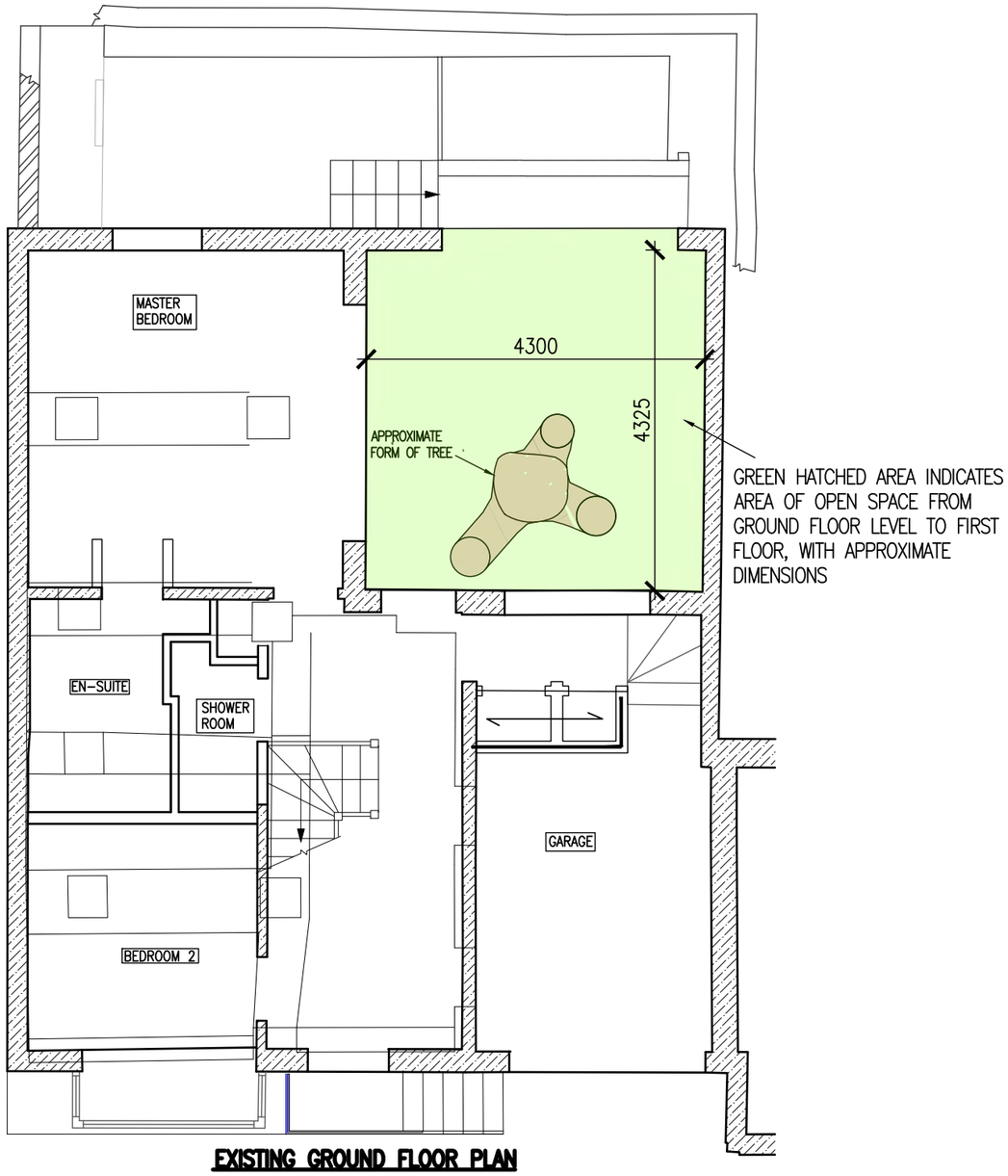
2.11 Architect's drawing

From https://find-an-architect.architecture.com/simon-miller-architects-ltd/london/tree-house-nw1

2.12 Architect's drawing

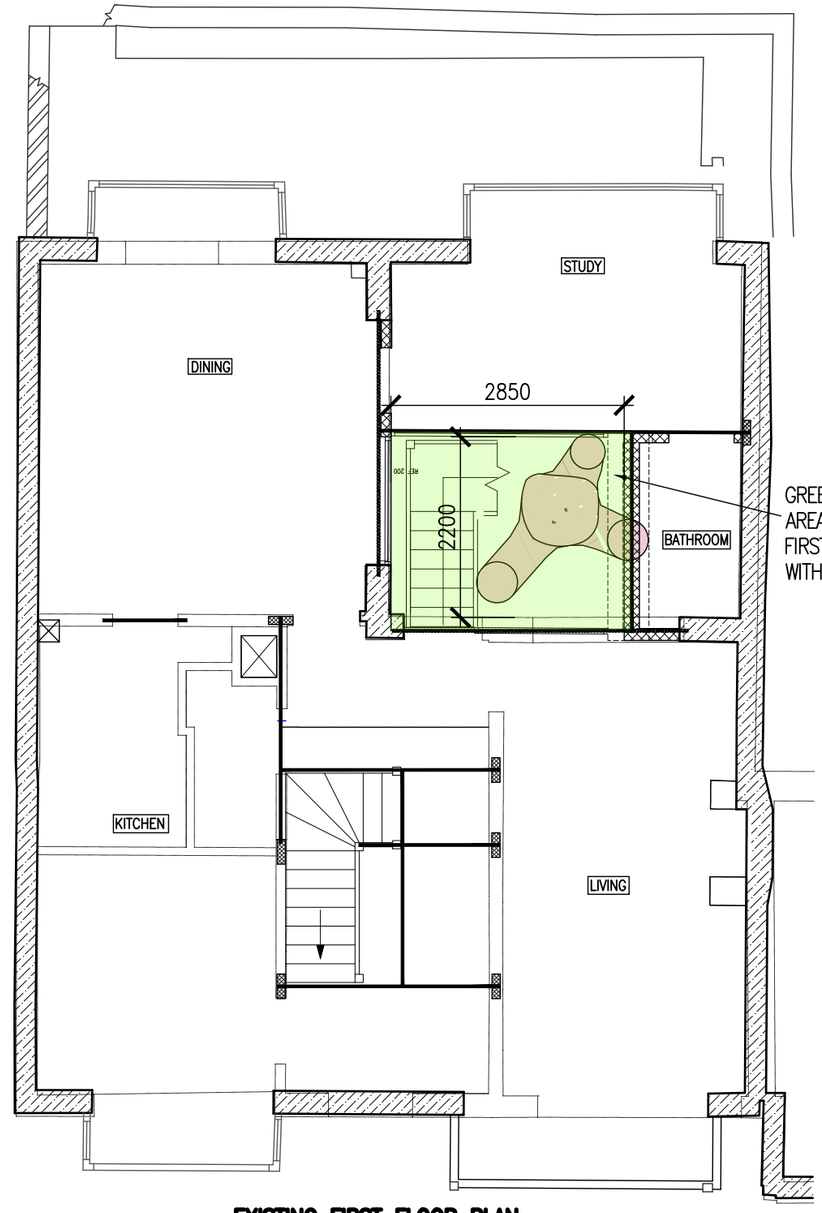
From https://find-an-architect.architecture.com/simon-miller-architects-ltd/london/tree-house-nw1

Appendix 2 Drawings of proposed steel structure and locations of proposed piles



GREEN HATCHED AREA INDICATES AREA OF OPEN SPACE FROM GROUND FLOOR LEVEL TO FIRST FLOOR, WITH APPROXIMATE DIMENSIONS

EXISTING GROUND FLOOR PLAN



GREEN HATCHED AREA INDICATES AREA OF OPEN SPACE FROM FIRST FLOOR LEVEL SKYWARDS, WITH APPROXIMATE DIMENSIONS

EXISTING FIRST FLOOR PLAN

PRELIMINARY

CONCEPT CONSULTANCY
STRUCTURAL DESIGNERS LTD
3 Knoll House, 77 Carlton Hill ~ London, NW8 9XD ~
Tel: 020 76256106; Mob: 07955 919824; ~ e-mail: info@conceptconsultancy.eu

Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: EXISTING GROUND AND 1st FLOOR PLAN COMBINED

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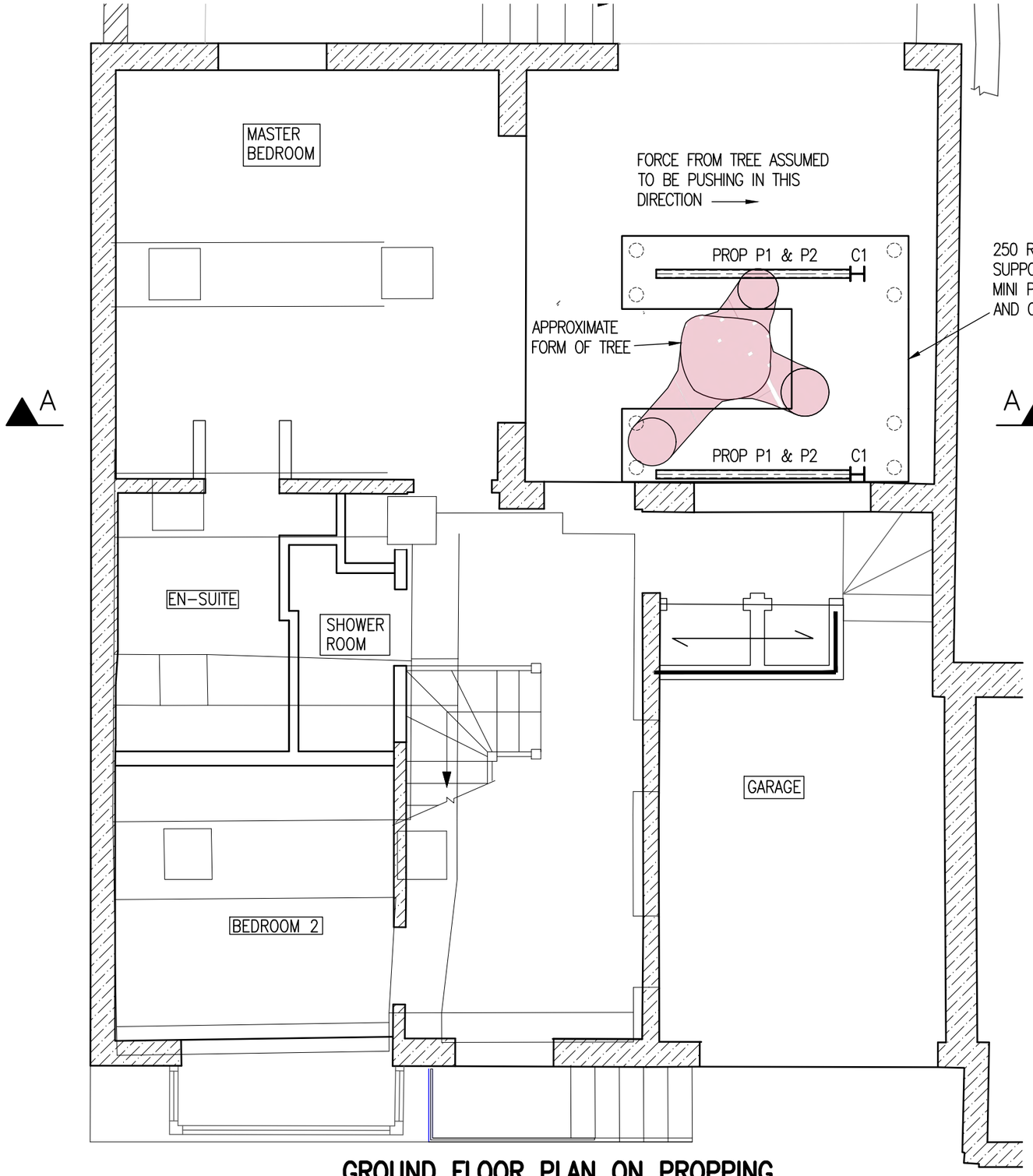

