26 Rosslyn Hill London – NW3

Structural Engineering Strategy Stage 2 Report

Report Prepared For:

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Introduction – Project Description

It is proposed to redevelop the site Rosslyn Hill, London NW3 through demolition behind the retained front façade and the erection of a replacement three storey dwelling with accommodation in the roof.

This report has been prepared to support the planning application for the new development and describes the general structural strategy for the new building.

The Site

Rosslyn Hill in Hampstead connect the south end of Hampstead High Street and the north end of Haverstock Hill (A502).

No 26 Rosslyn Hill front elevation is facing southwest and is adjacent to Hampstead Police station on its North boundary. On the South side of the site a brick retaining wall separates No 26 and Nos 22-24 properties.

There is a difference in levels between the front of the site at pavement level and the rear of the garden of approximately 3.20 m.

Consequently, access to the existing house lower ground floor from pavement level is through steps and a sloping footpath.

Existing Building

The existing building is a three-storey detached property comprising accommodation on the lower ground floor, upper ground floor and first floor.

Access from the pavement at higher level to the main house lower ground front and side entrance is via a series of steps and a sloping footpath to cater with the difference in levels between the lower ground floor and pavement at the front of the site.

The structural fabric of the building is typical of buildings of this type and period. It consists of solid load bearing masonry walls supporting internal suspended timber floors. The roofs over the main house are duo pitch timber frames roof with a mono pitch roof to the rear single storey part of the house. We expect these roofs to be timber cut rafters with timber purlins and struts supported on the front and rear elevation walls and on the internal loadbearing masonry walls.

Condition Survey

No condition survey nor structural survey of the property has been carried out at this stage of the design process.

As the project involves the demolition of the building with the retention of the front elevation wall only, we advise that a thorough condition survey of the front elevation and brick features is carried out prior to starting demolition and installing the façade retention system. The survey shall include extensive photographic records of all the façade features to be retained.

Equally, a survey of the boundary walls shall be undertaken and will form part of the information required for the Party Wall award.

Ground Conditions

No geotechnical investigation has been carried out to date and this will be commissioned in the next phases of the project.

However, the British Geological Survey maps and historical borehole records in the area reveal that the site geological strata consist of made ground over London Clay with the Woolwich and Reading Beds and Thanet Sand at greater depth (approximately 70.0 m below ground).

Substructure & Foundations

Main Foundations

The main foundations of the new building behind the retained façade consist of a traditional mass concrete trench fill foundation.

Based on the structural loading and anticipated ground conditions the preliminary design indicates 600 mm wide and 1.20 m deep foundations centred under the masonry load bearing walls above. A clay heave board shall be installed to the internal face of the external walls foundations to cater with lateral pressures created by the subsoil clay heave as described on drawing 1021-201.

Underpinning

No trial pits have been dug out to investigate the profile and depth of the existing garden wall foundations on the south side of the site and the retained façade foundations. These will be carried out in the next phases of the design.

However, it is anticipated that the brick garden wall will have to be underpinned to create the new lower ground floor service entrance, pantry and boot room. The reinforced concrete underpins and toes create a new retaining wall to the garden at No 22-24 Rosslyn Hill which is higher than the proposed new lower ground floor. A 450 mm toe to the 250 mm thick underpin forms the structural slab in the lower ground floor in the area adjacent to the original brick garden wall (see details on drawing 1031-201).

The underpins and associated toes will be cast in 1.0 m length in a "hit and miss" sequence in order to maintain the stability of the wall and retained earth behind at all times.

Mini Piles - Screw Piles

It is proposed to build a bin and bike store to the front of the building. The footprint of this element at lower ground level falls within tree T1 root protected area. Consequently, a traditional trench fill foundations as per the main building cannot be adopted for the bike store.

A screw pile foundations system with ground beams spanning between the piles and supporting the suspended floor is proposed for this part of the building (see details on drawings 1031-201).

Lower Ground Floor Slab

As the soil sub-strata is London Clay a suspended floor is proposed for the lower ground floor slab.

The proposed lower ground floor construction is a beam and block floor with 150 mm deep precast pre-stressed concrete beams at 525 mm centres with an aerated concrete block infill between the beams.

The beams are spanning between the new external and internal walls foundations as described above.

A 225 mm deep vented void will have to be maintained under the suspended floor construction with air vents installed within the external walls and internal walls to maintain cross ventilation.

Waterproofing

Waterproofing of the wall will be required along the underpinned brick wall between No 26 and No 22-24 as this wall is a retaining wall with the adjacent property garden behind at higher levels.

We recommend installing a waterproofing system to the toe of the underpinning in this area as well to prevent any ingress of water.

The waterproofing shall be Grade 3 waterproofing as defined in BS 8102 meaning no water penetration or damp is acceptable.

It is common practice in residential development to provide two lines of defence and two waterproofing systems.

Such systems can include a waterproof cementitious render applied to the internal face of the wall and top of the toe (eg SIKA render) together with a drained cavity (eg Delta Drain membranes) drained to the site drainage.

Superstructure

Floor Construction

Timber joists are used for the upper ground, first and second floors. However, in order to integrate the services within the floor construction depth and optimise the floor to ceiling heights it is proposed to use easy joists as opposed to traditional solid timber joists.

These joists consist of a timber top and bottom chords with metal web with large openings enabling horizontal services circulation within the floor thickness as illustrated below.

These joists are installed at 400 mm centres and are 225 mm deep. Tongue and groove floorboards screwed to the joists top chords create the floor subbase.



Easy joist floor construction

Vertical supports

The floors are supported by the new masonry walls as shown on the upper ground floor, first floor and second floor plans included in the appendices.

The new external load bearing walls supporting the floors are cavity wall construction with a brick outer skin and a 7N/mm² lightweight block inner skin. The internal load bearings walls consist of 200 mm thick lightweight blocks.

Where required, and as shown on the plans, steel beams are installed within the floor depth spanning between the loadbearing walls supporting the floors.

To the rear of the building a steel frame with steel columns down to foundation levels is installed to support the bay window starting at the upper ground floor and the set back mansard at second floor levels. Again, the steel frame beams are installed within the depth of the timber joists and consequently, no down stand beams are created in the ceilings.

Roof

The roof comprises a mansard to the front of the property and a flat roof behind the mansard.

The flat roof part construction is similar to the floor below and consist of easy joists at 400 mm centres to enable horizontal services circulation within the second floor ceiling.

Firing timber pieces are screwed to the top chord of the easy joists below the roof boarding to create the roof fall and provide adequate rainwater run off.

Where the internal loadbearing walls are not built up to the underside of the roof, steel beams are introduced to support the flat roof structure.

The mansard part of the roof is formed with cranked steel frames and 200 x 50 timber rafters supported on the second floor steel beams and the roof steel frames.

