



STRUCTURAL METHODOLOGY STATEMENT IN SUPPORT OF PLANNING APPLICATION

> 17 EATON MEWS NORTH LONDON SW1X 8AR

Report No: 220413-R01-00

May 2021

# 17 EATON MEWS NORTH

# STRUCTURAL METHODOLOGY STATEMENT PLANNING REPORT

May 2021

Report no: 220413-R01-00 Rev 5

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Checker:

Approver:

This report has been prepared for James Busta in accordance with the terms and conditions of appointment for 17 EATON MEWS NORTH. Mason Navarro Pledge Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

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APPENDIX C - CGL BASEMENT IMPACT ASSESSMENT



# 1.0 Executive Summary

This Structural Methodology Statement (SMS) sets out the proposed structure for the formation of a basement at 17 Eaton mews North. The proposed works will form a basement under the property that matches those already formed in the adjacent Mews Buildings.

It has been prepared in order to comply with the requirements set out in the Basement Development in Westminster Supplementary Planning Document (2014). As set out in that document this SMS includes the following information to demonstrate that the engineering of the proposed basement has been carefully considered and proper consideration has been given to the site specific geology, hydrology and boundaries.

- A. A desk Study of the site, including its history, geology and surrounding infrastructure.
- B. An appraisal of the existing structure.
- C. A site investigation relevant to the site.
- D. Details of the Engineering Design
- E. An analysis of the Upper Aquifer, where is exists and how the basement may impact on any groundwater flow.
- F. Details of flood risk, surface water flooding and critical drainage areas.
- G. An assessment of the movements expected and how these will affect adjoining properties.
- H. Details of sequences of construction and temporary propping to demonstrate how the basement can be built to prevent movements exceeding those predicted.

The main body of this SMS summarises all the aspects listed above. A Basement Impact Assessment (BIA) has been produced in support of this work. The BIA document provides full details the issues raised in points A,C,E,F and G above.



## 2.0 Introduction

This document has been produced as a supporting document to the planning application for the redevelopment of 17 Eaton Mews North. It outlines the approach to the structural alterations and formation of a new basement and describes the methods to be used in the construction of the works. The report also includes a Basement Impact Assessment that provides an assessment of the predicted ground movement due to the proposed excavation.

The report is based on a visual inspection of the existing structure and the publicly available results of nearby geotechnical investigations, along with our experience of similar properties and works in the local area. Prior to the next stage of design an invasive investigation of the existing building structure and the underlying foundations and geotechnical conditions should be carried out.

The design has been progressed on the basis that the two adjoining properties (numbers 16 and 18) have previously been redeveloped and basements have already been constructed in accordance with their respective planning applications.



### 3.0 Site Information

#### 3.1 Site Location and History

The site is located at the eastern end of Eaton Mews North in the south west of the City of Westminster. The property is located within the Belgravia Conservation area, and although not listed is considered a "Building of Merit" in the conservation area audit. The property is a mews building, originally serving Number 52 Eaton place and constructed by Cubitt between 1824 and 1848.

Prior to the development of Eaton Place and Eaton Mews North the area was given over to farm land. A Museum of London Archaeology map indicates no known archaeology on the site, but does note an element of Saxon "infrastructure" to the north.

Bomb maps from both 1914-18 and 1939-45 indicate no bomb damage to the property. A "dud" bomb or antiaircraft shell is noted as falling to the south of the property in September 1917 and the properties to the north east on the corner of Eaton Place and Belgrove place are noted as having been severely damaged during the Second World War. All properties on Eaton Place are noted as having received blast damage, but no damage is indicated within the mews.

#### 3.2 Arboriculture

The property does not have a garden and the space to the rear (part of number 52 Eaton place) is hard landscaped. There are no trees in the vicinity of the site and as such the basement will not have a detrimental impact on any roots.

#### 3.3 Underground Structures

The site is not located close to any know tunnels. The Victoria, Piccadilly and Circle Lines are all at least 600m from the site.

The safeguarded zone for Crossrail 2 is located approximately 300m to the south east.

#### 3.4 Existing Utilities

Utilities are known to be located beneath the cobbled surface of the Eaton mews North. Mains water supply and a combined mains sewer are thought to be located more than 3m from the proposed works, however this should be physically checked on site.

Gas and electricity are also located outside the footprint of the excavation. Again this will require physical confirmation prior to excavation commencing and the supplies into the building will require isolation prior to demolition.

#### 3.5 Boundary Conditions

The existing building completely fills the site, with no front or rear outdoor space. The front façade forms the boundary to Eaton Mews North, while the rear forms the boundary to the yard of 52 Eaton Place. The building is a mid-terrace property, adjoined by Numbers 16 and 18 Eaton Mews. The planning portal indicates that basements have previously been given consent in both adjoining properties, along with a mansard roof extension similar to the proposals for Number 17.

#### 3.6 Existing Building Structure

The existing building is of masonry and timber construction. Partially exposed roof trusses span front to back onto the façade walls. The existing first floor is of timber construction. The staircase is of modern construction sitting on a concrete block wall with a timber post supporting the edge of the floor above.

The ground floor is of solid ground bearing construction.



Image 1 - Front elevation. Number 17 in centre



### 4.0 Ground Conditions and Geotechnical Considerations

A more detailed description of the existing ground conditions and previous site investigations may be found in Appendix 3.

#### 4.1 Ground Conditions and Geology

The British Geological Society (BGS) published maps indicates that the area is underlain by superficial deposits of the Kempton Park Gravel Member over the London Clay Formation. The Kempton Park Gravel Member is a River Terrace Deposit and typically comprises of medium dense to dense gravel with sand, silt and occasional bands or lenses of clay.

The London Clay Formation is a firm to stiff, becoming stiff to very stiff with depth, fissured, dark grey silt clay with occasional siltstone/claystone inclusions and selenite crystals. Based on the contours on the BGS geological sheet6, the London Clay is anticipated to be approximately 35m to 40m thick in the area. The London Clay is underlain by Lambeth Group, Thanet Formation and Upper Chalk at depth.

The available BGS borehole records for the area indicate that the top fo the clay is around 8m below ground level.