GROUND FLOOR PLAN ON PROPPING

LEGEND

- EXISTING WALL
- EXISTING WALL TO BE DEMOLISHED
- WALL UNDER
- NEW STRUCTURAL WALL
- NEW STUD PARTITIONS (NON STRUCTURAL)
- TEMPORARY PROPPING REQUIRED

STRUCTURAL MEMBER SCHEDULE	
REF	MEMBER SIZE
B1	152X152X23UC
C1	152X152X23UC
P1	88.9X4CHS
P2	88.9X4CHS

SCHEDULE OF WORKS

1. INVESTIGATE COURTYARD
   - 1.1. SUSPENDED
   - 1.2. ON FILL
   - 1.3. LARGE PLANTER BOX
   - 1.4. DOES THIS HAVE ANY BEARING ON THE CONDITION OF THE TREE
2. PROVIDE FOUNDATION SLAB FOR POSSIBLE NEW PROPPING SYSTEM
3. FORM OF FOUNDATION DEPENDENT ON FINDINGS FROM COURTYARD INVESTIGATION
4. PROPPING SYSTEM CONSISTS OF VERTICAL UC SECTIONS AND STEEL CHS PROP SECTIONS BOLTED DOWN TO THE FOUNDATION SLAB. LATERAL THRUST ON FOUNDATION SLAB NEEDS TO BE CONSIDERED.
5. LASER SURVEY OF TREE REQUIRED TO DETERMINE VOLUME/MASS OF TREE.
6. ROOT SYSTEM TO BE INVESTIGATED /ASSESSED BY SPECIALIST TO DETERMINE IF FUNCTIONING CORRECTLY AND STILL CAPABLE OF SUPPORTING TREE.
7. EXISTING GLASS STAIRCASE TO BE REMOVED AND MODIFIED BY SPECIALIST TO ENSURE TREE DOES NOT CAUSE DAMAGE BY COMING IN CONTACT WITH IT DUE TO ITS FUTURE GROWTH.
8. BATHROOM WALL TO BE MOVED AWAY FROM THE TREE BY APPROXIMATELY 200mm TO AVOID CONTACT WITH TREE.
9. FLAT ROOF OF BATHROOM TO BE REDUCED IN LEVEL BY APPROXIMATELY 300mm TO AVOID CONTACT WITH TREE.

PRELIMINARY

CONCEPT CONSULTANCY
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Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: GROUND FLOOR PLAN ON PROPPING

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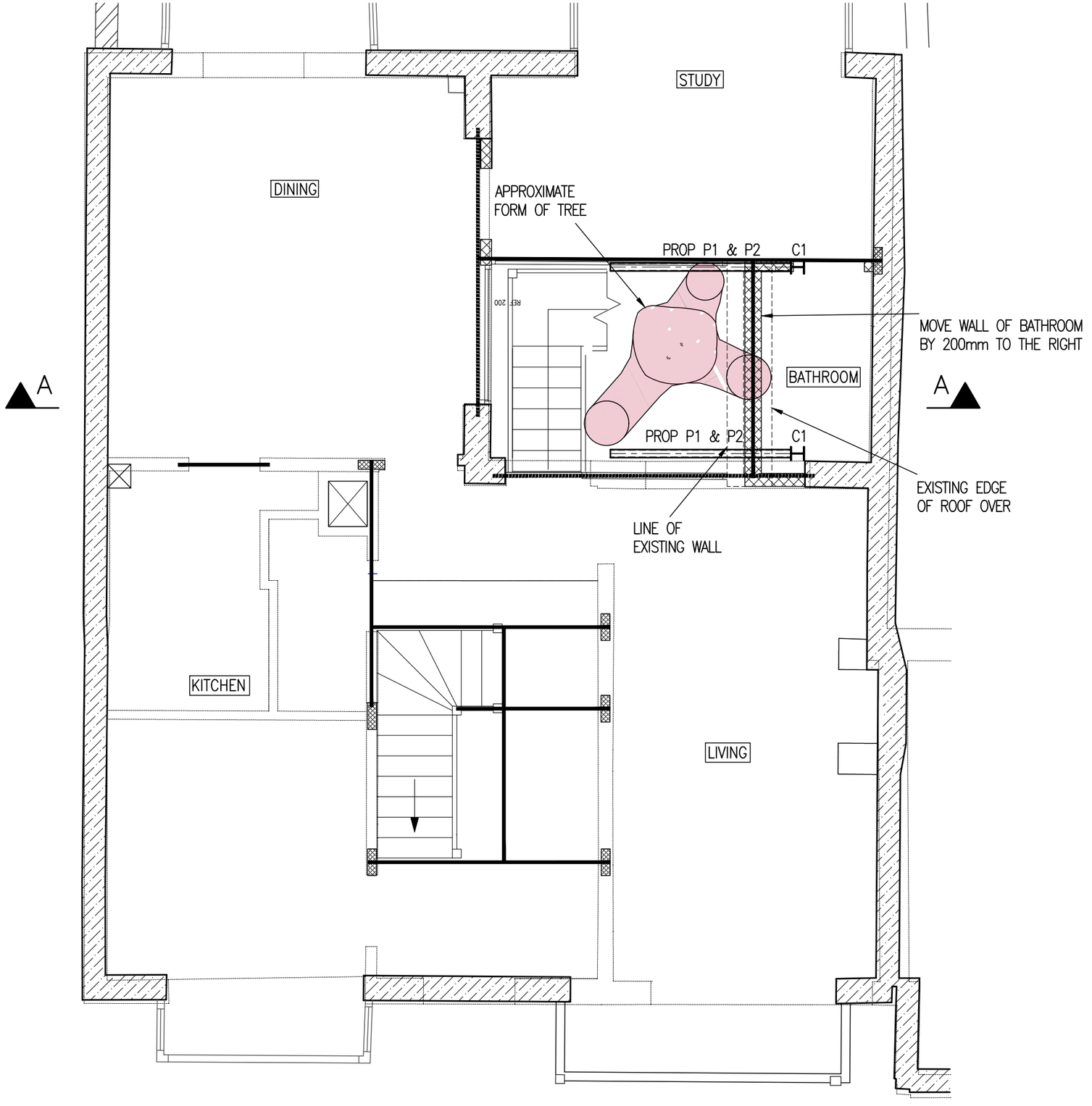

LEGEND

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- NEW STUD PARTITIONS (NON STRUCTURAL)
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REF	MEMBER SIZE
B1	152X152X23UC
C1	152X152X23UC
P1	88.9X4CHS
P2	88.9X4CHS

PRELIMINARY

FIRST FLOOR PLAN ON PROPPING

CONCEPT CONSULTANCY
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Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: FIRST FLOOR PLAN ON PROPPING

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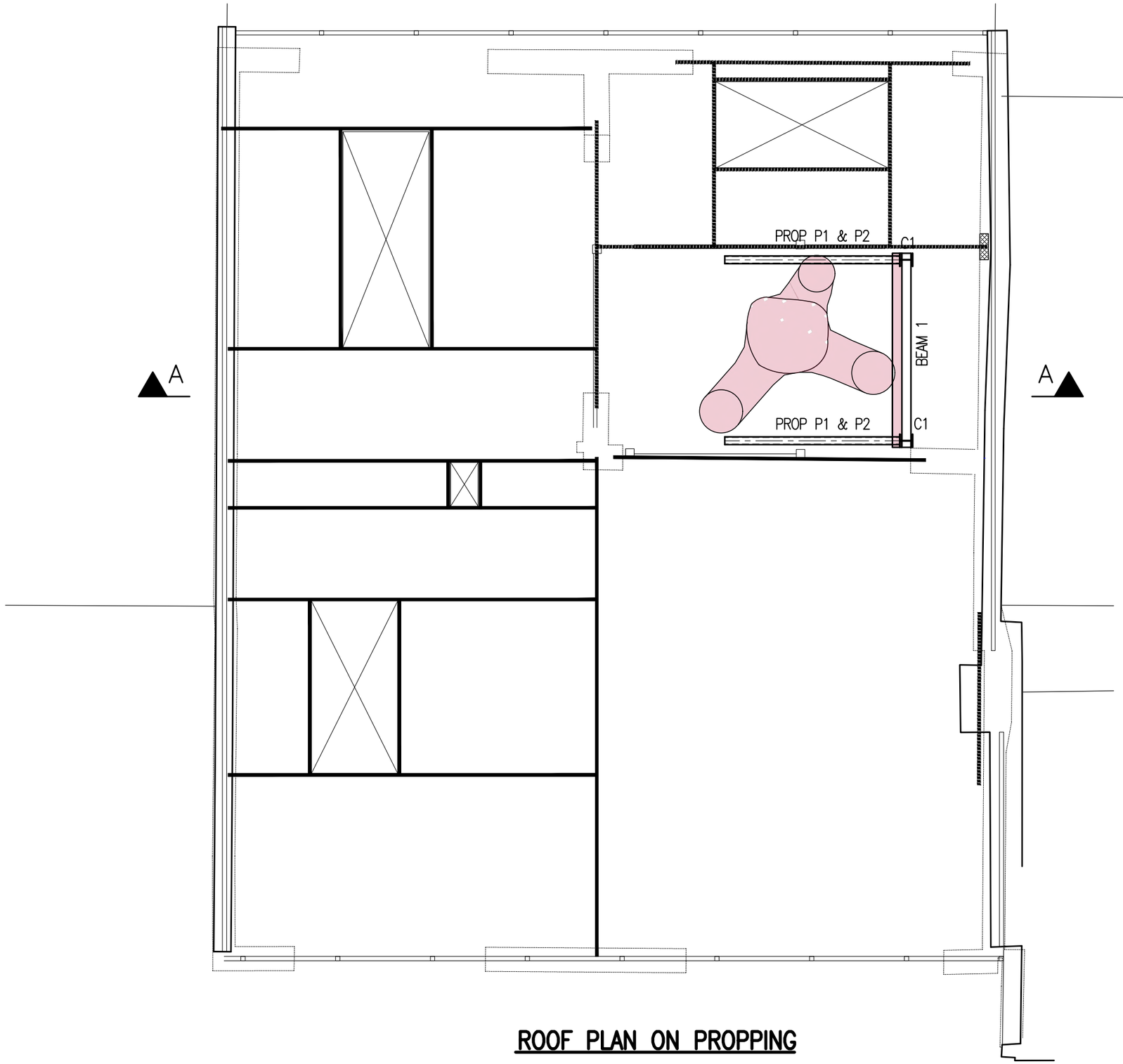

LEGEND

- EXISTING WALL
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- WALL UNDER
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- TEMPORARY PROPPING REQUIRED