Progressive Collapse

Structural robustness and progressive collapse requirements are defined in the Building Regulations and based on the building type and number of storeys.

The proposed building is a single occupancy dwelling four storey high and consequently falls into the Consequence Category 1 buildings.

As the building is designed and will be constructed in accordance with the Building Regulations technical guidance documents no additional measures are likely to be necessary for Consequence Category 1 buildings.

Lateral Stability

The lateral stability of the building is provided by the external masonry walls and the solid internal load bearing walls around the stairs.

Retained Façade

The proposed development consists of demolishing the existing building and retain the front elevation from the lower ground level to the first floor ceiling level (new second floor level).

Consequently, in the temporary condition the three storey façade will be left with no lateral restraints and supports after the demolition of the internal floors, and walls.

A temporary steel frame façade retention system shall be installed to provide lateral restraints the free-standing retained wall

Prior to demolition of the building behind the façade a thorough condition survey shall be carried out of the retained front elevation. All brick and stone features, defects shall be logged with extensive photographic records kept.

Façade Retention System

The façade retention is installed on the outside of the wall thus enabling the works to be carried out in the inside of the building.

The lateral stability of the façade in the temporary conditions is provided by a series of steel frames three storey high installed on the outside of the façade one new foundations.

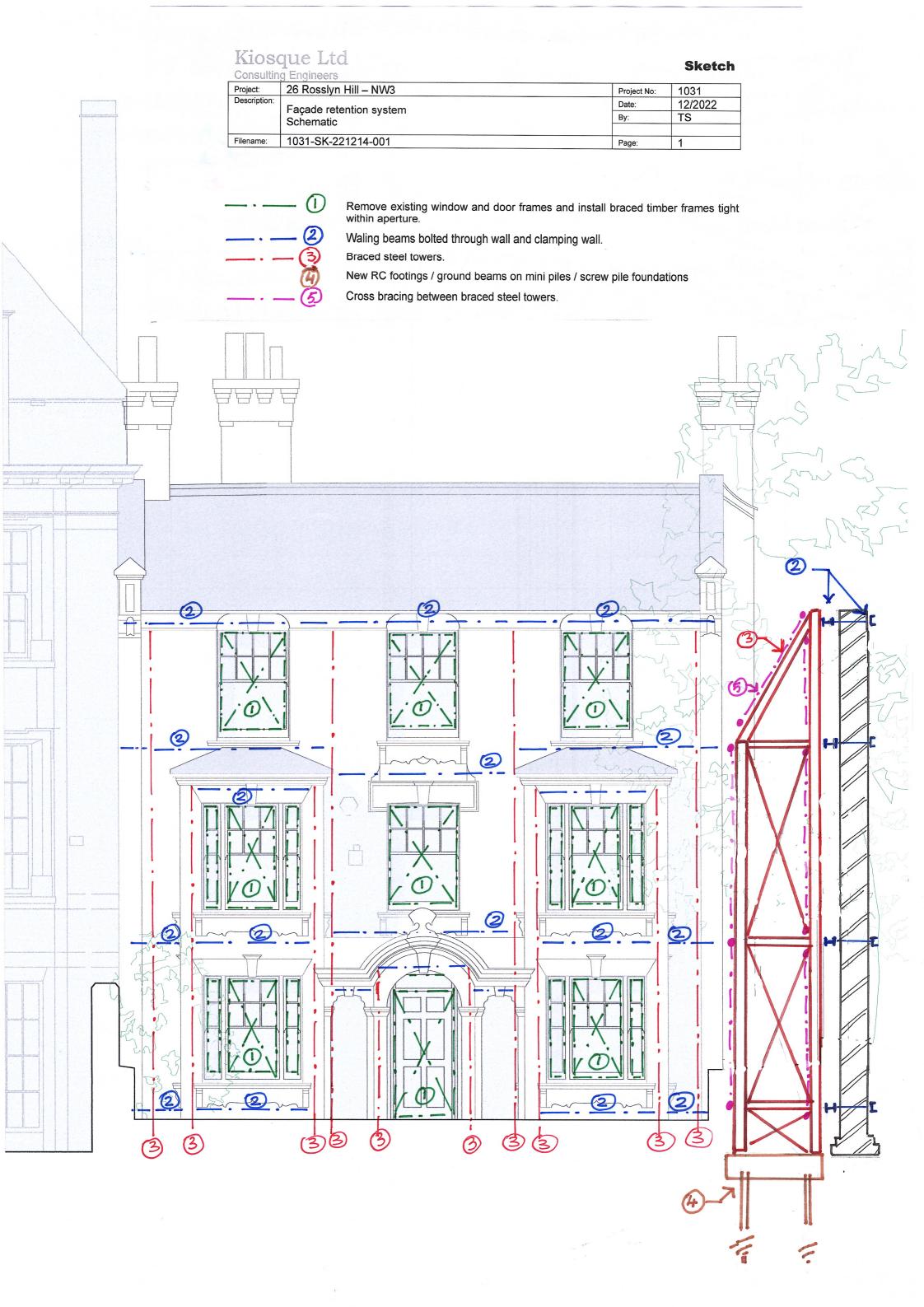
As the front of the property is within tree T1 root protected area (RPA), the new foundations for the temporary façade retention system consist of a series of reinforced concrete pad foundations / ground beams on screw piles. Therefore, this option minimises the amount of excavations within the RPA.

Braced steel towers / frames fabricated from standard steel sections (203 x 203 UC) are providing the lateral stability of the free-standing wall to be retained.

Horizontal waling steel beams spanning between the main steel frames / towers are installed typically at floor levels and bolted through the wall and clamping the façade. These beams shall be installed either above or below the future floor levels behind so that they will not clash with the future construction.

Prior to installing the façade retention system all windows and door frames will be removed and replaced by braced timber frames installed tight within the door and windows apertures. This will ensure that the existing openings will not distort during the demolition and in the temporary conditions.

Once the retention system has been installed demolition will start.



Construction Methodology

Main Construction Sequence

The following is an outline of the proposed sequence of construction activities on site:

- Installation of façade retention system foundations.
- Installation of façade retention system.
- Demolition of the existing building.
- · Underpinning of South boundary wall.
- Excavations to lower ground floor level formation levels.
- Trench fill foundations excavations.
- Installation of trench fill foundations.
- Construction of new masonry walls to underside of beam and block floor and DPC levels.
- Construction of lower ground floor beam and block floor.
- Construction of first lift of blockwork.
- Installation of rear steel frame to first floor.
- Installation of upper ground floor easy joists and steel beams.
- · Construction of second lift of blockwork.
- Installation of first floor easy joists and steel beams.
- Installation of rear steel frame to second floor level
- Construction of third lift of blockwork.
- Installation of second floor easy joists and steel beams.
- Installation of roof and mansard steel frame.
- Installation of roof mansard timber and easy joists.