A site-specific investigation, including a borehole will be required at the next stage of the project to confirm the above conditions and to expose the current as built arrangement of the foundations on the boundary of the site.

#### 4.2 Groundwater

The available records include limited information regarding ground water. Based on the experience of the Geotechnical Specialists it is anticipated that shallow ground water will be present in the Kempton park Gravel, typically around 1 to 2m above the surface of the London Clay. A second deeper body of water may be present within the Lambeth and Thanet Formation.

#### 4.3 Hydrogeology and Hydrology

The site is not located in a groundwater Source Protection Zone (SPZ). The Kempton park Gravel is classified as a Secondary Aquifer, with the London Clay Formation regarded as Unproductive Strata.

The shallow groundwater in the Kempton Park Gravel is thought to flow in a generally south/south-easterly direction towards the Thames.

The nearest surface water feature is Rosamund's Pond to the rear of Buckingham Palace, around 500m north east of the site. Published information from the Environment Agency and the City of Westminster's Preliminary Flood Risk Assessment indicate that the site is not at risk of flooding from rivers. An area of low to moderate surface water flood risk is present to the south and west of the site, while an area with a high risk of surface water flooding is located to the south west.

The River Westbourne, a "lost River" is located 250m west of the site.

#### Plate 3. Extract from BGS geological sheet 270 (South London)

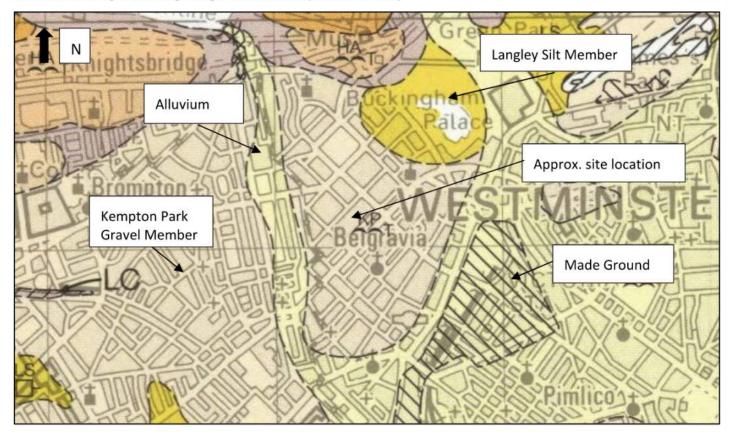


Figure 1 - Extract from CGL BIA Report (Appendix 3)



# 5.0 Development Proposals

#### 5.1 Basement Construction

Formation of the basement will commence with the underpinning of the front and rear façade walls. The underpinning will be undertaken in at least two lifts and will be carried out in a traditional hit and miss sequence as indicated in the attached drawings. All excavation will be undertaken by hand using non-percussive tools. Underpinning of the party walls is not anticipated as planning records indicate that the adjacent properties already benefit from a basement.

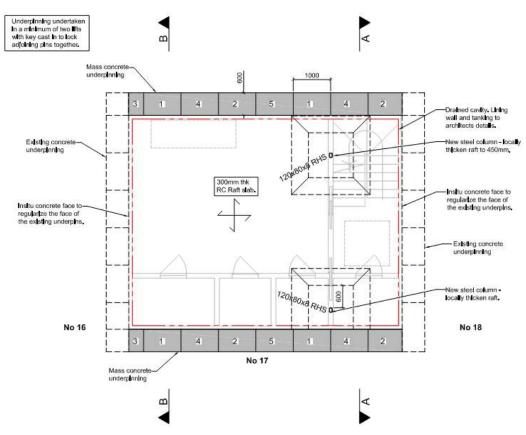


Figure 2 - Extract from Structural Drawing indicating possible underpinning sequence.

On completion of the underpinning the existing ground floor will be broken out and removed before general excavation commences. The basement excavation will be undertaken by hand or using a miniexcavator. The appointed contractor will develop the method statement; however it is envisaged that excavated material will be bagged up and stored on site before periodic removal into skips to be removed as soon as they are filled.

Once the excavation is completed the exposed faces of the existing party wall underpinning will be lined in concrete to regularise the face.

A new 300mm raft slab will be formed over the footprint of the building, including local thickening under the to internal steel columns.

#### 5.2 Super structure

The new ground floor will be constructed in concrete. The upper floors and roof are to be constructed from steel and timber, supported on the surrounding masonry walls and two internal steel posts. New concrete padstones are required under the bearings of all steel beams.

Overall stability is provided by diaphragm action in the floors, the upper floors using the ply deck and joists to distribute lateral load back to the surrounding masonry walls.

#### 5.3 Temporary Works

In order to stabilise the new underpinning and the party walls temporary propping will be required, as indicated in section 7 of this report. The design of the propping will be carried out by the temporary works specialist appointed by the selected contactor.

The temporary propping will remain in place until the new ground floor is complete to provide restraint to the top of the walls.

Temporary support to the front and rear facades will also be required to provide restraint as the existing internal structure is removed and replaced by the new steel and timber.

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### 6.0 Ground Movement Assessment

#### 6.1 Ground Movement

The formation of underpins, excavation of the basement and unloading and then reloading of the foundations will cause a limited amount of movement to occur. Have been commissioned to carry out a ground movement assessment based on the preliminary structural designs and published information regarding ground conditions. The full assessment is included in the Basement Impact Assessment included as Appendix 3 of this report. It is noted that the assessment used a timber ground floor, the use of a concrete ground floor is not considered to alter the results. The main findings are summarised below.

#### 6.2 Results of Assessment

The assessment has found only small levels of movement are anticipated as a result of the proposed works. With less than 1mm of movement predicted to occur in the neighbouring properties.

Stage	Max heave within basement footprint (mm)	Max settlement within basement footprint (mm)	Max vertical movement at No. 16 Eaton Mews North (mm)	Max vertical movement at No. 18 Eaton Mews North (mm)
Total movement	-3.0	1.5	0.3	-0/1

<sup>\*-</sup>ve value indicates heave.

The predicted values are also presented on Plate 9, below.