STRUCTURAL MEMBER SCHEDULE	
REF	MEMBER SIZE
B1	152X152X23UC
C1	152X152X23UC
P1	88.9X4CHS
P2	88.9X4CHS

ROOF PLAN ON PROPPING

PRELIMINARY

CONCEPT CONSULTANCY
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Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: ROOF PLAN ON PROPPING

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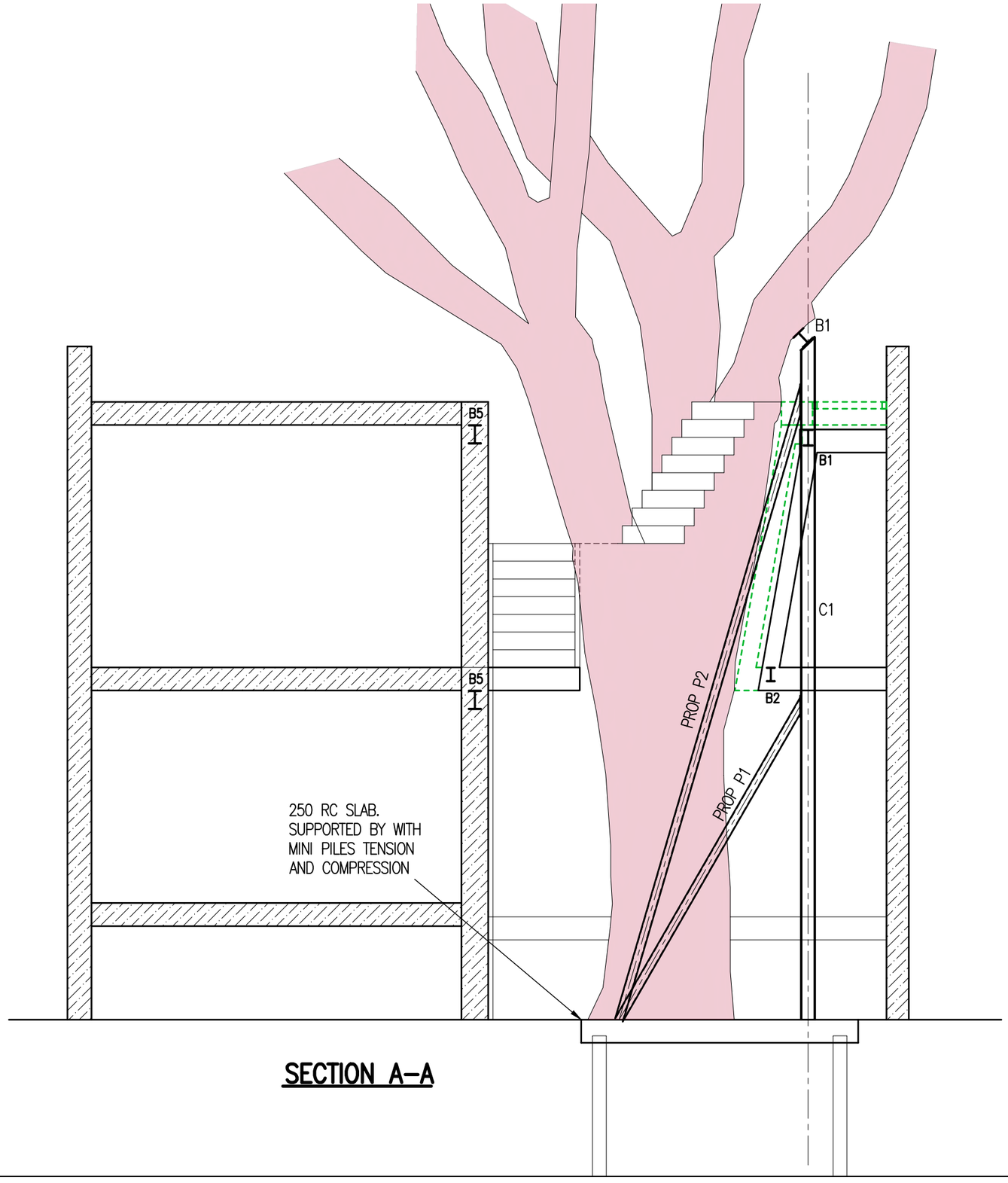

SECTION A–A

LEGEND

- EXISTING WALL
- EXISTING WALL TO BE DEMOLISHED
- WALL UNDER
- NEW STRUCTURAL WALL
- NEW STUD PARTITIONS (NON STRUCTURAL)
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B1	152X152X23UC
C1	152X152X23UC
P1	88.9X4CHS
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Title: SECTION A-A

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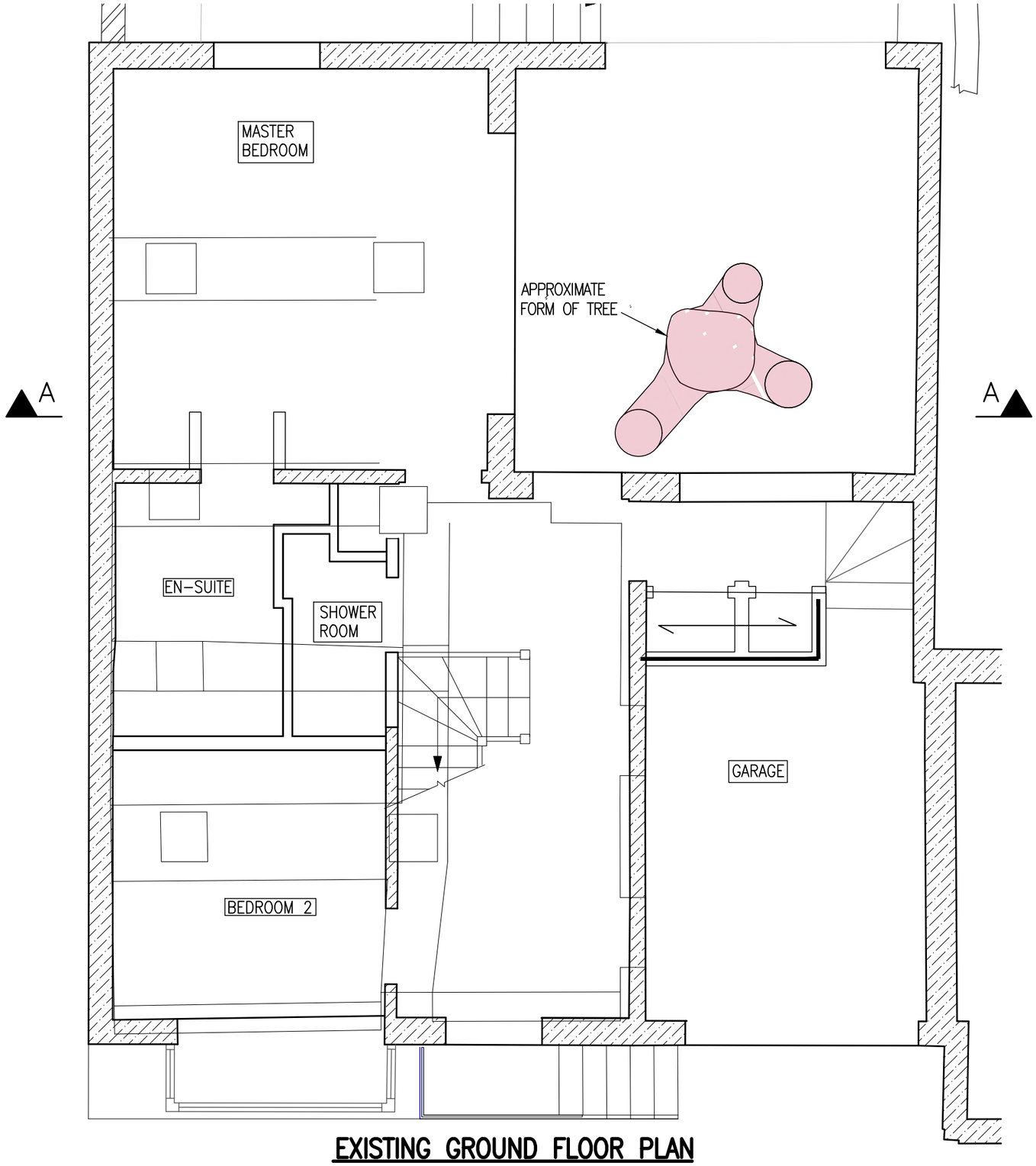

LEGEND

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- NEW STUD PARTITIONS (NON STRUCTURAL)
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PRELIMINARY

EXISTING GROUND FLOOR PLAN

CONCEPT CONSULTANCY
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Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: EXISTING GROUND FLOOR PLAN

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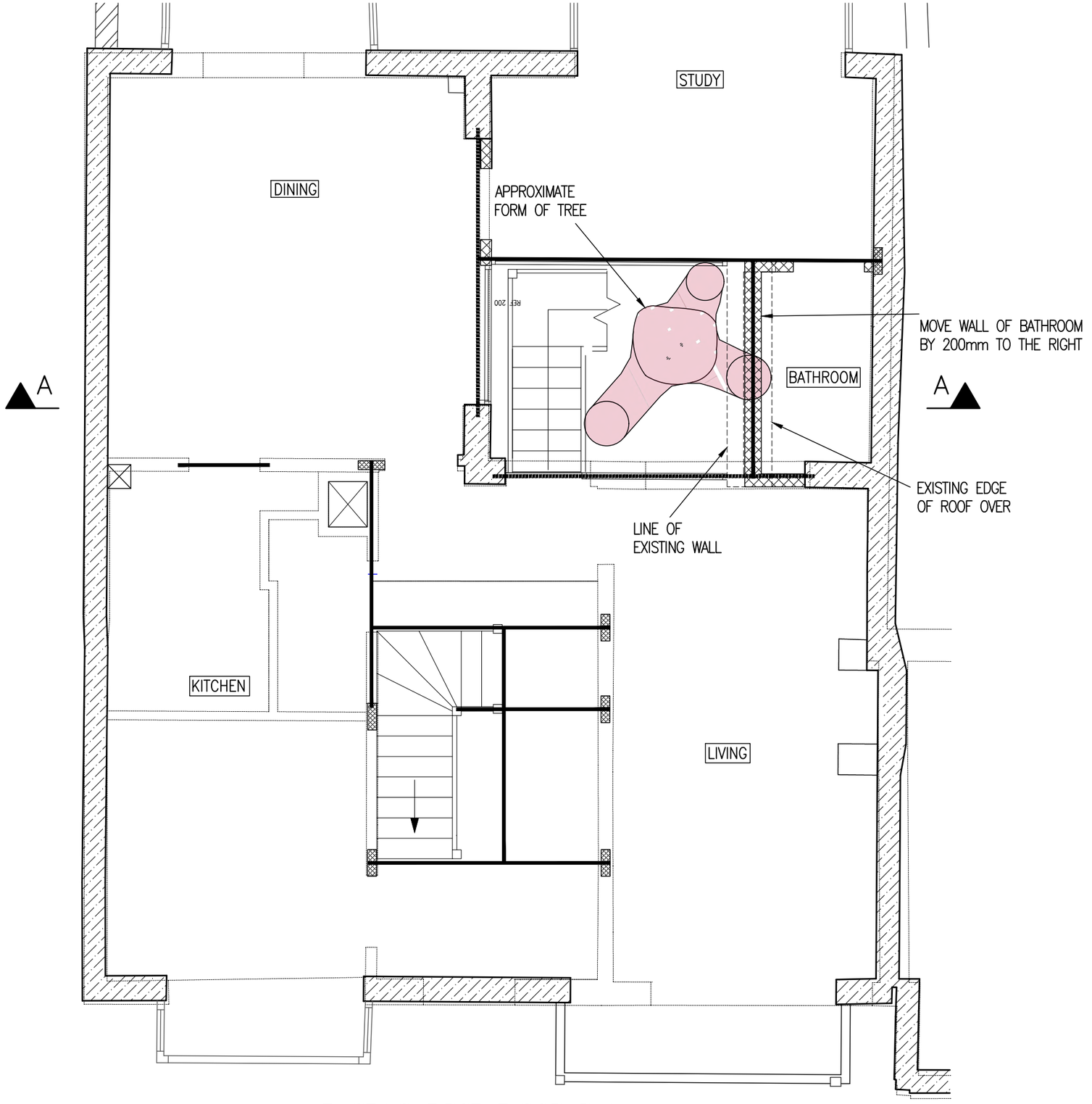