Next Stages Further Studies / investigations

Further studies and investigations will be required to develop the design to the next detailed stages and have been listed below:

Geotechnical Investigations:

Trial pits and boreholes together with soil analysis will be required to inform the ground conditions, soil contamination, ground water level required for the foundations design.

Existing Foundations Depth and Profile:

Excavations of trial pits to expose the existing foundations of the retained façade and the South boundary garden wall will ascertain the depth and profile of the foundations at these locations.

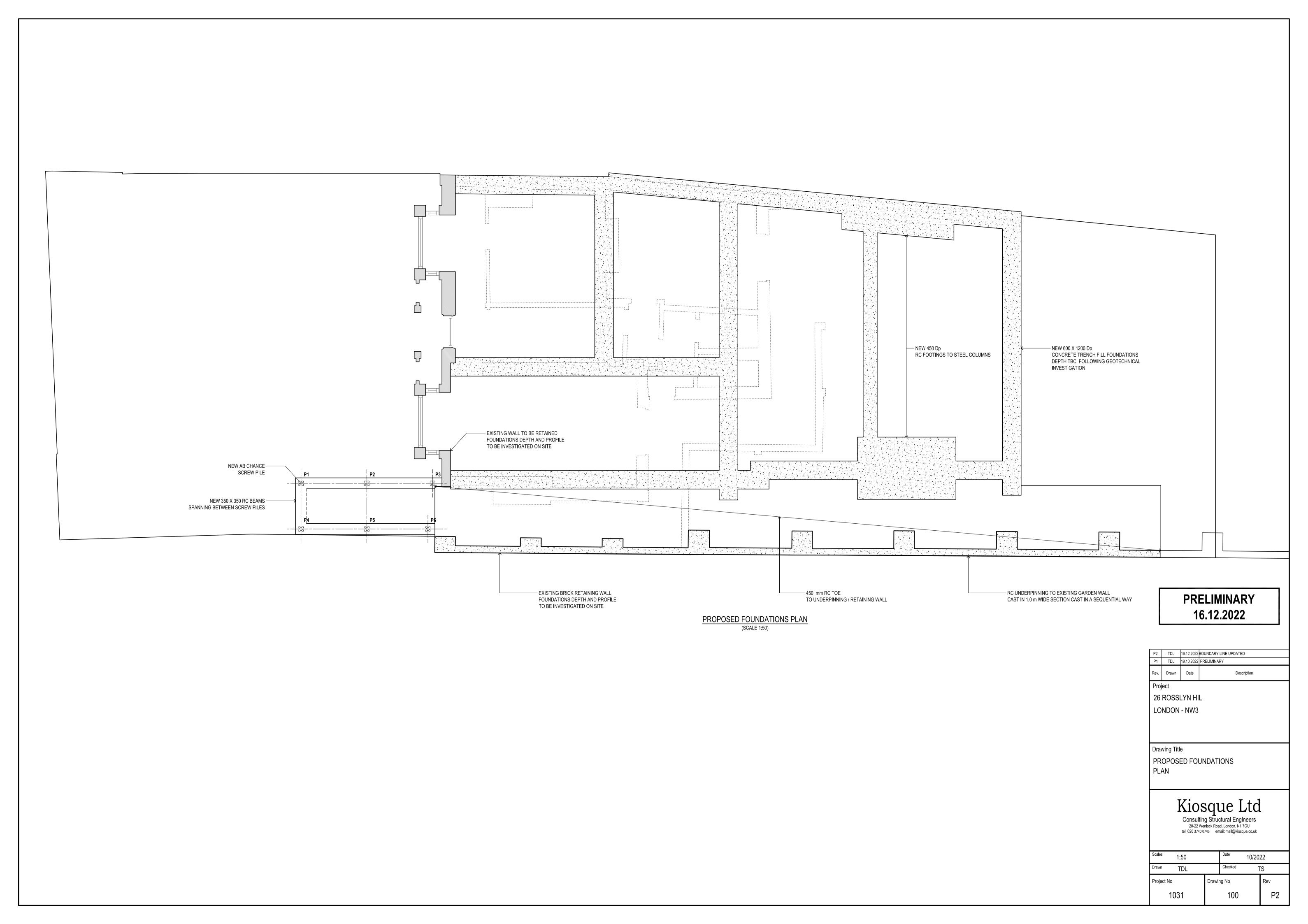
Condition Survey of the façade

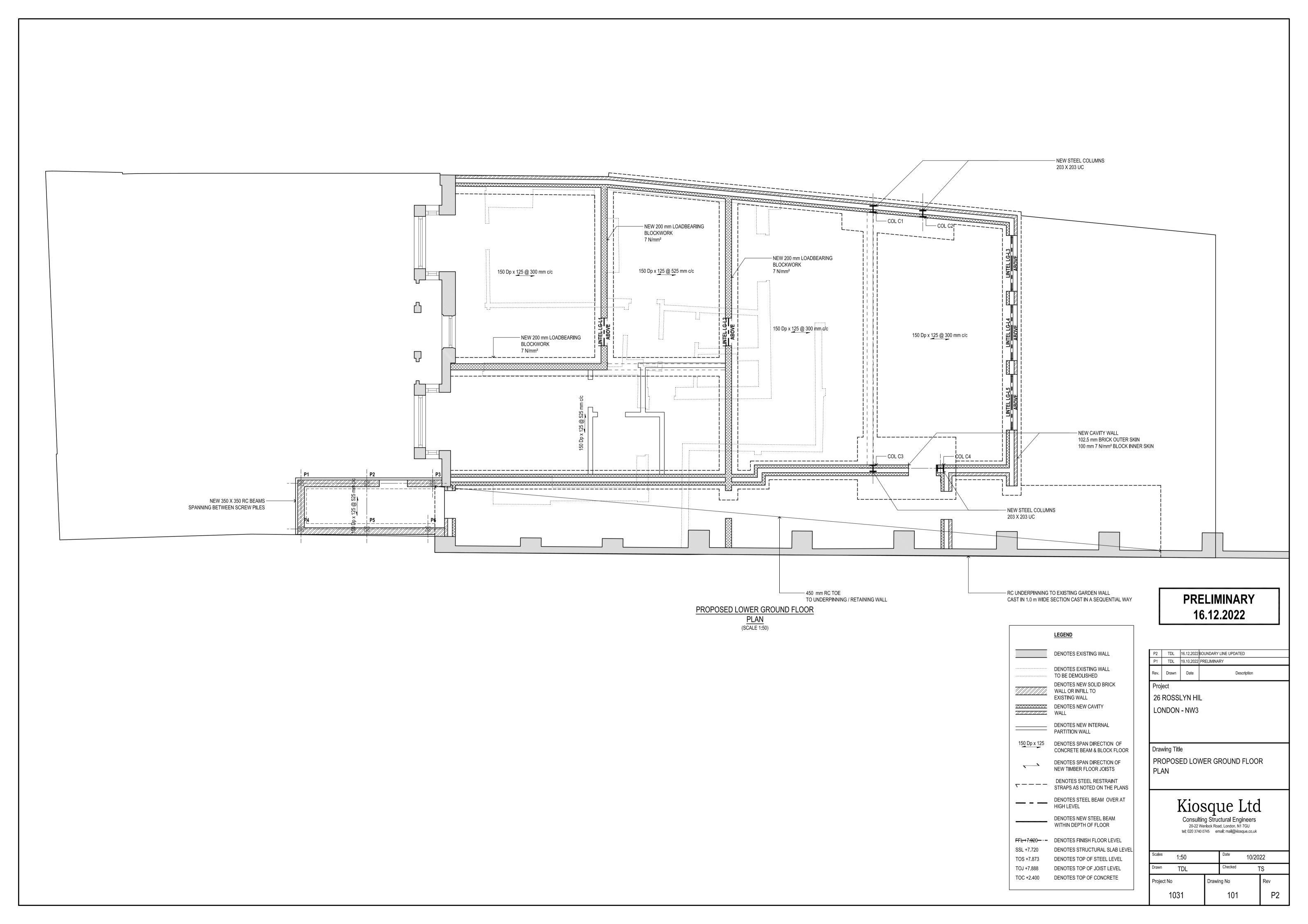
Condition survey of the garden wall

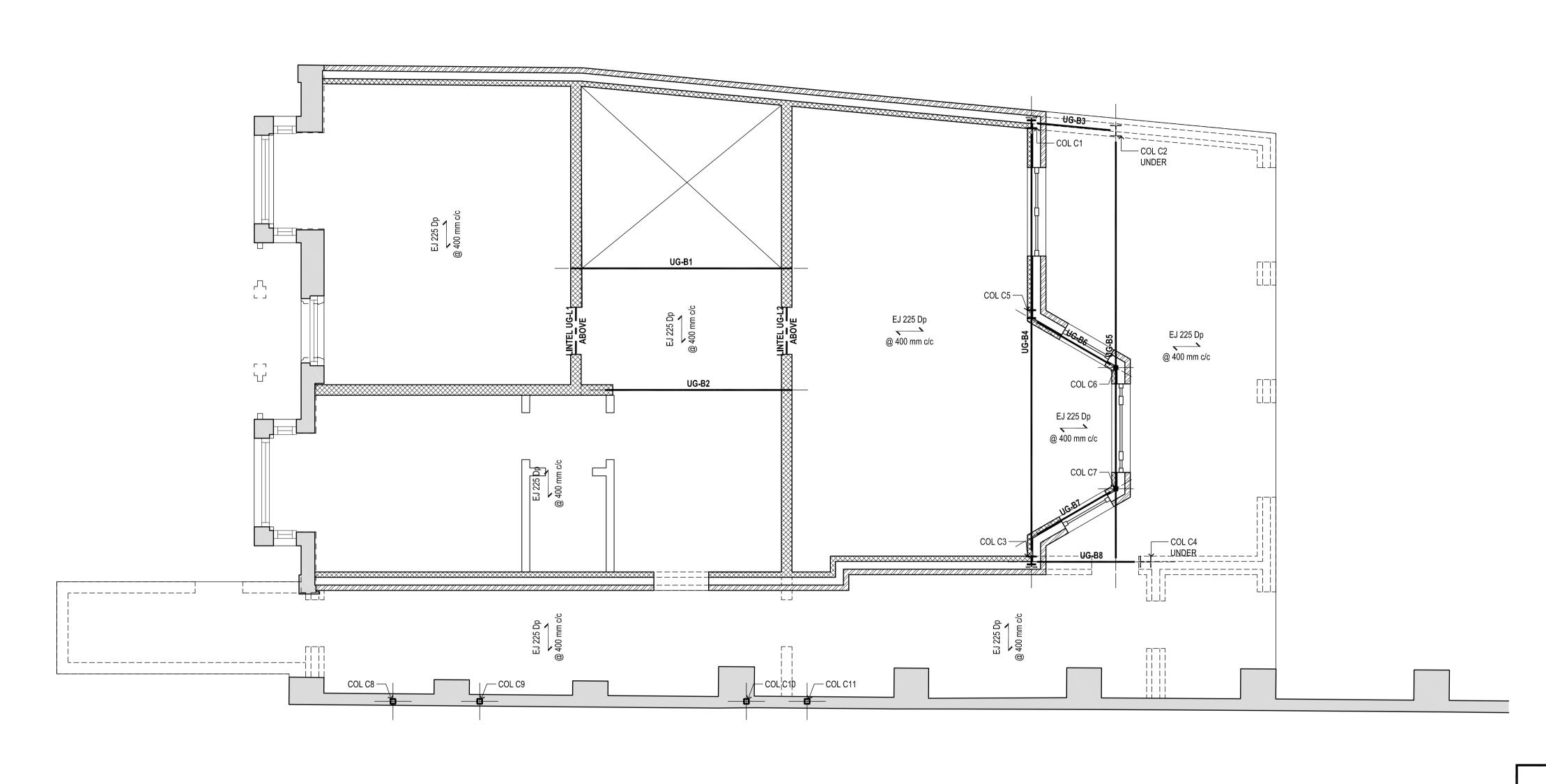
Topographic survey and levels of the ground of adjacent properties along the boundary