Plate 9. Drained 'total' movements at 17 Eaton Mews North

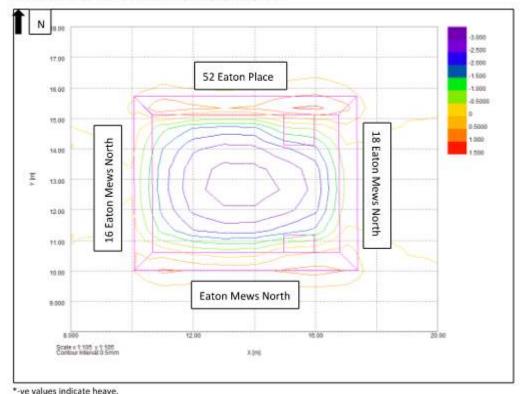


Figure 3 - Extract from CGL Movement Analysis

#### 6.3 Damage Assessment

The estimated movement has been used to determine the impact on the surrounding structures in accordance with CIRIA C760. The assessment places a category against the expected level of damage in accordance with the table below.

Category	Description
0 (Negligible)	Negligible – hairline cracks
1 (Very slight)	Fine cracks that can easily be treated during normal decoration (crack width <1mm)
2 (Slight)	Cracks easily filled, redecoration probably required. Some repointing may be required externally (crack width <5mm)
3 (Moderate)	The cracks require some opening up and can be patched by a mason. Repointing of external brickwork and possibly a small amount of brickwork to be replaced (crack width 5 to 15mm or a number of cracks <3mm)
4 (Severe)	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows (crack width 15mm to 25mm but depends on number of cracks)
5 (Very severe)	This requires a major repair involving partial or complete re-building (crack width usually >25mm but depends on number of cracks)

Figure 4 - Extract from CGL Report describing damage categories

The results indicate that the anticipated damage to neighbouring properties is Category 0 (Negligible). Damage to the facades of Number 17 is estimated to be consistent with Damage Category 1. This will be addressed through normal redecoration during the project.

The assessment is based on the results of the analysis and relies on the appointed contractor complying with normal good practice in their underpinning and excavation works.

#### 6.4 Monitoring

Although only very small movements are predicted it is recommended that a monitoring strategy is put in place during the works to observe ground movements and allow adjustments to be made in the event of unexpected results.

The monitoring will be in accordance with the Observational Method as defined in CIRIA R185 and will require survey targets to be installed at key points to allow regular readings to be taken. The monitoring should commence prior to works starting on site.



# 7.0 Outline Construction Sequence

The sequence outlined below is as envisaged during the structural design. The appointed contractor will develop their own sequence and method of working, which may differ from that set out below. The contractor will produce a detailed method statement, including temporary works designs and details in advance of work commencing on site.

#### 7.1 Stage 1 - Site Set Up

- Mobilisation of the contractor's team.
- Surveys to confirm buried services and boundary conditions.
- Condition survey of adjacent properties and mews surface.
- Design of temporary works.
- Establishment of site welfare.
- Isolating incoming services.
- Establish monitoring targets on surrounding structures.

#### 7.2 Stage 2 - Soft Strip

- Remove all finishes and internal non-loadbearing partitions
- Confirm details of existing structure are as expected.

#### 7.3 Stage 3 - Façade Propping and Demolition

- Establish temporary works and external scaffold.
- Install temporary structure to support facades once internal structures removed.
- Consider provision of temporary roof to allow works to be undertaken under cover.
- Demolition of existing roof and first floor

#### 7.4 Stage 4 - Underpinning

- Locally break out ground floor at perimeter of building.
- Excavate by hand to expose underside of existing footing, working in hit and miss sequence as set out on drawings.
- Install RC underpins, including dry pack at interface with existing footings.
- Backfill excavations before excavating for next section in sequence.

#### 7.5 Stage 5 - Propping

- On completion of all underlining locally reduce internal level to top of underpins.
- Install horizontal whaling beams to perimeter of building with internal props to hold underpins in position.

#### 7.6 Stage 6 - Excavation

- Excavate soil within proposed basement
- At approximately 50% depth install further horizontal whaler and locally excavate to install raking shaws on sacrificial pad footing located below proposed formation level

#### 7.7 Stage 7 - New Basement Raft Slab

- Clean and prepare formation to receive blinding layer
- Fix reinforcement, including laps/couplers to bars in underpinning
- Place concrete and allow to cure.

#### 7.8 Stage 8 - Lining walls and Columns

- Fix rebar to face of existing party wall underpinning.
- Fix shutters to face of existing underpinning
- Place concrete to form lining wall to regularise face of underpinning.
- Cast new RC columns