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PRELIMINARY

EXISTING FIRST FLOOR PLAN

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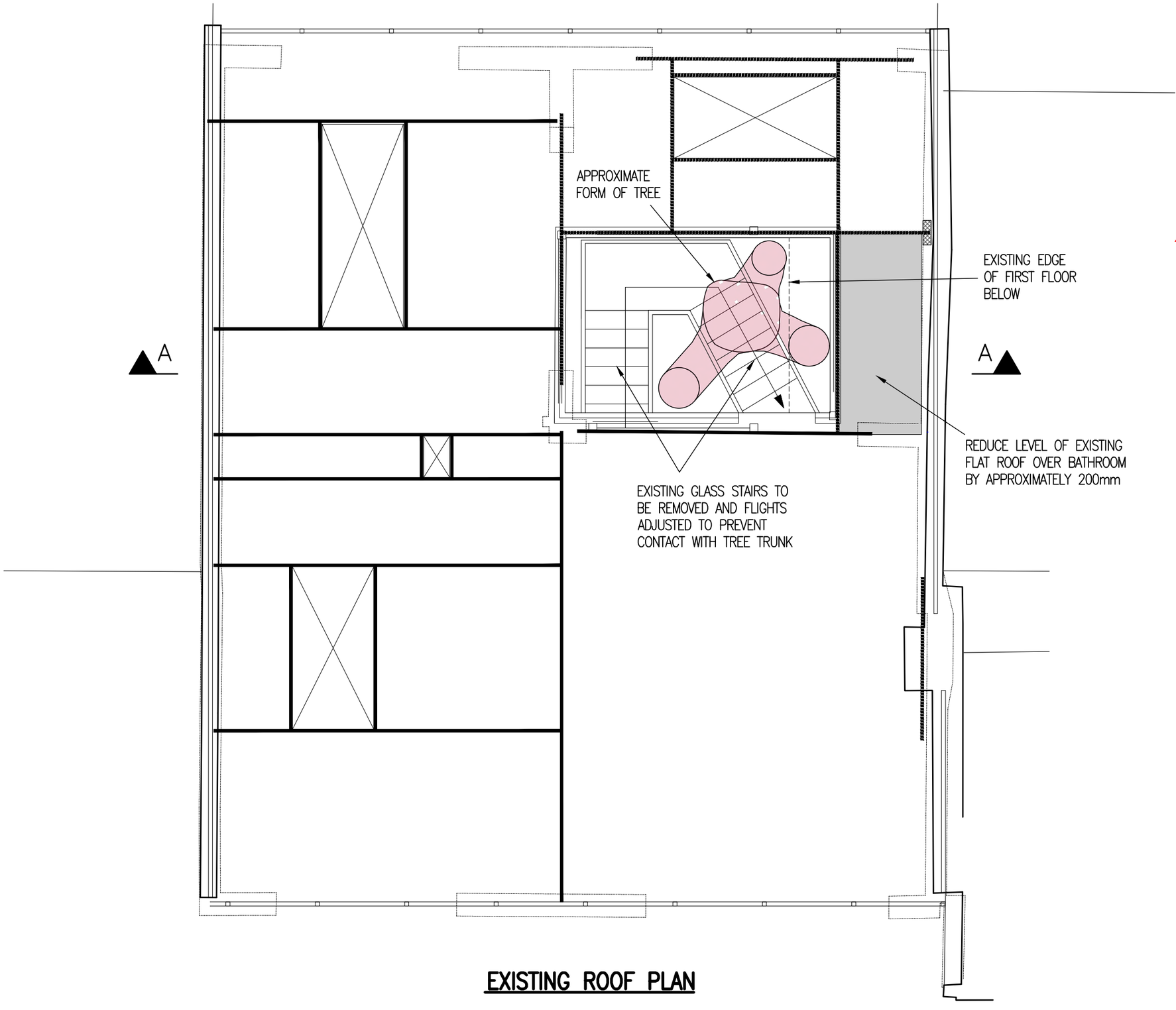

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EXISTING ROOF PLAN

PRELIMINARY

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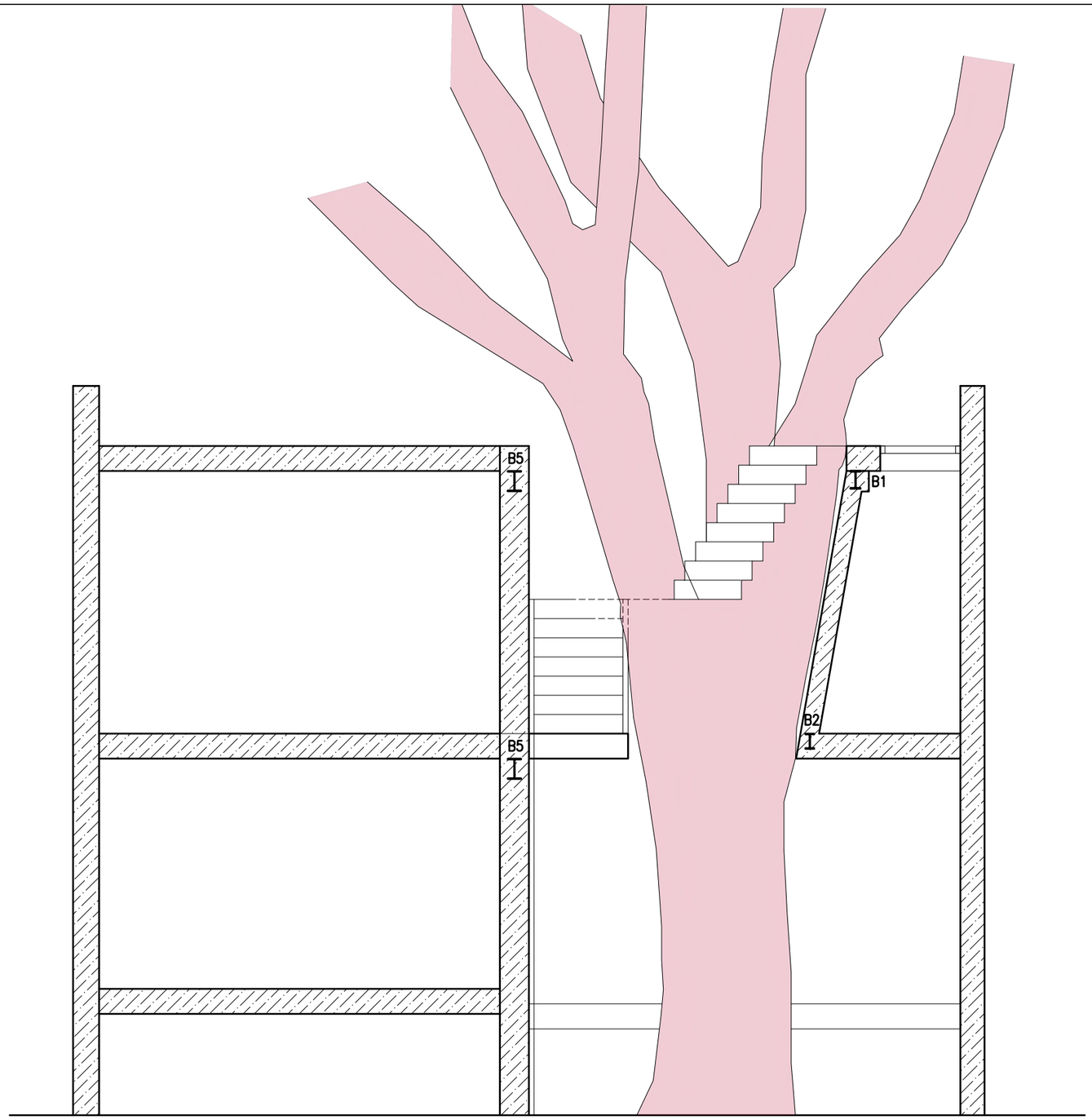

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EXISTING SECTION A–A

PRELIMINARY

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Client: BILL SAMUEL AND VIVIENNE WORDLEY

Project: 37 CAMDEN MEWS LONDON NW1

Title: EXISTING SECTION A-A

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Date	Drawn by	Checked	
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Scales	Job No.	Drawing No.	Revision
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GENERAL NOTES