Appendices

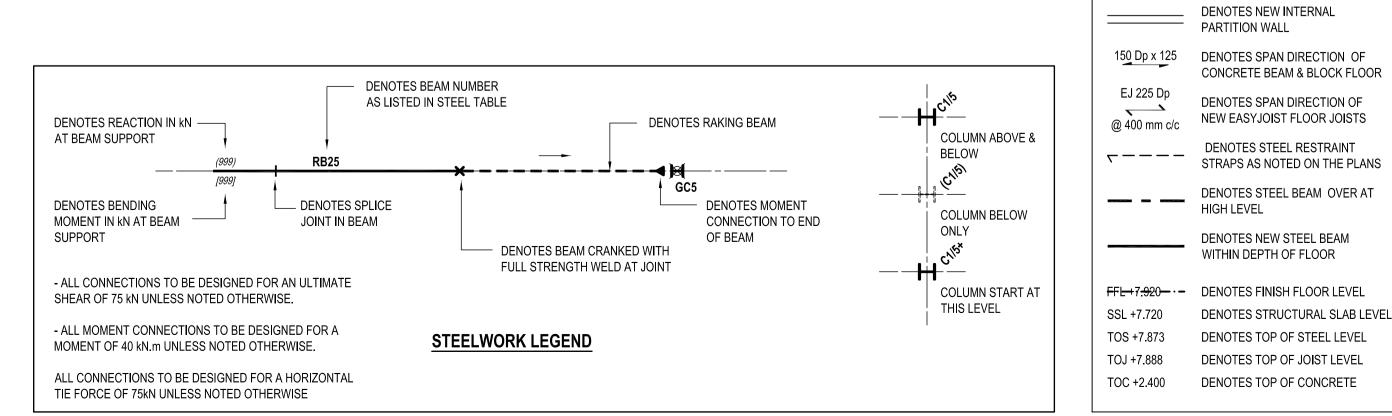
Appendix 1: Structural Drawings











PRELIMINARY 19.10.2022

LEGEND

DENOTES NEW SOLID BRICK
WALL OR INFILL TO **EXISTING WALL**

DENOTES NEW CAVITY WALL

DENOTES EXISTING WALL

DENOTES EXISTING WALL TO BE DEMOLISHED

DENOTES SPAN DIRECTION OF

NEW EASYJOIST FLOOR JOISTS

DENOTES STEEL RESTRAINT STRAPS AS NOTED ON THE PLANS

DENOTES STEEL BEAM OVER AT HIGH LEVEL

DENOTES STRUCTURAL SLAB LEVEL

DENOTES TOP OF STEEL LEVEL

DENOTES TOP OF JOIST LEVEL

DENOTES TOP OF CONCRETE

DENOTES NEW STEEL BEAM

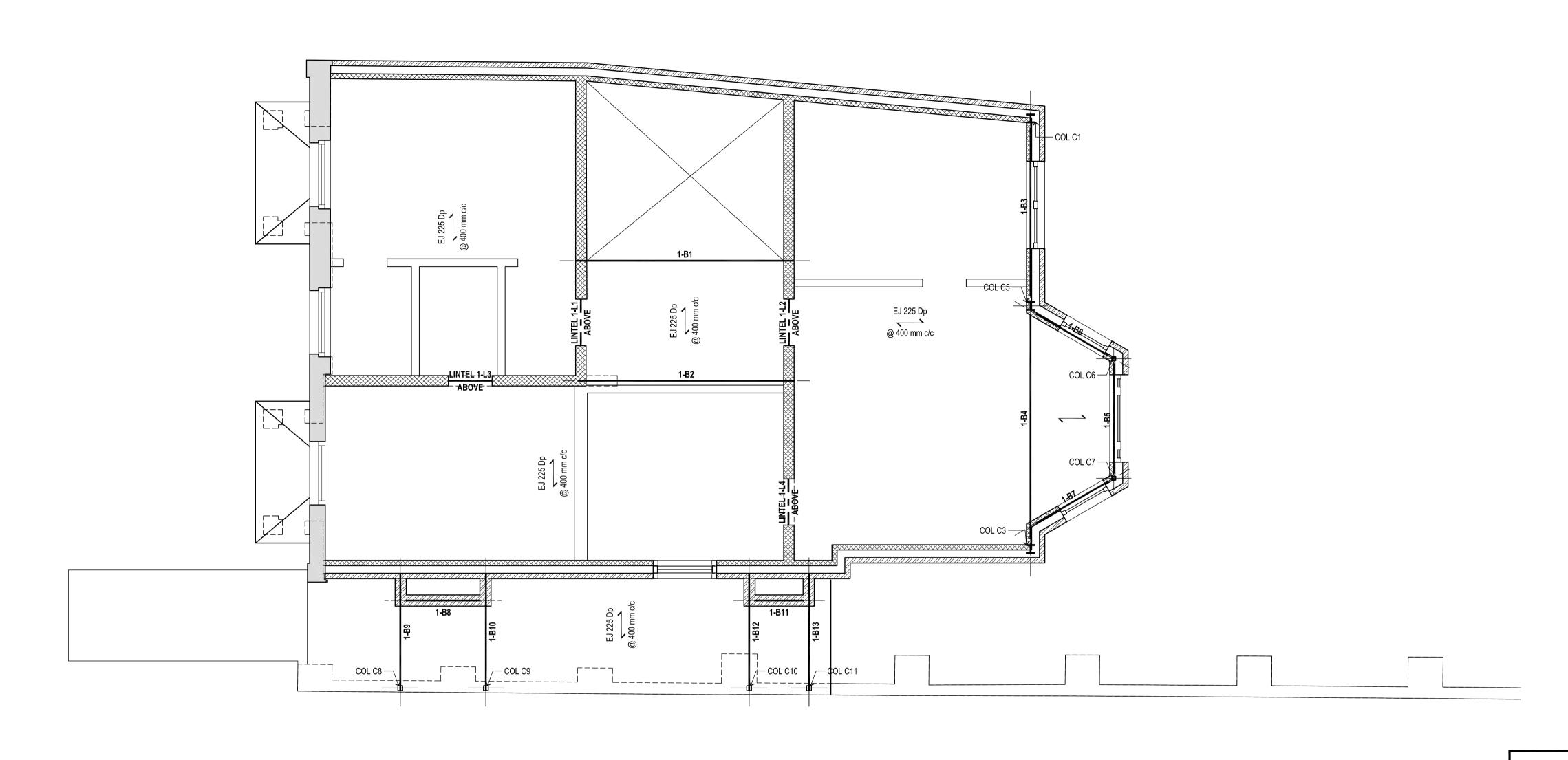
WITHIN DEPTH OF FLOOR

P1	TDL	19.10.2022	PRELIMINARY				
Rev.	Drawn	Date	Description				
Proj	ect						
26	ROSS	LYN HI	L				
LONDON - NW3							
D 1 TW							
Drawing Title							
PROPOSED UPPER GROUND FLOOR							