#### 7.9 Stage 9 - New Ground Floor

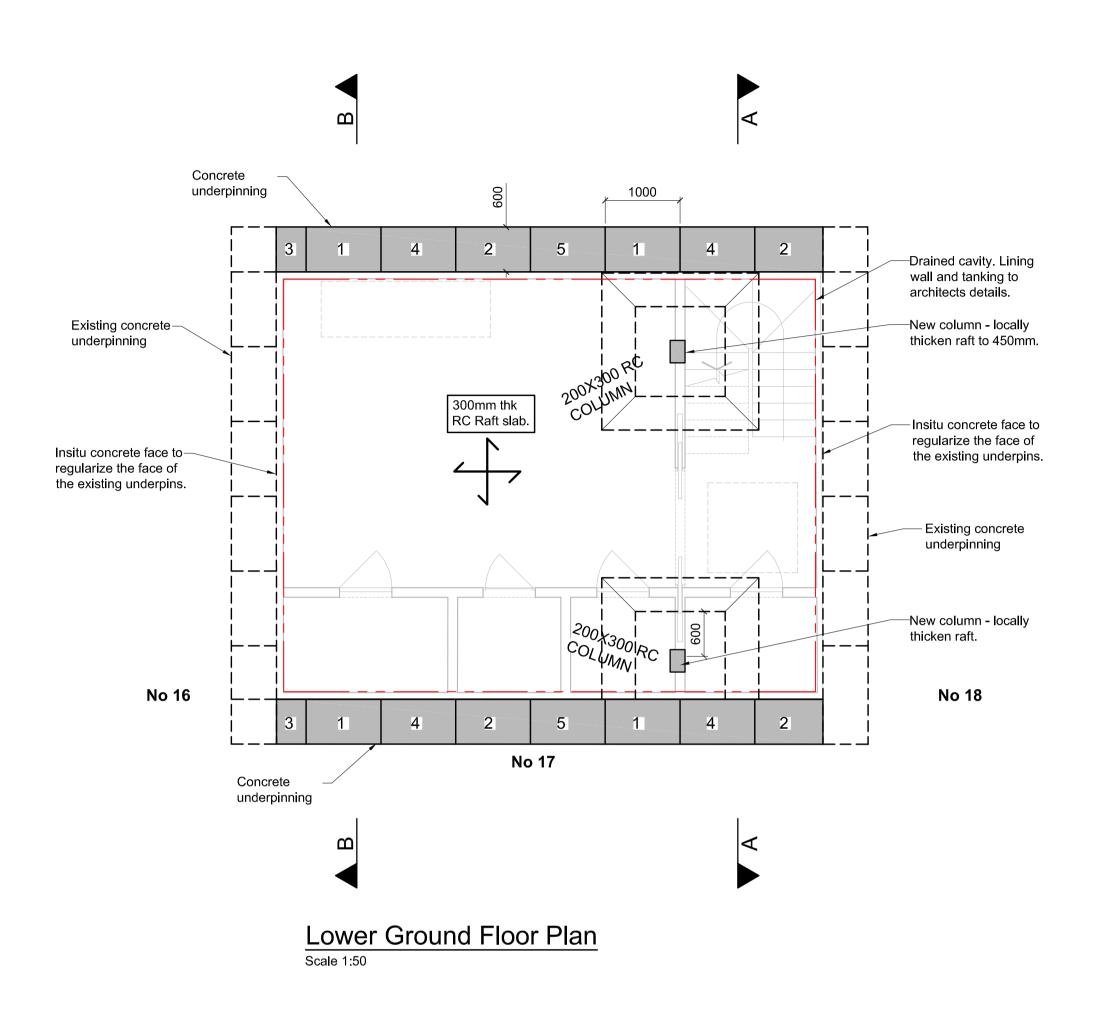
- Construct new RC ground floor slab.
- Once slab has reached adequate strength remove temporary props.
- Infill voids in raft slab where raking props removed.

#### 7.10 Stage 10 - Superstructure

- Install new pad stones in perimeter walls.
- Erect new steel frame.
- Fix ply timber deck.

#### 7.11 Stage 11 - Remove Façade Supports

- Once new superstructure is complete (including ply deck) remove façade supports.
- Make good/repair finishes to façade walls



# Notes for underpinnning

1. Excavate for underpin heading number 1 ensuring the sides of the excavation are properly supported. Note: Headings of the same number may be undertaken simultaneously. Use concrete poling boards as permanent shuttering if required to retain the soil at the back top edge of the excavation. Excavations must be kept dry.

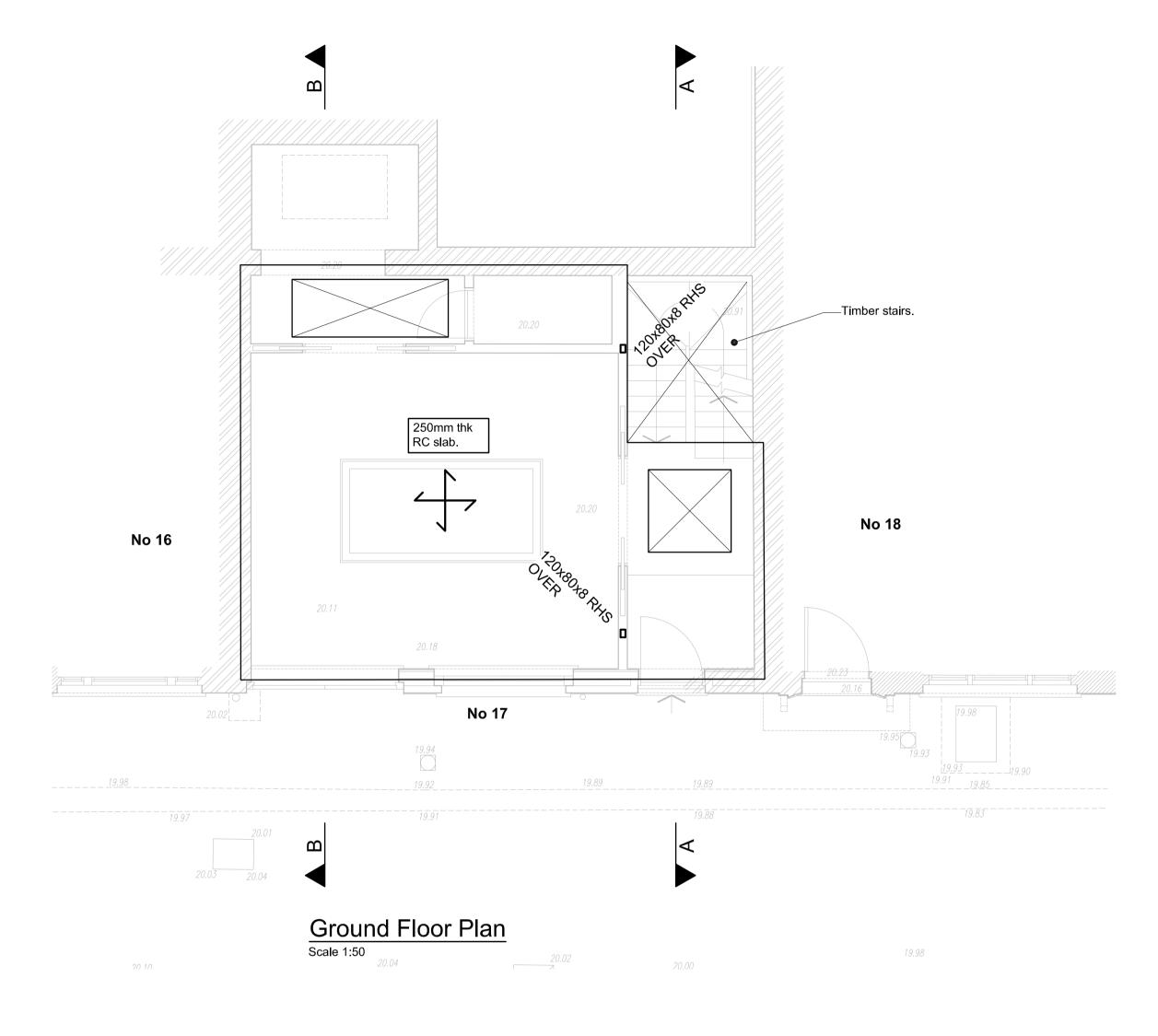
# 2. Clean off the bottom of the existing concrete foundation.