1. ALL STRUCTURAL ENGINEERING DRAWINGS ARE TO BE READ WITH THE STRUCTURAL SPECIFICATION AND IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTS, ENGINEERS & OTHER SPECIALISTS' DRAWINGS & SPECIFICATIONS
2. DO NOT SCALE FROM STRUCTURAL DRAWINGS. WORK TO FIGURED DIMENSIONS ONLY. ALL DIMENSIONS IN mm U.N.O. ALL LEVELS IN m A.O.D U.N.O.
3. SETTING OUT TO BE VERIFIED WITH CA PRIOR TO CONSTRUCTION & WHERE APPLICABLE, ALL DIMENSIONS & RELATIONSHIPS TO BE DETERMINED ON SITE BY CONTRACTOR BEFORE FABRICATION COMMENCES. ALL SETTING–OUT TO BE TAKEN FROM THE ARCHITECTS DRAWINGS.
4. REFER TO ARCHITECTS DRAWINGS FOR INFORMATION ON FINISHES, DOORS, WINDOWS, LIGHTING, NON STRUCTURAL WALLS, LANDSCAPING, PAVING, WATERPROOFING. ALL BRACKETS & FIXINGS FOR THE SUPPORT OF THE FINISHES ARE SHOWN ON THE ARCHITECT'S DRAWINGS.
5. ALL WATER & DAMP PROOFING WORKS TO BE TO ARCHITECT'S DETAILS. WHERE THIS DRAWING SHOWS WATERPROOF OR DAMP PROOF MEMBRANES, THEY ARE SIMPLY INTENDED TO INDICATE THEIR POSITION IN RELATION TO THE STRUCTURE. THE MEMBRANES HAVE BEEN DESIGNED, SPECIFIED & DETAILED BY THE ARCHITECT OR THE MANUFACTURERS ARE TO BE INSTALLED AS SHOWN ON THEIR DRAWINGS.
6. ALL FIRE PROTECTION WORKS ARE TO THE ARCHITECT'S DETAILS UNLESS SPECIFICALLY NOTED OTHERWISE.
7. ALL FLOOR SEPARATION DETAILS & ACOUSTIC ISOLATION ARE TO THE ARCHITECT'S DETAILS.
8. ALL EXTERNAL WORKS, LANDSCAPING, PAVING ETC. ARE TO THE ARCHITECT'S DETAILS.
9. TYPICALLY, ALL NON–LOAD BEARING PARTITIONS ARE OMITTED FOR CLARITY. REFER TO THE ARCHITECT'S DRAWINGS FOR DETAILS.
10. IF IN DOUBT ABOUT THE INFORMATION SHOWN ON THIS DRAWING OR ANY RELATED DRAWING – ASK
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE EXISTING STRUCTURES ON THE SITE AND MUST TAKE ALL NECESSARY PRECAUTIONS TO SAFEGUARD THE STABILITY.
12. ANY TEMPORARY WORKS INCLUDING, NEEDLING, SHORING, STRUTTING AND PROPPING SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
13. ALL DEMOLITION WORKS SHALL BE UNDERTAKEN STRICTLY IN ACCORDANCE WITH THE PARTY WALL AGREEMENTS.
14. ALL INFORMATION ON THE EXISTING STRUCTURE IS TO BE CHECKED AND CONFIRMED ON SITE AND ANY DISCREPANCIES REPORTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORKS.
15. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO BRACING, SHORING OF LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. BEFORE RELATED WORK COMMENCES THE CONTRACTOR SHALL SUBMIT A METHOD STATEMENT AND SEQUENCE OF WORK TO THE ENGINEER AND ARCHITECT.
16. CONSTRUCTION MATERIAL SHALL BE SPREAD OUT IF PLACED ON FRAMED FLOORS OR ROOF, IN SUCH A MANNER THAT THE STRUCTURE IS NOT OVERLOADED IN EITHER THE PERMANENT OR TEMPORARY CONDITION.
17. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM. OTHER STANDARDS MAY BE CONSIDERED BUT ONLY WITH PRIOR APPROVAL BY THE ENGINEER.
18. CONTRACTOR TO ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL AND PLUMBING WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTOR PRIOR TO CONSTRUCTION.
19. OPTIONS ARE FOR CONTRACTORS CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY IF HE CHOOSES AN OPTION AND HE SHALL CO–ORDINATE ALL DETAILS.
20. ALL DIMENSIONS ON DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS ONLY APPLY. DRAWINGS ARE NOT TO BE SCALED. ALL LEVELS ARE IN METRES U.N.O.
21. FOR CLARITY, ALL ROOF AND FLOOR OPENINGS MAY NOT BE SHOWN ON FRAMING PLANS. FOR EXACT SIZE, NUMBER AND LOCATION FOR OPENING, SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS. WHERE OPENINGS ARE INDICATED ON THE STRUCTURAL DRAWINGS, THESE ARE TO BE CHECKED BY THE CONTRACTOR AGAINST RELEVANT SERVICE ENGINEERS OR SUBCONTRACTORS DRAWINGS PRIOR TO CONSTRUCTION.
22. ALL LEVELS ARE RELATED TO THE ORDINANCE DATUM (OD)
23. THE CONTRACTOR SHALL NOTE, AND MAKE ALLOWANCES FOR, THE MEASURES NECESSARY TO COMPLY WITH THE WASTE MINIMISATION AND RECYCLING TARGETS SET OUT IN SPECIFICATION.
24. FOR DETAILS AND SETTING OUT OF RWP, SVP, WVP AND ALL OPENINGS SEE THE RELEVANT ARCHITECTS DRAWINGS.

ABBREVIATIONS:

CJ	–	CONSTRUCTION JOINT
CRS	–	CENTRES
C/C	–	CROSS CENTRES
CU	–	COLUMN UNDER
DIM	–	DIMENSION
DIA	–	DIAMETER
EGL	–	EXISTING GROUND LEVEL
DJ	–	DOUBLE JOIST
FFL	–	FINISHED FLOOR LEVEL
GA	–	GENERAL ARRANGEMENT
IP	–	INTERSECTION POINT
MAX.	–	MAXIMUM
MC	–	MASS CONCRETE
MJ	–	MOVEMENT JOINT
MS	–	MILD STEEL
NTS	–	NOT TO SCALE
OD	–	OUTER DIAMETER
PC	–	PRECAST CONCRETE
RC	–	REINFORCED CONCRETE
SOP	–	SETTING OUT POINT
SS	–	STAINLESS STEEL
SSL	–	STRUCTURAL SLAB LEVEL
TOC	–	TOP OF CONCRETE
TOS	–	TOP OF STEEL
TOW	–	TOP OF WALL
TOU	–	TOP OF UPSTAND
TYP	–	TYPICAL
TJ	–	TRIPLE JOIST
UNO	–	UNLESS NOTED OTHERWISE
U/S	–	UNDERSIDE
VB	–	VERTICAL BRACING
ø	–	DIAMETER

CONSTRUCTION DESIGN & MANAGEMENT

1. PB ARE PROJECT 'DESIGNERS' AS DEFINED IN THE CDM REGULATIONS.
2. PB HAVE ASSUMED A COMPETENT & EXPERIENCED CONTRACTOR WILL BE EMPLOYED. PB HAVE CARRIED OUT A RISK ASSESSMENT TO IDENTIFY UNUSUAL RISKS. THIS RISK ASSESSMENT IS CONTAINED WITHIN THE HEALTH & SAFETY PLAN.
3. PARTY WALL AWARDS TO BE SUBMITTED BY THE CA TO THE RELEVANT ADJOINING PROPERTIES. THE CONTRACTOR IS TO COMPLY WITH THE PARTY WALL AWARD REQUIREMENTS.
4. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE LEVELS & SETTING OUT DIMENSIONS, INCLUDING 'AS BUILT' POSITIONS OF TEMPORARY WORKS, BEFORE COMMENCING THE WORKS. THE CONTRACTOR MUST CARRY OUT AN EXACT SITE SURVEY TO CONFIRM ALL FINAL LEVELS & SETTING OUT. ANY DISCREPANCIES THAT MAY EXIST BETWEEN DRAWINGS AND ANY OTHER RELATED DOCUMENT SHOULD BE NOTIFIED TO THE CA IMMEDIATELY.
5. ALL WORK TO BE CARRIED OUT TO THE SATISFACTION OF THE CA.
6. THE CONTRACTOR IS ADVISED TO VISIT THE SITE TO SATISFY HIMSELF REGARDING THE PRACTICABILITY OF THE WORKS.
7. CHECKING – THE ENGINEER'S COMMENTS ON SUB–CONTRACTORS DRAWINGS WILL CENTRE ON COMPLIANCE WITH THE DESIGN INTENT & EXCLUDE DIMENSIONAL CHECKS.

CONSTRUCTION

1. ALL WORKMANSHIP, MATERIALS & LOADING TO BE IN STRICT ACCORDANCE WITH THE LATEST EDITIONS OF BUILDING REGULATIONS, MANUFACTURERS SPECIFICATIONS & RECOMMENDATIONS:

   BS EN 1991 ACTIONS ON STRUCTURES
   BS EN 1997 FOUNDATIONS AND EARTH RETAINING STRUCTURE
   BS EN 1993 STEELWORK
   BS EN 1992 & BS 8500–1:2006 CONCRETE
   BS 7543:2003 DURABILITY
   BS EN 1996 UNREINFORCED AND REINFORCED MASONRY
   BS 6180:2011 BALUSTRADING AND HAND RAILING
2. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN & SUPPLY OF ALL TEMPORARY WORKS (i.e. BRACING, PROPPING, SHORING & TYING) & THE STABILITY OF THE WORKS DURING CONSTRUCTION. THEY MUST SUBMIT THEIR PROPOSALS TO THE STRUCTURAL ENGINEER SUFFICIENTLY IN ADVANCE OF THE WORK COMMENCING. UNDER NO CIRCUMSTANCES WILL ANY STRUCTURAL ALTERATIONS BE CARRIED OUT PRIOR TO THE STRUCTURAL ENGINEER COMMENTING ON THE CONTRACTORS TEMPORARY WORKS PROPOSALS.
3. IF AN INDEPENDENT CHECK ON THE TEMPORARY WORKS IS DEEMED TO BE NECESSARY BY PB, THE CONTRACTOR SHALL SUPPLY SUCH INFORMATION AS IS REQUIRED BY THE CHECKER TO OBTAIN APPROVAL.
4. THE CONTRACTOR SHALL PREPARE & SUBMIT HIS OWN CONSTRUCTION SEQUENCE/METHOD OF CONSTRUCTION TO THE CA & PB PRIOR TO COMMENCEMENT OF WORK ON SITE. IT SHOULD BE ADHERED TO & ANY VARIATION TO THIS SHOULD BE AGREED IN ADVANCE WITH PB. THE CONTRACTOR IS RESPONSIBLE FOR PROGRAMMING THE WORKS.
5. NO CONSTRUCTION METHODOLOGY THAT CAUSES A MODIFICATION OF THE PERMANENT WORKS WILL BE ACCEPTED.
6. THE CONTRACTOR SHALL, AT THE OUTSET, ESTABLISH WITH THE LOCAL AUTHORITY THEIR REQUIREMENT FOR INSPECTING THE WORKS & ADHERE TO THESE.
7. THE CA IS RESPONSIBLE IN SUBMITTING ALL DRAWINGS & CALCULATIONS FOR OBTAINING BUILDING REGULATION APPROVAL PRIOR TO CONSTRUCTION.
8. ALL SPECIALIST NAMED MATERIALS AND PROPRIETARY PRODUCTS ARE TO BE USED & FULLY FIXED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. ALTERNATIVE PRODUCTS TO THOSE NAMED ON THE DRAWINGS ARE SUBJECT TO APPROVAL BY PB.
9. ALL JOINTS ARE DESIGNED FOR THE RANGE OF MOVEMENTS OF THE COMPLETED STRUCTURE. THE CONTRACTOR MUST ENSURE THAT THE CONSTRUCTION METHODOLOGY DOES NOT REQUIRE THESE JOINTS TO ALTER.
10. ALL PLANT AND ITS SUPPORTS TO BE ADEQUATELY ISOLATED FROM THE STRUCTURE (I.E ANTI VIBRATION MOUNTINGS). REFER TO DETAILS BY OTHERS.