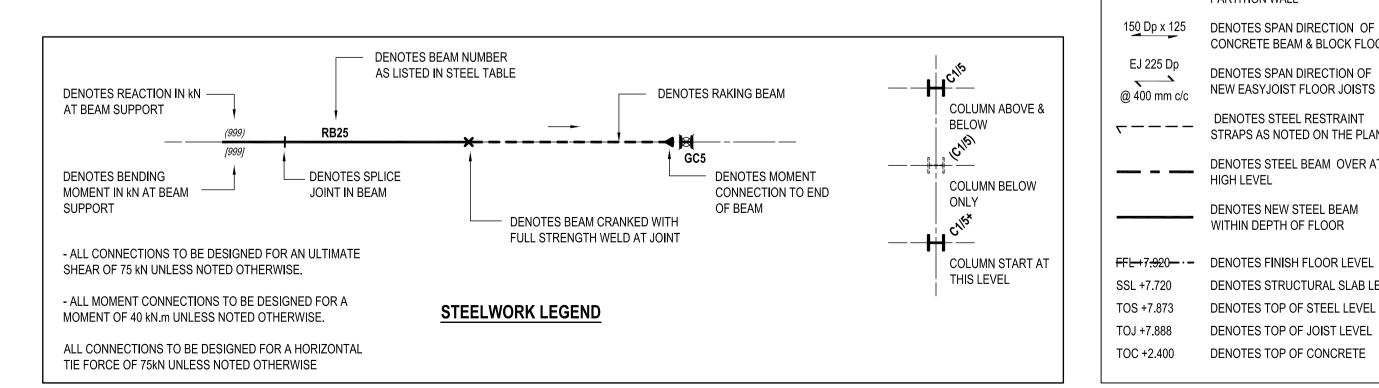
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PLAN

Scales 1:50	Date 10/2022			
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Project No	Drawing No			Rev
1031		102	P1	







PRELIMINARY 19.10.2022

	LEGEND				
	DENOTES EXISTING WALL	P1	TDL	19.10.2022	PRELIMINARY
	DENOTES EXISTING WALL TO BE DEMOLISHED	Rev.	Drawn	Date	Description
	DENOTES NEW SOLID BRICK WALL OR INFILL TO EXISTING WALL DENOTES NEW CAVITY WALL		ROSS	LYN HI - NW3	
	DENOTES NEW INTERNAL PARTITION WALL				
150 Dp x 125	DENOTES SPAN DIRECTION OF CONCRETE BEAM & BLOCK FLOOR	Drav	wing Titl	е	
EJ 225 Dp @ 400 mm c/c	DENOTES SPAN DIRECTION OF NEW EASYJOIST FLOOR JOISTS	PR PL		ED FIR	ST FLOOR
~	DENOTES STEEL RESTRAINT STRAPS AS NOTED ON THE PLANS				