3. As soon as the excavation is complete and approved by the building inspector, cast underpin in C25 concrete up to within 75mm of the underside of the existing foundation. Excavations are not to be completed and left open overnight.

4. 24 Hours after casting, ram in dry pack between the concrete heading and the underside of the existing foundations. Dry pack is to be 'Earth damp' 1:2 cement: sharp sand. It is important that the mix is not over-wetted and that it is thoroughly rammed in place over the whole area.

5. Temporarily back fill excavation in 200mm layers of well compacted granular material.

6. Repeat the above operations for each heading in sequence. make sure that the side of the heading previously cast and now exposed has any soil adhering to it cleaned off. Note 3 Clear days must elapse between the full completion of the heading before excavation for an immediately adjacent heading can commence.



#### General

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administrator for comment before work begins.

1.4 All materials to comply with the relevant British Standard.

## <u>Concrete</u>

2.1 All concrete is to be in accordance with the National

Structural Concrete Specification 4th Edition.

2.2 All concrete materials, transportation, handling and workmanship to be in strict compliance with the relevant

Eurocode; EC2, BS EN 1992.

2.3 All reinforced concrete to be designated grade RC30/37 UNO.

2.4 All mass concrete to be designated grade GEN3.

2.5 The minimum cover to reinforcement is 50mm UNO.

2.6 Min 50mm blinding concrete is to be placed under all reinforced concrete in contact with the ground.

2.7 Dry pack is to be 'Earth damp' 1:2 cement : sharp sand.2.8 All padstones to be constructed in either 30N mass concrete

(GEN 1) or 50N (Class B) Engineering brick.

## Reinforcement

3.1 All reinforcing bars to be B500A or B500B grade.3.2 All reinforcement in accordance with the relevant Eurocode;EC2, BS EN 1992 and with BS8666: 2005.

3.3 Provide minimum 42Ø lap length to all rebars connections.

Temporary Works and Sequence:
Final design of temporary works and construction sequence to be undertaken by appointed contractor using a suitably qualified temporary works coordinator and designer and be in accordance with the current version of BS5975:2019.

Removal of internal floors and roof will leave the retained facades unstable, temporary propping and bracing must be put in place prior to demolition commencing.

Temporary propping and bracing of the underpinning is required until the new ground floor structure is completed. Propping and restraint should account for surcharge loading of scaffold and facade retention. On the front elevation the surcharge due to highway loading should also be included.

P3 Preliminary Issue 28/05/21 DR
P2 Preliminary Issue 10/05/21 DR
P1 Preliminary Issue 30/04/21 DR
REV COMMENTS DATE CHK

# PRELIMINARY



MR JAMES BUSTA

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17 EATON MEWS NORTH LONDON , SW1X 8AR