REINFORCED CONCRETE

1. CONCRETE CONSTRUCTION TO BE IN ACCORDANCE WITH THE SPECIFICATIONS: BS 8110
2. ALL CONCRETE SHALL BE IN ACCORDANCE WITH BS 5328.
3. CONCRETE MIXES IN ACCORDANCE WITH PB SPECIFICATION.
4. CEMENT SHALL BE ORDINARY PORTLAND CEMENT COMPLYING WITH BS1200 UNLESS OTHERWISE APPROVED.
5. REINFORCEMENT SHALL BE HOT ROLLED DEFORMED BARS COMPLYING WITH BS 4449:2005. ALL HIGH YIELD BARS SHALL BE DEFORMED BARS TYPE 2. STEEL FABRIC SHALL COMPLY WITH BS 4483:2005.
6. FOR WATERPROOFING/ FINISHES TO SLABS, WALLS AND COLUMNS REFER TO ARCHITECT DRAWINGS
7. INSERTS SHALL BE PROVIDED AS NECESSARY, INCLUDING SUPPORT FOR MASONRY AND SERVICES. REINFORCEMENT SHALL BE ADJUSTED TO SUIT. PLASTIC TAPE SHALL BE USED TO PREVENT CONTACT OF DISSIMILAR METALS
8. ALL READY MIX CONCRETE SHALL BE PRODUCED AT AN APPROVED "READY–MIX" BATCHING PLANT WHICH MUST BE CERTIFIED AS A "QSRMIC ACCREDITED PLANT" UNDER THE QUALITY SCHEME OF THE BRITISH READY MIXED CONCRETE ASSOCIATION. SUCH ACCREDITATION IS TO CONTINUE DURING THE WHOLE PERIOD OF CONCRETE PRODUCTION FOR THE WORKS. HOWEVER, SHOULD THE CONTRACTOR WISH TO MIX CONCRETE ON SITE, HE MUST SUBMIT. HOWEVER, SHOULD THE CONTRACTOR WISH TO MIX CONCRETE ON SITE, HE MUST SUBMIT TO PB FOR APPROVAL FULL DETAILS OF HIS PROPOSALS INCLUDING BATCHING EQUIPMENT, MIX PROPORTIONS ETC.
9. REFER TO ARCHITECT'S DRAWINGS/SPECIFICATIONS FOR DETAILS OF ALL CONCRETE FINISHES.
10. CONCRETE BLINDING SHALL BE C12/15N/mm2
11. FOR CONCRETING IN COLD WEATHER REFER TO THE CONCRETE SPECIFICATION AND TO THE PROVISIONS OF BS 8110.
12. THE POSITION AND TREATMENT OF CONSTRUCTION JOINTS SHALL BE TO THE APPROVAL OF THE ENGINEER.
13. MOVEMENT JOINT FILLER SHALL BE A COMPRESSIBLE FIBRE BOARD SUCH AS HYDROCELL XL BY FOSROC INTERNATIONAL OR SIMILAR APPROVED.
14. MOVEMENT JOINT SEALANT SHALL BE A TWO PART POLYSULPHIDE SEALANT SUCH AS THIOFLEX 600 BY FOSROC INTERNATIONAL OR AN APPROVED EQUAL, UNLESS NOTED OTHERWISE.
15. CONCRETE VERTICAL SURFACES ADJOINING MASONRY WALLS SHALL BE CAST WITH A CONTINUOUS STAINLESS STEEL PROPRIETARY CHANNEL BY ANCON CCL OR SIMILAR APPROVED.
16. CORE DRILLING OF ANY REINFORCED CONCRETE ELEMENTS OF THE WORK SHALL NOT BE ALLOWED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.
17. MINIMUM MESH LAP LENGTHS TO BE AS FOLLOWS:
    A193 MESH 300mm
    A252 MESH 400mm
    A393 MESH 500mm
18. CONCRETE GRADE TO BE MIN. C32/40 UNLESS OTHERWISE NOTED ON DRAWINGS.
19. PROVIDE A MINIMUM OF 24 HOURS NOTICE TO THE ENGINEER FOR INSPECTION OF ALL REINFORCING STEEL PRIOR TO PLACING CONCRETE.
20. CONCRETE CUBES SHALL BE TAKEN AT A RATE OF ONE SET OF THREE CUBES PER 20m² OR FRACTION THEREOF, WITH A MINIMUM OF ONE SET PER DAY PER CLASS OF CONCRETE. CUBES SHALL BE TESTED AT 7 AND 28 DAYS. ALL THE RESULTS SHALL BE FORWARDED DIRECTLY TO THE ENGINEER.
21. ALL SAMPLING AND TESTING OF CONCRETE TO COMPLY WITH BS 1881.
22. NOMINAL COVER TO REINFORCEMENT SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED ON DRAWINGS:

SURFACE POURED AGAINST EARTH	– 75mm
SURFACE POURED AGAINST FORMWORK BUT IN CONTACT WITH EARTH OR C12/15N BLINDING	– 50mm
BEAMS, COLUMNS	– 30mm
SLABS	– 30mm
23. CONCRETE FLOOR MIXTURE (U.N.O.):

INGREDIENTS	MIX
20mm CHIP	700
10mm CHIP	460
SAND	770
CEMENT	350
WATER	140
*ADMIXTURE (kg)	1.86
**ADMIXTURE (ltr)	2.5
FREE W/C RATIO	0.4
WORKABILITY (mm)	75

* RP1, A STANDARD PLASTICISER
** GLENIUM C315, A SUPERPLASTICISER

PRECAST CONCRETE

26. CONCRETE CONSTRUCTION TO BE IN ACCORDANCE WITH THE SPECIFICATIONS: BS 8110
27. ALL CONCRETE SHALL BE IN ACCORDANCE WITH BS 5328.
28. CONCRETE MIXES IN ACCORDANCE WITH PB SPECIFICATION.
29. CEMENT SHALL BE ORDINARY PORTLAND CEMENT COMPLYING WITH BS1200 UNLESS OTHERWISE APPROVED.
30. REINFORCEMENT SHALL BE HOT ROLLED DEFORMED BARS COMPLYING WITH BS 4449:2005. ALL HIGH YIELD BARS SHALL BE DEFORMED BARS TYPE 2. STEEL FABRIC SHALL COMPLY WITH BS 4483:2005.
31. UNITS ARE TO BE ERECTED BY COMPETENT CONTRACTORS AS APPROVED BY PRECAST SUPPLIER / MANUFACTURER, AND THE ENGINEER.
32. OPENINGS – NO OPES, NOTCHES OR ALTERATIONS ARE TO BE MADE TO UNITS WITHOUT PRIOR CONSULTATION WITH PRECAST SUPPLIER / MANUFACTURER.
33. MORTAR SHALL COMPLY WITH THE MIX DESIGNATED FOR GRADE (III) GIVEN IN TABLE 1, IS325, PART 1 UNLESS OTHERWISE STATED ON DRAWINGS. MORTAR TESTING SHALL BE IN ACCORDANCE WITH BS 5628, APPENDIX A.1. SAND FOR MORTAR SHALL COMPLY WITH BS 1200.
34. THE CONTRACTOR SHALL SUBMIT FULLY DETAILED FABRICATION DRAWINGS TO THE ENGINEER FOR APPROVAL A MINIMUM OF 10 WORKING DAYS BEFORE FABRICATION IS DUE TO COMMENCE. NO FABRICATION SHALL COMMENCE UNTIL APPROVAL OF THE SHOP DRAWINGS IS RECEIVED AND UNTIL ALL COMMENTS HAVE BEEN INCORPORATED.
35. APPROVAL BY THE ENGINEER IN NO WAY RELIEVES THE CONTRACTOR FOR ANY RESPONSIBILITY FOR THE ACCURACY, CORRECTNESS AND ADEQUACY OF CALCULATIONS, DESIGN, DETAILS AND DIMENSIONS.

MASONRY (BRICKWORK & BLOCKWORK)

3. MATERIALS, COMPONENTS AND WORKMANSHIP USED IN THE CONSTRUCTION OF BRICK AND BLOCK WALLS SHALL COMPLY WITH THE RECOMMENDATIONS OF BS 5628 PART 1.
4. MATERIALS:

I) CLAY BRICKS SHALL COMPLY WITH BS 3921.
II) PRECAST CONCRETE BLOCKS SHALL COMPLY WITH BS 6073.
III) SAND FOR MORTAR SHALL BE ORDINARY PORTLAND CEMENT IN ACCORDANCE WITH BS1200.
IV) CEMENT USED IN THE MORTARS SHALL BE PORTLAND CEMENT TO BS 12 OR SULPHATE RESISTING CEMENT TO BS 4027 AS DIRECTED ON THE DRAWINGS.
V) LIME SHALL BE NON–HYDRAULIC (CALCIUM), SEMI– HYDRAULIC (CALCIUM) OR MAGNESIUM LIME IN ACCORDANCE WITH BS 890.
VI) WATER SHALL BE POTABLE.
VII) NO ADMIXTURES SHALL BE USED WITHOUT THE PRIOR WRITTEN CONSENT OF THE ENGINEER. MORTAR PLASTICISERS SHALL MEET THE REQUIREMENTS OF BS 4887.
VIII) PIGMENTS SHALL CONFORM TO THE REQUIREMENTS OF BS 1014. CALCIUM CHLORIDE SHALL NOT BE USED AS AN ADDITIVE.

3. MORTAR SHALL COMPLY WITH THE MIX DESIGNATED FOR GRADE (III) GIVEN IN TABLE 1, IS325, PART 1 UNLESS OTHERWISE STATED ON DRAWINGS. MORTAR TESTING SHALL BE IN ACCORDANCE WITH BS 5628, APPENDIX A.1.
4. BLOCKS FOR RISING WALLS SHALL BE SOLID UNITS. BLOCK SIZES FOR OTHER AREAS SHALL BE AS INDICATED ON DRAWINGS OR SPECIFICATIONS. JOINT THICKNESS SHALL BE 10mm.
5. THE CHARACTERISTIC COMPRESSIVE STRENGTH OF THE BLOCKS SHALL BE 5.0 N/mm2 UNLESS NOTED OTHERWISE ON DRAWINGS. BLOCKS SHALL BE TESTED AT A RATE OF 5 PER 1000 BY AN INDEPENDENT TESTING AGENCY.

PRELIMINARY

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Title: STRUCTURAL NOTES

Revision	Date	Made by	Amendments

Date	Drawn by	Checked	
28/11/22	RR	CG	
Scales	**Job No.**	**Drawing No.**	**Revision**
NA	3292	800	

MASONRY (BRICKWORK & BLOCKWORK) – CONTINUOUED...

4.
5.

6. BED JOINT REINFORCEMENT SHALL BE "BRICKFORCE REINFORCEMENT" BY BRC BUILDING PRODUCTS OR SIMILAR APPROVED. BED JOINT REINFORCEMENT SHALL BE PROVIDED IN ACCORDANCE WITH THE TYPE, SIZE AND SPACING INDICATED ON THE DRAWINGS. IT SHALL BE IN STAINLESS STEEL GRADE 304, UNLESS NOTED OTHERWISE ON THE DRAWINGS.

7. RISING WALL INTERSECTIONS SHALL BE TIED TOGETHER IN A MASONRY BOND. OTHER WALLS SHALL BE TIED IN MASONRY BOND AT CORNERS UNLESS NOTED OTHERWISE ON DRAWINGS.

8. CAVITY WALL TIES SHALL BE STAINLESS STEEL TYPE 1 TIES IN ACCORDANCE WITH BS DD140 UNLESS OTHERWISE NOTED ON DRAWINGS. TIES SHALL BE SPACED IN ACCORDANCE WITH THE SPECIFICATION AND IS325, PART 1.

9. FOR MASONRY CONSTRUCTION DURING COLD WEATHER REFER TO THE SPECIFICATIONS AND THE PROVISIONS OF BS 5628.

10. ALL RISING WALLS SHALL BE LAID WITH FULL MORTAR COVERAGE ON HORIZONTAL AND VERTICAL FACES.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHORING AND BRACING OF ALL MASONRY WALLS AS NECESSARY TO ENSURE STABILITY DURING CONSTRUCTION. SUCH SHORING AND BRACING SHALL BE MAINTAINED IN POSITION UNTIL THE MASONRY HAS ATTAINED ITS DESIGN STRENGTH AND THE RESTRAINING/SUPPORT STRUCTURE IS IN PLACE.