DENOTES STEEL BEAM OVER AT HIGH LEVEL

DENOTES STRUCTURAL SLAB LEVEL

DENOTES TOP OF STEEL LEVEL

DENOTES TOP OF JOIST LEVEL

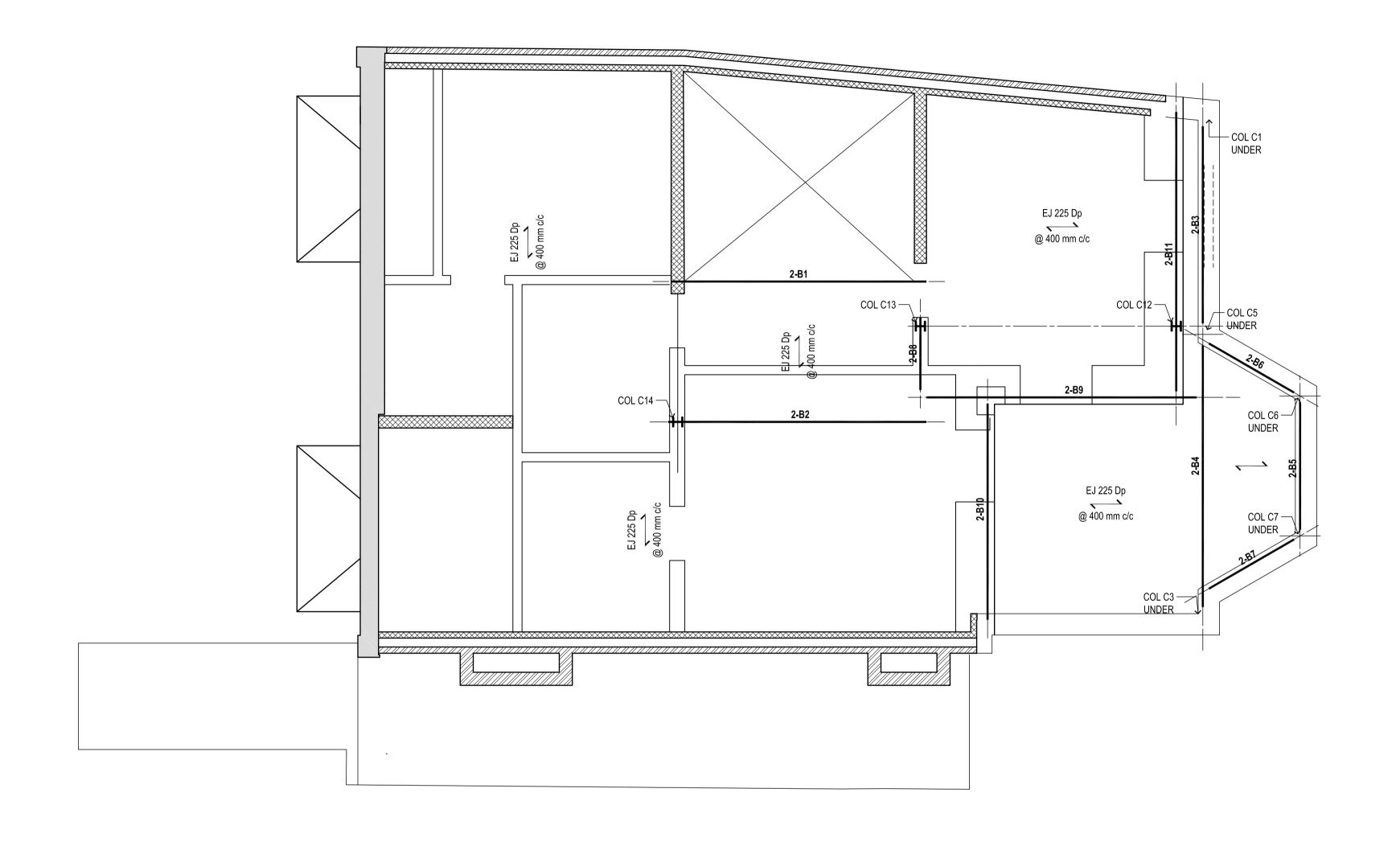
DENOTES TOP OF CONCRETE

DENOTES NEW STEEL BEAM

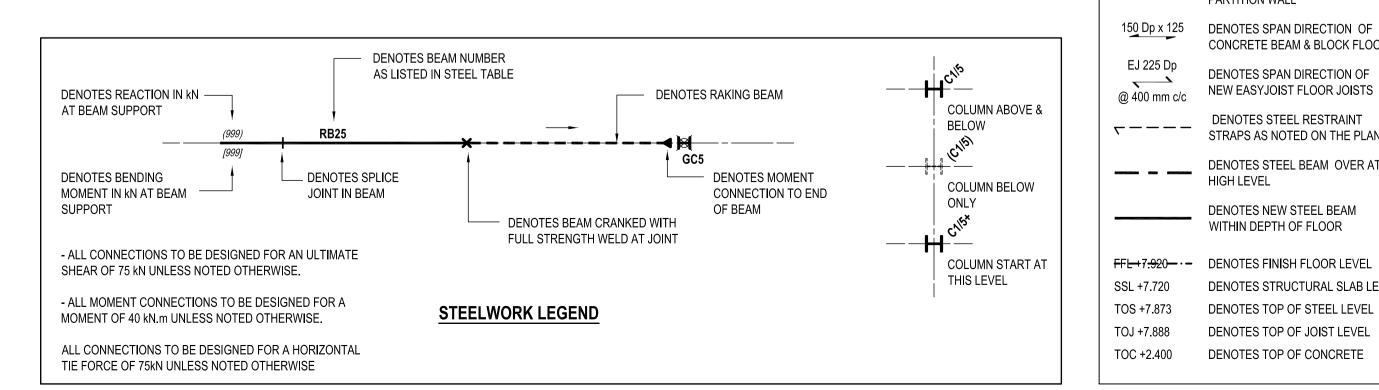
WITHIN DEPTH OF FLOOR

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PROPOSED SECOND FLOOR PLAN (SCALE 1:50)



PRELIMINARY 19.10.2022

	LEGEND				
	DENOTES EXISTING WALL	.			
	DENOTES EXISTING WALL TO BE DEMOLISHED	P1 Rev.	TDL Drawn	19.10.2022 Date	PRELIMINARY Description
	DENOTES NEW SOLID BRICK WALL OR INFILL TO EXISTING WALL	Proj 26		LYN HI	L
	DENOTES NEW CAVITY WALL	LO	NDON	- NW3	
	DENOTES NEW INTERNAL PARTITION WALL				
15 <u>0</u> Dp x <u>12</u> 5	DENOTES SPAN DIRECTION OF CONCRETE BEAM & BLOCK FLOOR	Drav	wing Titl	e	
EJ 225 Dp @ 400 mm c/c	DENOTES SPAN DIRECTION OF NEW EASYJOIST FLOOR JOISTS	PR PL		ED SE	COND FLOOR
_	DENOTES STEEL RESTRAINT STRAPS AS NOTED ON THE PLANS				