DRAWING

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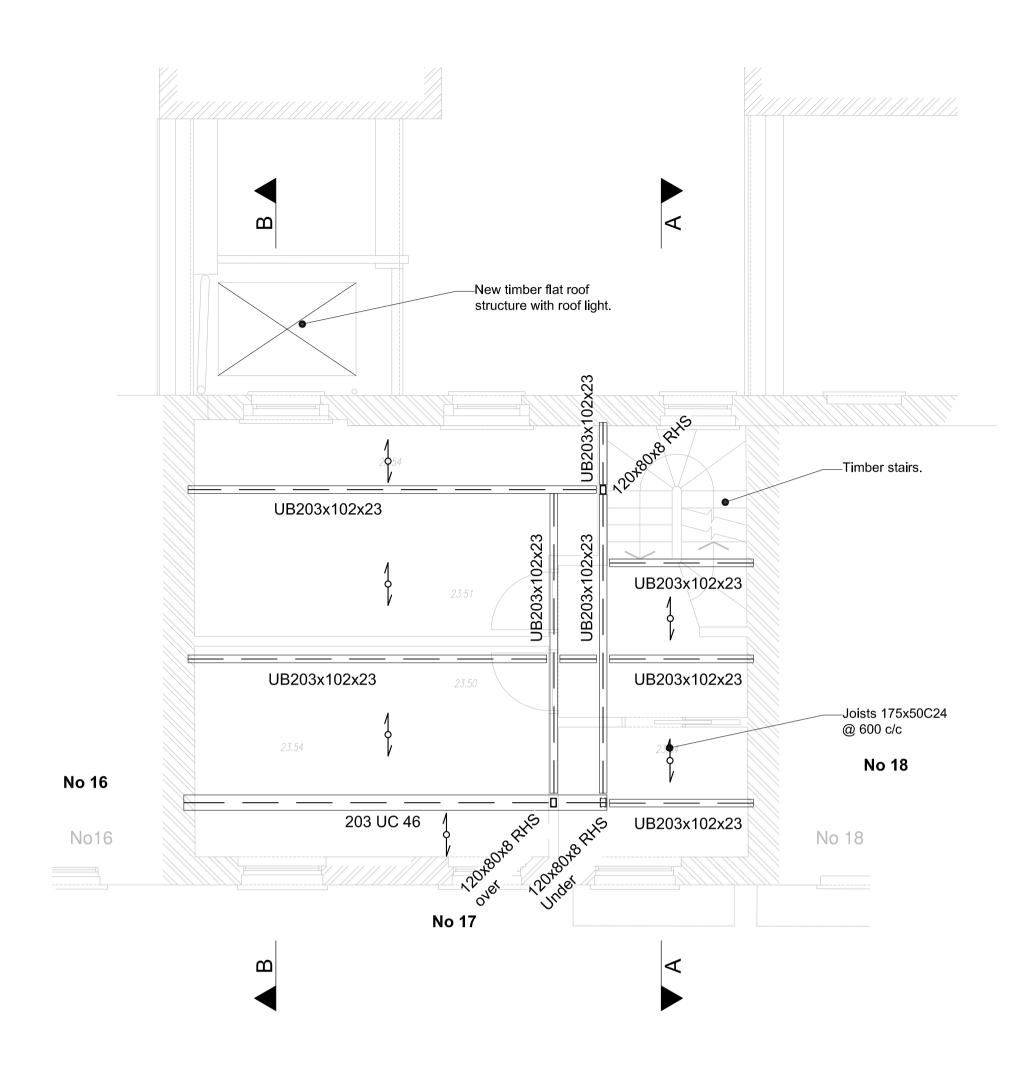
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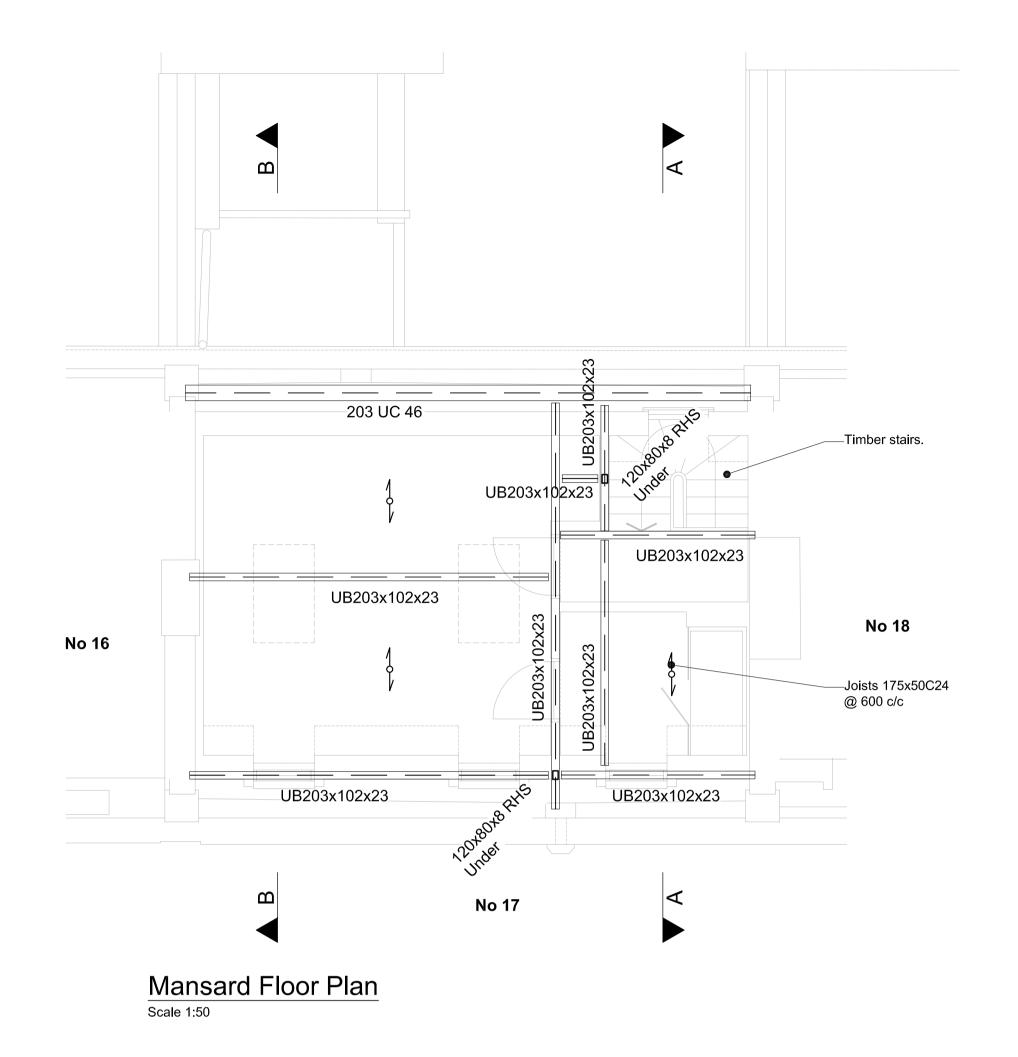
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First Floor Plan Scale 1:50



Note: Removal of chimney breasts will require steel beams to support masonry over - No gallows brackets.

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#### Reinforcement

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3.3 Provide minimum 42Ø lap length to all rebars connections.

Provide insitu concrete padstones under all new steel beams.

### Floor Perimeter:

Fix new timber wall plate to perimeter of floor with M12 resin anchors at 400 mm c/c. Where floor spans perpendicular to the wall fix joist hangers to new plate. Where floor is parallel to wall fix floor deck to top of new plate.

accordance with the current version of BS5975:2019.

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> P2 Preliminary Issue P1 Preliminary Issue