12. BACK FILL SHALL NOT BE PLACED AGAINST WALLS WITHIN 10 DAYS OF COMPLETION OF THE WALL. THE MAXIMUM LEVEL DIFFERENCE BETWEEN BACK FILL ON EITHER SIDE OF A MASONRY WALL SHALL BE 225mm. HEAVY EQUIPMENT USED IN BACK FILLING SHALL NOT OPERATE CLOSER TO THE WALL THAN A DISTANCE EQUAL TO THE HEIGHT OF THE BACK FILL ABOVE THE FOOTINGS.

13. REQUIREMENTS FOR REINFORCED MASONRY:

(A) CONCRETE FOR FILLING CORES OR EMBEDDED REINFORCING BARS SHALL BE C28/35 UNLESS NOTED OTHERWISE ON DRAWINGS. MAXIMUM AGGREGATE SIZE 10mm.

(B) VERTICAL BAR REINFORCEMENT SHALL BE SECURED IN POSITION. CAVITIES CONTAINING REINFORCEMENTS SHALL BE COMPLETELY FILLED WITH CONCRETE AND CLEAN OUT OPENINGS SHALL BE PROVIDED AT THE BASE OF VERTICAL CORES.

14. FOR LINTEL DETAILS REFER TO PROJECT DETAIL DRAWINGS AND MASONRY SPECIFICATION.

15. REFER TO ARCHITECTS DRAWINGS FOR DETAILS OF SETTING OUT TO MASONRY SPECIFICATION.

16. REINFORCED U–BLOCK TO BE PROVIDED AT CILL LEVEL OF ALL WINDOW OPES.

17. * DENOTES 'UBLOCK'/P.C. BUILDERS LINTEL OVER FOR ALL STANDARD BLOCKWORK OPENINGS. ALTERNATIVELY KEYSTONE ANGLE LINTELS FOR STANDARD BRICKWORK OPENINGS.

18. CONTROL JOINTS TO BE PROVIDED IN BLOCKWORK AT 6m Crs. WALL TIES SHALL BE PLACED AT 450 Crs. ACROSS CONTROL JOINTS ON INTERNAL LEAVES. WALL TIES TO BE DOBONDED AT ONE END.

TIMBER

1. ALL TIMBER MEMBERS ARE TO BE MINIMUM GRADE C24 U.N.O. TO BS EN 1993–1–8:2008, BS 4978 & BS 4417. TIMBER TO BE PRESSURE IMPREGNATED WITH PRESERVATIVE AND CUT ENDS BRUSH TREATED.

2. ALL JOISTS SHOWN DOUBLED OR TRIPLED ARE TO BE BOLTED TOGETHER AT MAX. 500 CRS USING M12 GRADE MIN. 4.6 BOLTS AND USING 51mm DIAMETER DOUBLE SIDED ROUND TOOTHED PLATE CONNECTORS BETWEEN TIMBERS AT EACH BOLT LOCATION.

3. ALL BOLTS INTO TIMBER ARE TO HAVE 50mmsq x 3mm THICK MS WASHERS BELOW NUT.

4. WANE NOT PERMITTED.

5. SOLID BLOCKING OR HERRINGBONE STRUTTING TO BE PROVIDED BETWEEN ALL TIMBER JOISTS OR RAFTERS AS FOLLOWS:

– 2.5m TO 4.5m SPAN: MIDSPAN AND AT EACH END SUPPORT.

– SPANS LONGER THAN 4.5m: TWO ROWS EQUALLY SPACED IN SPAN AND AT END SUPPORTS OUTER JOISTS OR RAFTERS TO BE BLOCKED SOLIDLY TO PERIMETER WALLS.

5. LATERAL RESTRAINT STRAPS FOR FLOORS ARE TO BE MINIMUM 900mm LONG 30 x 5 GALVANIZED MS STRAPS AT 1200mm c/c WITH 150mm BOB END. STRAPS PERPENDICULAR TO JOISTS TO BE NAILED TO TOPS OF THREE JOISTS + SOLID BLOCKING INFILL USING 5, 75mm LONG, 3.8I NAILS. STRAPS PARALLEL TO JOISTS ARE TO BE LET–IN TO THE TOP OF THE JOISTS AND NAILED IN PLACE USING 6, 50 LONG, 3.4I NAILS. REFER TO TYPICAL DETAILS.

6. LATERAL RESTRAINT STRAPS ARE TO BE USED TO STRAP TOGETHER JOISTS OVER STEEL JOIST ARE TO BE CONNECTED TO JOISTS WITH 3 No.12 WOOD SCREWS EACH SICE, LATERAL STRAPS TO BE TEK SCREWED TO TOP OF STEEL BEAM.

7. JOIST HANGERS – AT ALL CONNECTIONS BETWEEN TIMBER AND STEEL BEAMS U.N.O, CONTINUOUS SOLID TIMBER BLOCK TO THE WEB OF THE BEAM THROUGH BOLTED TO STEEL BEAM WITH M10 GRADE 8.8 BOLTS @600mm c/c AND JOIST HANGERS BY SIMPSON STRONG TIE OR SIMILAR APPROVED ARE TO BE PROVIDED.

8. NO CHANGES TO PROVIDED TIMBER SIZES WILL BE ACCEPTED WITHOUT PRIOR APPROVAL.

9. WALL PLATES FOR ROOF ARE TO BE TIED DOWN USING LONGx30x2.5 GALVANISED MS STRAPS AT 1200 CRS WITH 150 BOB END. STRAPS PERPENDICULAR TO JOISTS TO BE SCREWED TO TOPS OF 3 JOISTS + SOLID BLOCKING USING No10 WOOD SCREWS. STRAPS PARALLEL TO JOISTS ARE TO BE LET IN TO THE TOP OF THE JOISTS AND SCREWED IN PLACE WITH No. 10 WOOD SCREWS.

10. ALLOW FOR JOIST HANGERS TO ALL CONNECTIONS.

11. ROOF TIMBER RAFTERS TO BE DOUBLED–UP EITHER SIDE OF ROOF LIGHTS, UNLESS NOTED OTHERWISE.

STEELWORK & COLD FORMED PURLINS AND SHEET RAILS

1. ALL STEELWORK TO BE GRADE S355 J0 TO BS 5950 U.N.O AND IN ACCORDANCE WITH PB'S SPECIFICATION.

2. ALL STEEL SHALL BE SAW CUT.

3. ALL STEEL TO BE BLAST CLEAN STEEL TO SA 2 1/2

4. THE FABRICATOR IS TO COMPLETE THE DETAILING OF ALL CONNECTIONS NOT FULLY DETAILED ON THE DRAWINGS, USING DESIGN CONNECTION FORCES GIVEN BY THE ENGINEER. FOR COLD FORMED SECTIONS THE FABRICATOR IS TO COMPLETE THE DETAIL DESIGN FOR THOSE ELEMENTS SHOWN ON THE DESIGN DRAWINGS, AND PRODUCE COORDINATED DRAWINGS SHOWING ALL CONNECTION DETAILS ETC.

5. CONNECTIONS ARE TO BE DESIGNED AND DETAILED BY THE CONTRACTOR FOR THE MIN FORCES LISTED CALCULATIONS SHALL BE SUBMITTED FOR APPROVAL WITH THE FABRICATIONS DRAWINGS.

6. ALL STRUCTURAL STEELWORK IS TO BE DESIGNED AND FABRICATED IN ACCORDANCE WITH PB SPECIFICATION CLAUSES.

7. ALL STEEL TO STEEL CONNECTIONS TO COMPRISE A MINIMUM OF 2No M16, GRADE 8.8 BOLTS AND TO BE CAPABLE OF RESISTING A MINIMUM FACTORED SHEAR LOAD OF 75kN AND MIN. FACTORED TIE FORCE = 75kN. ALL MOMENT LOADS ARE TO BE TREATED AS REVERSIBLE UNO

8. ALL BOLTS ARE TO BE GRADE 8.8 SHERADIZED TO BS EN 13811:2003, CLASS 1. ALL BOLTS, NUTS AND WASHERS ARE TO BE TO BS EN 1993–1–8:2003. WASHERS ARE TO BE PLACED BENEATH THE ROTATED ITEM.

9. ANCHOR BOLTS SHALL BE GRADE 8.8 MATERIAL UNLESS STATED OTHERWISE ON THE DRAWINGS. GROUT UNDER BASE PLATES SHALL BE SBO FIVE STAR NON SHRINK GROUT OR SIMILAR APPROVED AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. GROUT TO BE POURED WHEN COLUMNS HAVE BEEN PLUMBED, LINED AND LEVELLED. HOLDING DOWN BOLTS AND LEVELLING PACKS SHALL BE TOTALLY ENCLOSED BY GROUT.

10. ALL SITE FABRICATED CONNECTIONS TO RECEIVE SITE APPLIED PRIMER & STRIPE COATS COMPATIBLE WITH EXISTING CORROSION PROTECTION SYSTEM.

11. ALL CONTACT SURFACES IN FRICTION GRIP BOLTED CONNECTIONS TO BE LEFT UNPAINTED.

12. ANY STEELWORK BELOW GROUND TO BE ENCASED IN CONCRETE. MINIMUM COVER TO STEEL TO BE 75mm.

13. REFER TO ARCHITECT'S SPECIFICATION FOR FIRE PROOFING DETAILS.

14. THE STEELWORK SUB–CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING ALL NECESSARY SITE MEASUREMENTS PRIOR TO FABRICATION TO ENSURE THE CORRECT FIT OF THE NEW WORKS ON SITE.

15. THE CONTRACTOR IS TO ENSURE THE USE OF NEOPRENE WASHERS OR SIMILAR SEPARATION MEDIUMS TO PREVENT BI–METALLIC REACTIONS.

16. THE HOLDING DOWN BOLTS SHALL BE SUPPLIED BY THE STEELWORK SUB–CONTRACTOR AND FIXED BY THE GENERAL CONTRACTOR. THE HOLDING DOWN BOLTS & BASEPLATES ARE TO BE DESIGNED BY THE FABRICATOR.

17. ALL CONNECTION PLATES TO BE THE GREATER OF 12mm, OR THE THICKNESS OF THE WEB/ FLANGE WHICH THEY JOIN IN ACCORDANCE WITH BS 5950

18. ALL WELDS ARE TO BE A MIN 6mm FULL PROFILE CONTINUOUS FILLET WELD (FPFW) IN ACCORDANCE WITH BS 5135 UNO. WHERE A WELD IS CALLED UP AS FULL STRENGTH BUTT WELD (FSBW) IT IS ASSUMED THAT IT WILL BE FULL PENETRATION. SITE WELDING WILL NOT BE ACCEPTABLE.

19. ALL FABRICATION DRAWINGS ISSUED FOR APPROVAL WILL BE COMMENTED ON WITHIN 10 WORKING DAYS. ANY ITEMS FABRICATED PRIOR TO APPROVAL SHALL BE AT THE CONTRACTOR'S RISK.

20. THE STEELWORK FABRICATOR SHALL PRODUCE AND SUBMIT TWO COPIES OF FULLY DETAILED & DIMENSIONED FABRICATION DRAWINGS TO THE ENGINEER FOR APPROVAL A MINIMUM OF 10 WORKING DAYS BEFORE FABRICATION IS DUE TO COMMENCE. NO FABRICATION SHALL COMMENCE UNTIL APPROVAL OF THE SHOP DRAWINGS IS RECEIVED AND UNTIL ALL COMMENTS HAVE BEEN INCORPORATED.