10/05/21 DR 30/04/21 DR

# **PRELIMINARY**



Consulting Civil and Structural Engineers LONDON · MANCHESTER · HITCHIN

Email: office@mnp.co.uk www.mnp.co.uk

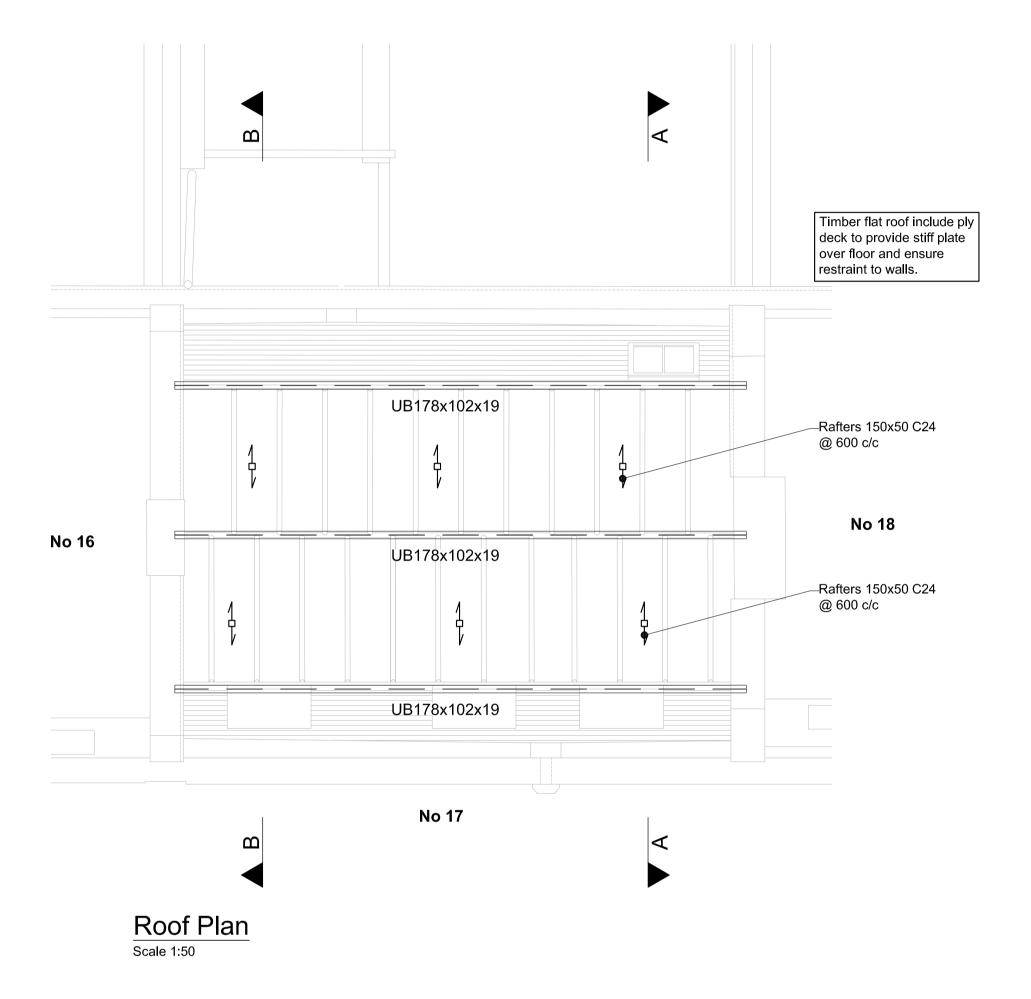
MR JAMES BUSTA

17 EATON MEWS NORTH LONDON, SW1X 8AR

FIRST FLOOR & MANSARD FLOOR GA

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Note: Removal of chimney breasts will require steel beams to support masonry over - No gallows brackets.

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> P2 Preliminary Issue P1 Preliminary Issue