21. APPROVAL BY THE ENGINEER IN NO WAY RELIEVES THE CONTRACTOR FOR ANY RESPONSIBILITY FOR THE ACCURACY, CORRECTNESS AND ADEQUACY OF CALCULATIONS, DESIGN, DETAILS AND DIMENSIONS.

22. ALL COLUMNS, BEAMS AND CROSS BRACING TO BE POSITIONED SUCH THAT CENTRE LINES OF ALL MEMBERS INTERSECT AT CONNECTIONS U.N.O.

23. ALL STEEL BEAMS TO BEAR ON PLATES/ BRICKWORK 100mm MINIMUM UNLESS NOTED OTHERWISE. PLATES TO BE BEDDED ON 10MM THICK MORTAR. REINSTATE BRICKWORK AROUND BEAM ENDS AND PACK VOIDS WITH MORTAR.

24. WHERE BEAMS ARE SUPPORTED ON WALLS/PIERS USE 2 NO. M12 BOLTS THROUGH BOTTOM FLANGE AND CAST INTO PADSTONES U.N.O.

25. COLD FORMED PURLINS AND SHEETING RAILS SHALL BE DESIGNED TO BS 5950 PART 5 AND SHALL BE MANUFACTURED FROM HOT DIPPED GALVANISED STEEL TO BS EN 10147: 1992. STEEL SHALL BE GRADE E350 WITH A Z225 ZINC COATING UNLESS NOTED OTHERWISE.

MOVEMENT & TOLERANCES

THE STRUCTURE HAS BEEN DESIGNED TO SATISFY THE FOLLOWING MOVEMENT CRITERIA:

CONCRETE STRUCTURES	LIVE LOAD DEFLECTION	SPAN/360
STEEL STRUCTURES	LIVE LOAD DEFLECTION	SPAN/360
	TOTAL LOAD DEFLECTION	SPAN/250
LATERAL	WIND LOAD DEFLECTION	SPAN/360
	STOREY SWAY	SPAN/360

GENERALLY PERMISSIBLE DEVIATIONS/TOLERANCES ARE AS PER THE NSCS/NSSS UNLESS MODIFIED BY THE CONCEPT DESIGN PROJECT SPECIFICATIONS OR NOTED ON CONCEPT DESIGN DRAWINGS.

CONSTRUCTION TOLERANCES

SPACE BETWEEN WALLS:
- BRICK/BLOCK = +/– 20mm
- TIMBER STUD = +/– 32mm

SPACE BETWEEN COLUMNS:
- STEEL = +/– 12mm

WALL VERTICALITY:
- BRICK / BLOCK = 10mm
- TIMBER STUD = 10mm

COLUMN VERTICALITY:
- STEEL = 6mm

VERTICAL POSITION OF BEAMS:
- STEEL = +/– 20mm

VERTICAL POSITION OF FLOORS:
- INSITU / COMPOSITE = +/– 15mm

PLAN POSITION:
- BRICK / BLOCK / STEEL / TIMBER = +/– 10mm

FLATNESS OF FLOORS:
- UNDER 3m STRAIGHT EDGE = 5mm

FOUNDATIONS

1. CONCRETE BLINDING SHALL BE PROVIDED UNDER ALL FOUNDATIONS TO A MINIMUM THICKNESS OF 50mm. EXCAVATED SURFACES SHALL BE FREE OF LOOSE MATERIAL, DRY AND BLINDING AS SOON AS POSSIBLE AFTER INSPECTION OF BEARING SURFACES BY THE ENGINEER.

2. FOUNDATIONS TO BE CENTERED UNDER COLUMNS AND WALLS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

3. ALL INSULATION AND DPC'S TO ARCHITECTS DETAILS.

4. FINAL FORMATION LEVELS AND FOUNDATION LAYOUT TO BE AGREED ON SITE WITH ENGINEER DURING EXCAVATION AND PRIOR TO CONSTRUCTION / CASTING.

5. ALL CONCRETE IN FOUNDATIONS TO BE GRADE C10P SRC.

6. DEPTH TO BE IN ACCORDANCE WITH NHBC STANDARDS CHAPTER 4.2.

7. IF PLANT ROOTS AND/OR SOIL DESICCATION IS DISCOVERED DURING EXCAVATION FOUNDATION DEPTHS MAY HAVE TO BE INCREASED.

8. REFER TO SERVICES LAYOUT FOR UNDERGROUND DRAINAGE AND DUCTING, ETC. USE PRECAST CONCRETE LINTELS OVER ALL SERVICE PIPES, ETC.

UNDERPINNING – METHOD STATEMENT & PROCEDURE

1. BEFORE STARTING THE WORK THE CONTRACTOR IS TO CHECK FOR ANY SERVICES THAT COULD BE DAMAGED BY THE UNDERPINNING WORK.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT HIS OPERATIONS DO NOT IN ANY WAY IMPAIR THE SAFETY OR CONDITION OF THE BUILDING BOTH BEFORE AND DURING THE EXCAVATION OF THE WORK AND IMMEDIATELY INFORM THE ENGINEER IF HE CONSIDERS THAT MORE STRINGENT PROCEDURES THAN THOSE SPECIFIED ARE NECESSARY.

3. UNDERPINNING IS TO BE CARRIED OUT IN SHORT SECTIONS OF MAX 1.0M IN LENGTH. THE BOTTOMS OF FOUNDATION SHALL BE INSPECTED AND APPROVED BY THE ENGINEER AND THE BUILDING INSPECTOR BEFORE CONCRETE IS POURED. THE UNDERPINNING IS TO BE CARRIED OUT TO THE SATISFACTION OF THE ENGINEER AND BUILDING INSPECTOR.

4. PROJECTING PORTIONS OF THE EXISTING FOOTINGS ARE TO BE CAREFULLY CUT OFF WHERE DIRECTED AND THE UNDERSIDE OF THE FOOTINGS ARE TO BE CLEANED AND HACKED FREE OF DIRT, SOIL OR LOOSE MATERIALS BEFORE UNDERPINNING.

5. THE BODY OF THE UNDERPINNING IS TO BE CONSTRUCTED IN 1:2:4 MIX CONCRETE AND IS TO BE CAST TO THE WIDTHS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER. EXCAVATION AND CONCRETING OF ANY SECTION OF UNDERPINNING SHALL BE CARRIED OUT ON SAME DAY.

6. THE MASS CONCRETE IS TO BE STOPPED OFF 75MM BELOW THE UNDERSIDE OF THE EXISTING WALL/FOOTING AND THE FINAL PINNING UP OVER THE WHOLE WIDTH OF THE WALL/FOOTING IS TO BE CARRIED OUT WITH 1:3 MIX CEMENT TO SHARP SAND DRY PACK MORTAR WELL RAMMED IN 24 HOURS AFTER THE MASS CONCRETE HAS BEEN POURED.

7. EXCAVATION TO ANY SECTION OF UNDERPINNING SHALL NOT BE STARTED UNTIL AT LEAST 48 HOURS AFTER COMPLETION OF ANY ADJACENT SECTIONS OF WORK.

8. THE SIDES OF THE PREVIOUS UNDERPINNING BAYS ARE TO BE ROUGHENED OR KEYED TO THE SATISFACTION OF THE ENGINEER AND BUILDING INSPECTOR.

9. SEQUENCE OF UNDERPINNING TO BE AS SHOWN. ALL SECTIONS MARKED 1 TO BE EXCAVATED, CAST AND DRY PACKED BEFORE STARTING EXCAVATION OF SECTIONS MARKED 2 AND ALL SECTIONS MARKED 2 TO BE COMPLETED BEFORE EXCAVATION FOR SECTIONS MARK 3 ETC.

10. THE CONTRACTOR IS TO KEEP A RECORD OF THE SEQUENCE AND DIMENSIONS OF THE UNDERPINNING ACTUALLY CARRIED OUT, INCLUDING DETAILS OF EXCAVATION, CASTING CONCRETE AND PINNING UP FOR EACH SECTION.

11. EXCAVATED MATERIAL INTENDED FOR BACKFILLING IS TO BE KEPT PROTECTED FROM DRYING OUT OR WETTING AND IS TO BE PLACED IN MAXIMUM 150MM LAYERS, CAREFULLY COMPACTED WITH A PNEUMATIC OR ELECTRIC PERCUSSION TOOL WITH COMPACTING PLATE.

NOTE:
- ALL UNDERPINS TO BE MAX 900M LONG U.N.O.
- ALL UNDERPINS TO BE DOWELLED INTO ADJACENT UNDERPINS WITH H20 DOWELL BARS @ 500C/C HORIZONTALLY AND VERTICALLY.
- ① DENOTES CONSTRUCTION SEQUENCE FOR UNDERPINNING WORKS.
- ALL UNDERPINNING DETAILS SUBJECT TO CONFIRMATION FOLLOWING RECEIPT OF EXISTING FOUNDATION DETAILS.
- ALL UNDERPINNING DETAILS, EXTENTS & FOUNDATION SIZES T.B.C. PRIOR TO COMMENCEMENT OF WORKS ON SITE.
- GROUND CONDITIONS & ALLOWABLE GROUND BEARING PRESSURE VARIES ACROSS THE SITE. REFER TO SITE INVESTIGATION REPORT 4054 A BY GBG FOR FULL DETAILS.
- DEPTH OF EXISTING MADE GROUND VARIES ACROSS THE SITE. ALL NEW FOUNDATIONS/UNDERPINS ARE TO EXTEND A MINIMUM OF 150MM INTO THE VIRGIN SAND & GRAVEL STRATUM UNDERLYING THE MADE GROUND. REFER TO SITE INVESTIGATION REPORT – 4054 A A BY GBG FOR FULL DETAILS.
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- ALL WATERPROOFING TO ARCHITECTS DETAILS.

TYPICAL REINFORCEMENT QUANTITIES

ELEMENTS:	QUANTITIES (U.N.O.):
SLABS	100 kg/m³
RC PAD FOOTINGS	150 kg/m³
TRANSFER SLABS	200 kg/m³
PILE CAPS/RAFTS	150 kg/m³
COLUMNS	450 kg/m³
RC GROUND BEAMS	230 kg/m³
RC BEAMS	220 kg/m³
RC RET. WALLS	175 kg/m³
RC STAIRS	135 kg/m³
RC WALLS	65 kg/m³
RC BASEMENT SLABS	150 kg/m³
RC LIFT PITS	200 kg/m³
75mm SCREED	10 kg/m³

LOADINGS

ELEMENTS:	DL	LL
FLAT ROOF	1.00 kN/m²	0.90 kN/m²
PITCHED ROOF	1.00 kN/m²	0.75 kN/m²
FLOOR	0.80 kN/m²	1.50 kN/m²
PARTITIONS/WALLS:		
INTERNAL	–	0.60 kN/m²
EXTERNAL	–	–

PRELIMINARY

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Title: STRUCTURAL NOTES

Revision	Date	Made by	Amendments
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Date	Drawn by	Checked	
28/11/22	RR	CG	
Scales	Job No.	Drawing No.	Revision
NA	3292	801	

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