10/05/21 DR 30/04/21 DR

# PRELIMINARY



Consulting Civil and Structural Engineers LONDON · MANCHESTER · HITCHIN 

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MR JAMES BUSTA

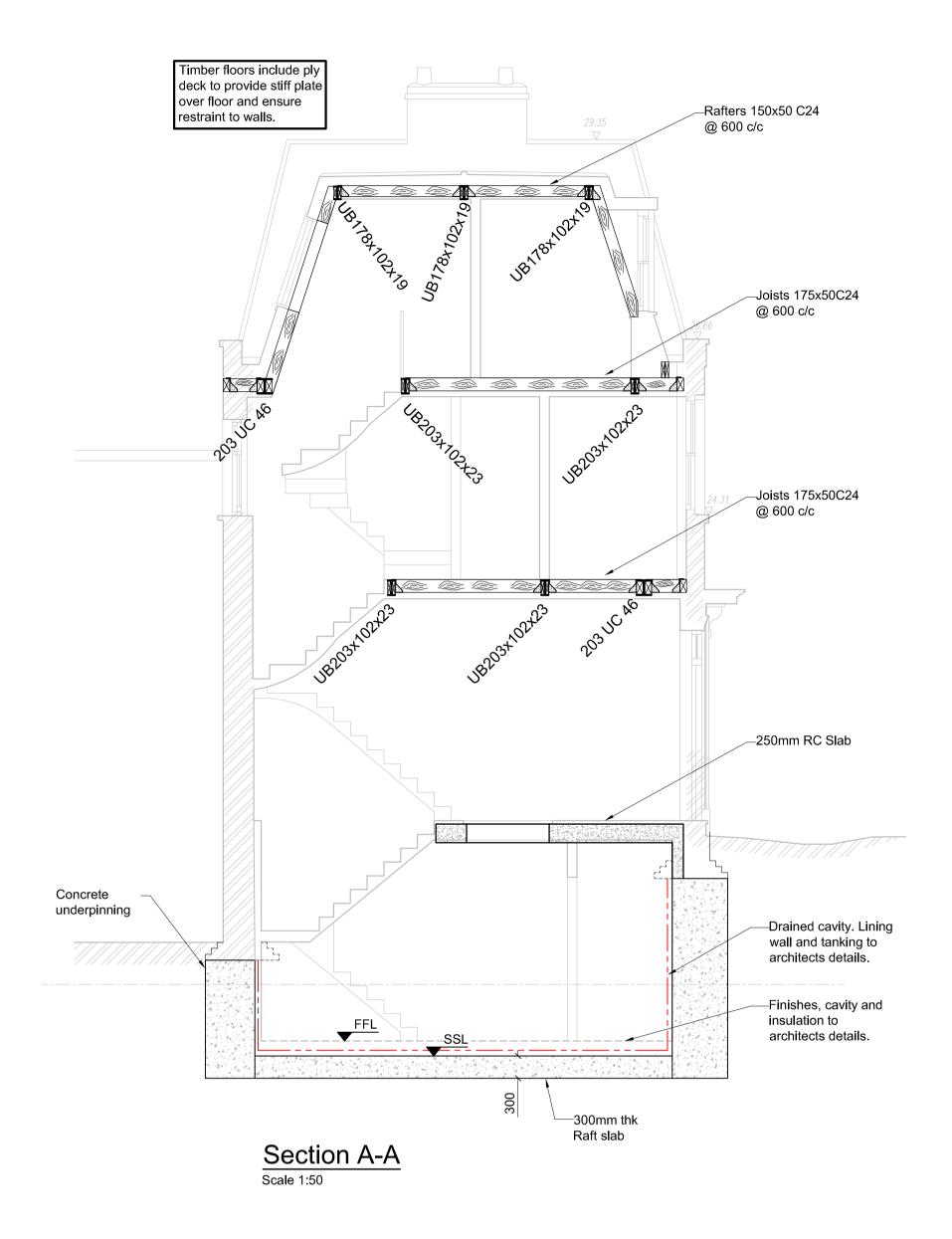
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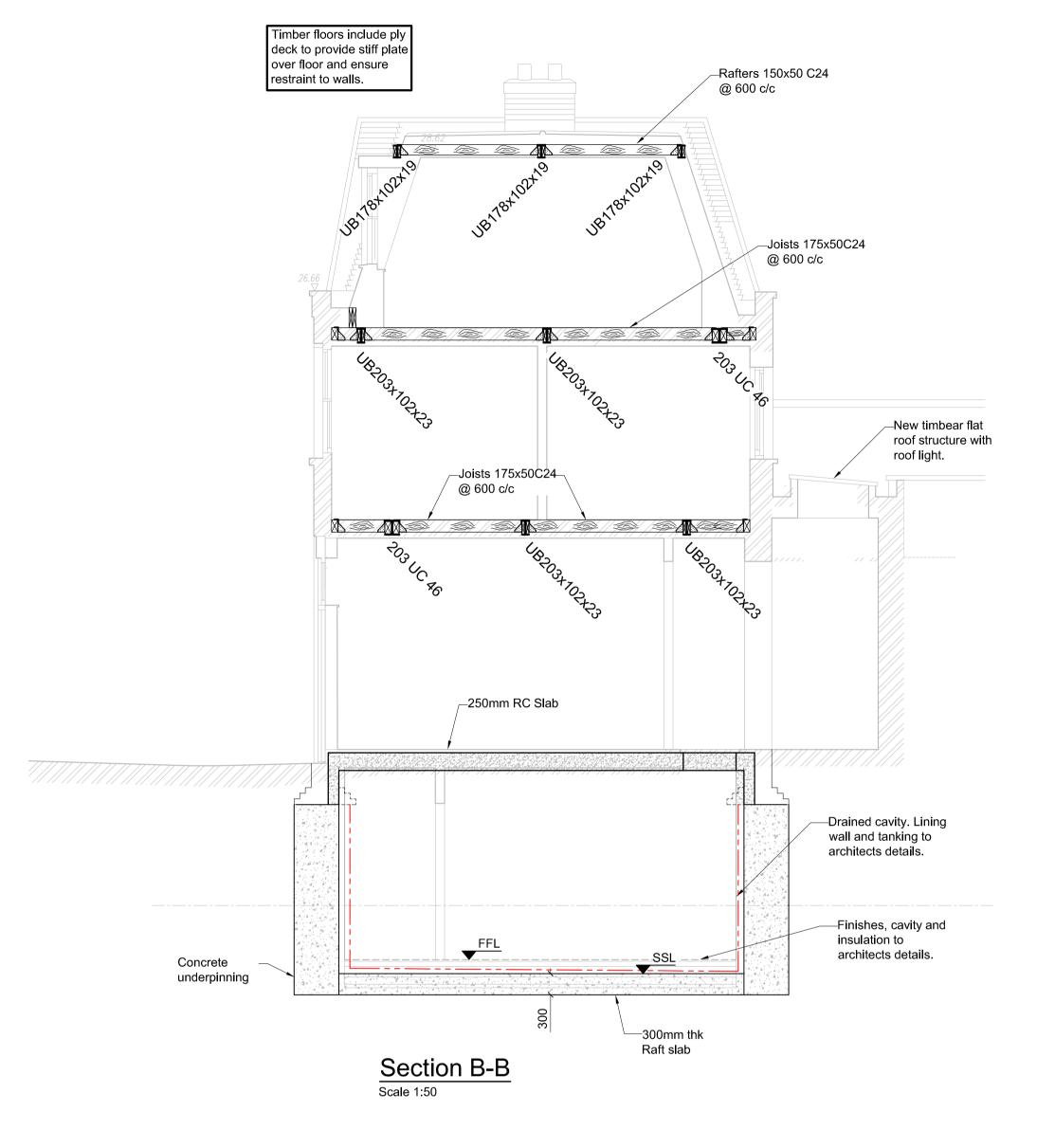
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Structural Concrete Specification 4th Edition. 2.2 All concrete materials, transportation, handling and workmanship to be in strict compliance with the relevant

Eurocode; EC2, BS EN 1992. 2.3 All reinforced concrete to be designated grade RC30/37 UNO.

2.4 All mass concrete to be designated grade GEN3.

2.5 The minimum cover to reinforcement is 50mm UNO. 2.6 Min 50mm blinding concrete is to be placed under all

reinforced concrete in contact with the ground. 2.7 Dry pack is to be 'Earth damp' 1:2 cement : sharp sand.

2.8 All padstones to be constructed in either 30N mass concrete (GEN 1) or 50N (Class B) Engineering brick.

#### Reinforcement

3.1 All reinforcing bars to be B500A or B500B grade. 3.2 All reinforcement in accordance with the relevant Eurocode; EC2, BS EN 1992 and with BS8666: 2005.

3.3 Provide minimum 42Ø lap length to all rebars connections.

Provide insitu concrete padstones under all new steel beams.

#### Floor Perimeter:

Fix new timber wall plate to perimeter of floor with M12 resin anchors at 400 mm c/c. Where floor spans perpendicular to the wall fix joist hangers to new plate. Where floor is parallel to wall fix floor deck to top of new plate.

# Temporary Works and Sequence:

Final design of temporary works and construction sequence to be undertaken by appointed contractor using a suitably qualified temporary works coordinator and designer and be in accordance with the current version of BS5975:2019.

Removal of internal floors and roof will leave the retained facades unstable, temporary propping and bracing must be put in place prior to demolition commencing.

Temporary propping and bracing of the underpinning is required until the new ground floor structure is completed. Propping and restraint should account for surcharge loading of scaffold and facade retention. On the front elevation the surcharge due to highway loading should also be included.

> P3 Preliminary Issue 28/05/21 DR P2 Preliminary Issue 10/05/21 DR P1 Preliminary Issue 30/04/21 DR

# **PRELIMINARY**



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