DENOTES STEEL BEAM OVER AT HIGH LEVEL

DENOTES STRUCTURAL SLAB LEVEL

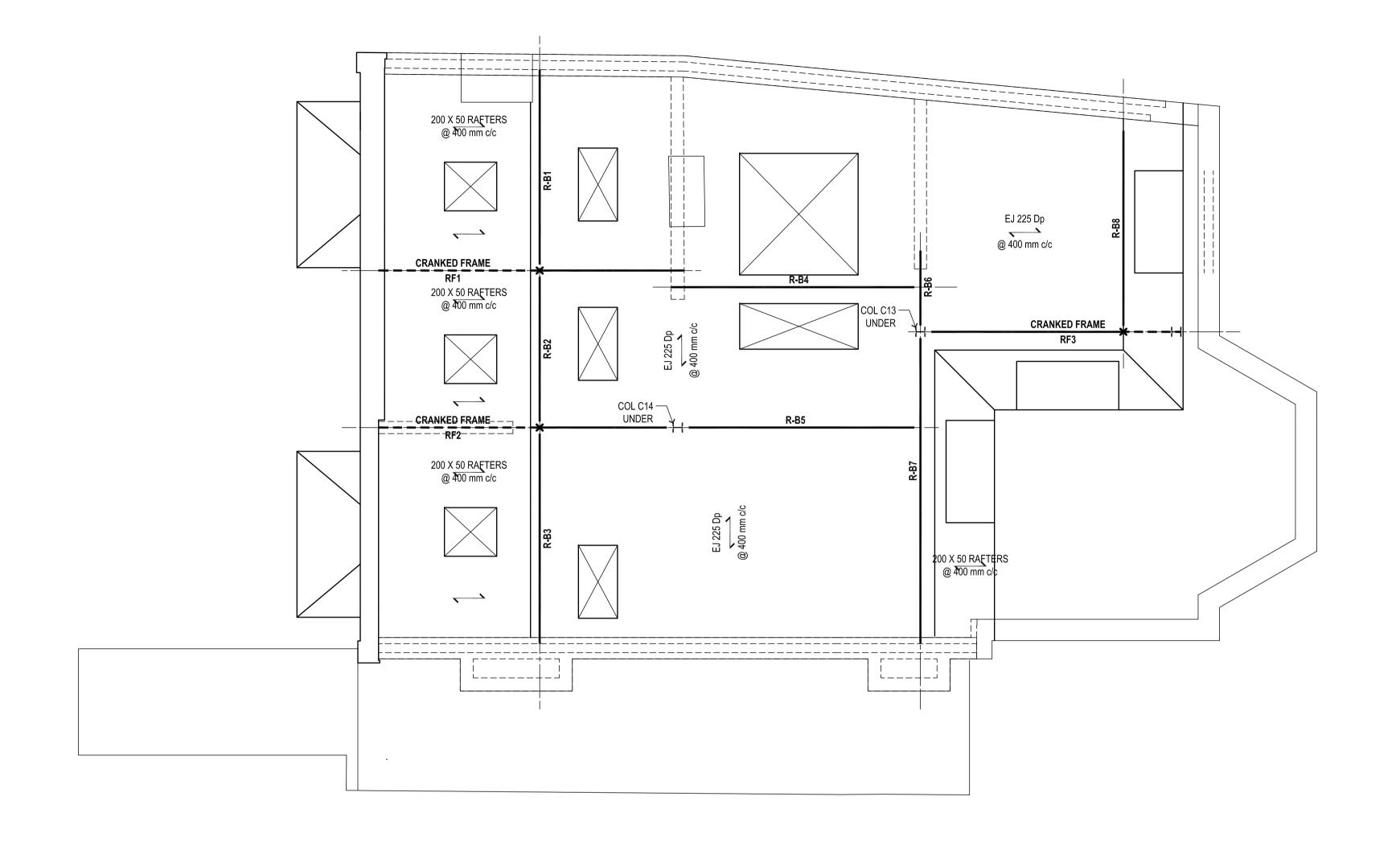
DENOTES TOP OF STEEL LEVEL

DENOTES TOP OF JOIST LEVEL

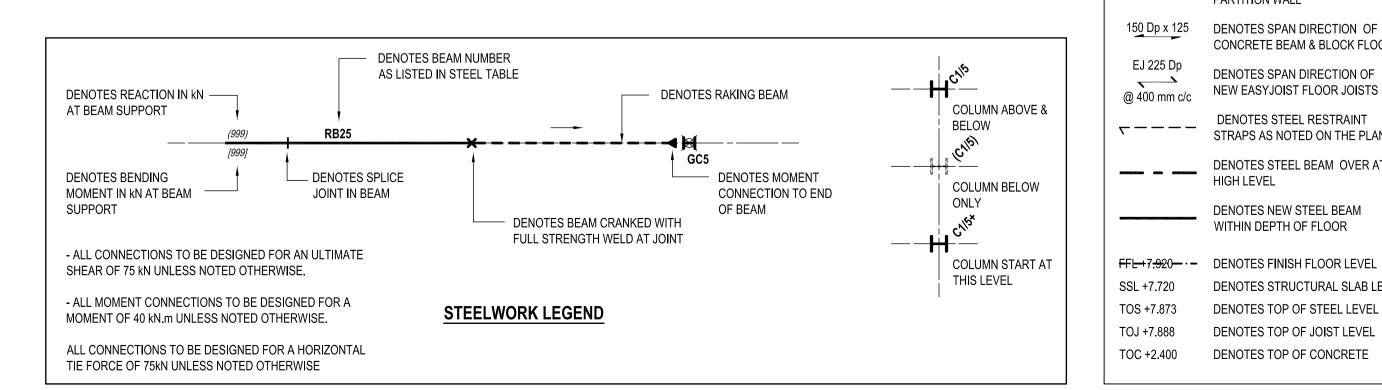
DENOTES NEW STEEL BEAM WITHIN DEPTH OF FLOOR

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Consulting Str	uctural Engineers
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tel: 020 3740 0745	email: mail@kiosque.co.uk

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PROPOSED ROOF PLAN (SCALE 1:50)



PRELIMINARY 19.10.2022

	LEGEND				
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	DENOTES EXISTING WALL TO BE DEMOLISHED	Rev.	Drawn	Date	Description
	DENOTES NEW SOLID BRICK WALL OR INFILL TO EXISTING WALL	Proj 26		LYN HI	L
	DENOTES NEW CAVITY WALL	LO	NDON	- NW3	
	DENOTES NEW INTERNAL PARTITION WALL				
150 Dp x 125	DENOTES SPAN DIRECTION OF CONCRETE BEAM & BLOCK FLOOR	Drav	wing Titl	e	
EJ 225 Dp	DENOTES SPAN DIRECTION OF NEW EASYJOIST FLOOR JOISTS	PR PL/		ED RO	OF
	DENOTES STEEL RESTRAINT				

STRAPS AS NOTED ON THE PLANS

DENOTES STEEL BEAM OVER AT HIGH LEVEL

DENOTES NEW STEEL BEAM WITHIN DEPTH OF FLOOR

DENOTES STRUCTURAL SLAB LEVEL

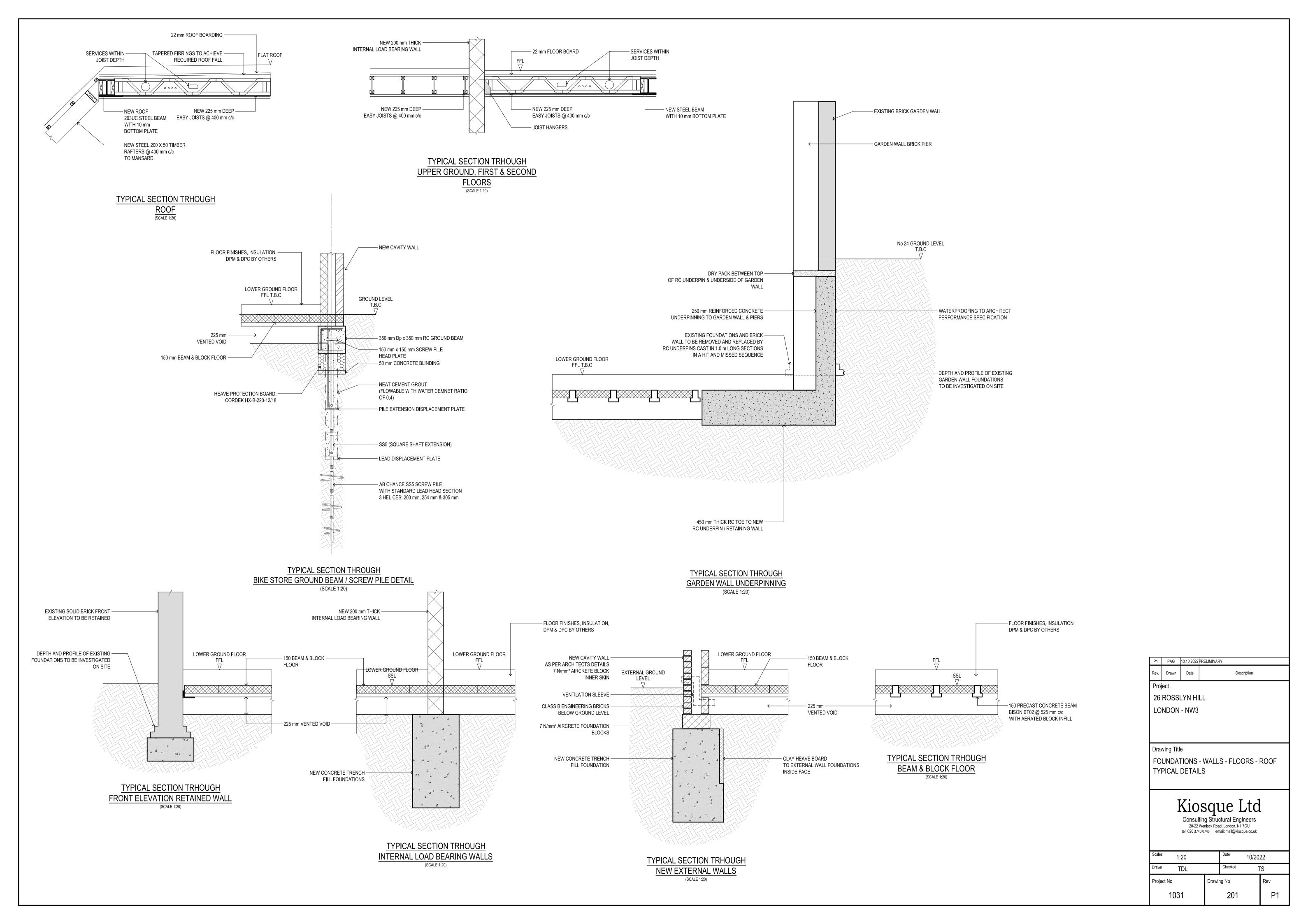
DENOTES TOP OF STEEL LEVEL

DENOTES TOP OF JOIST LEVEL

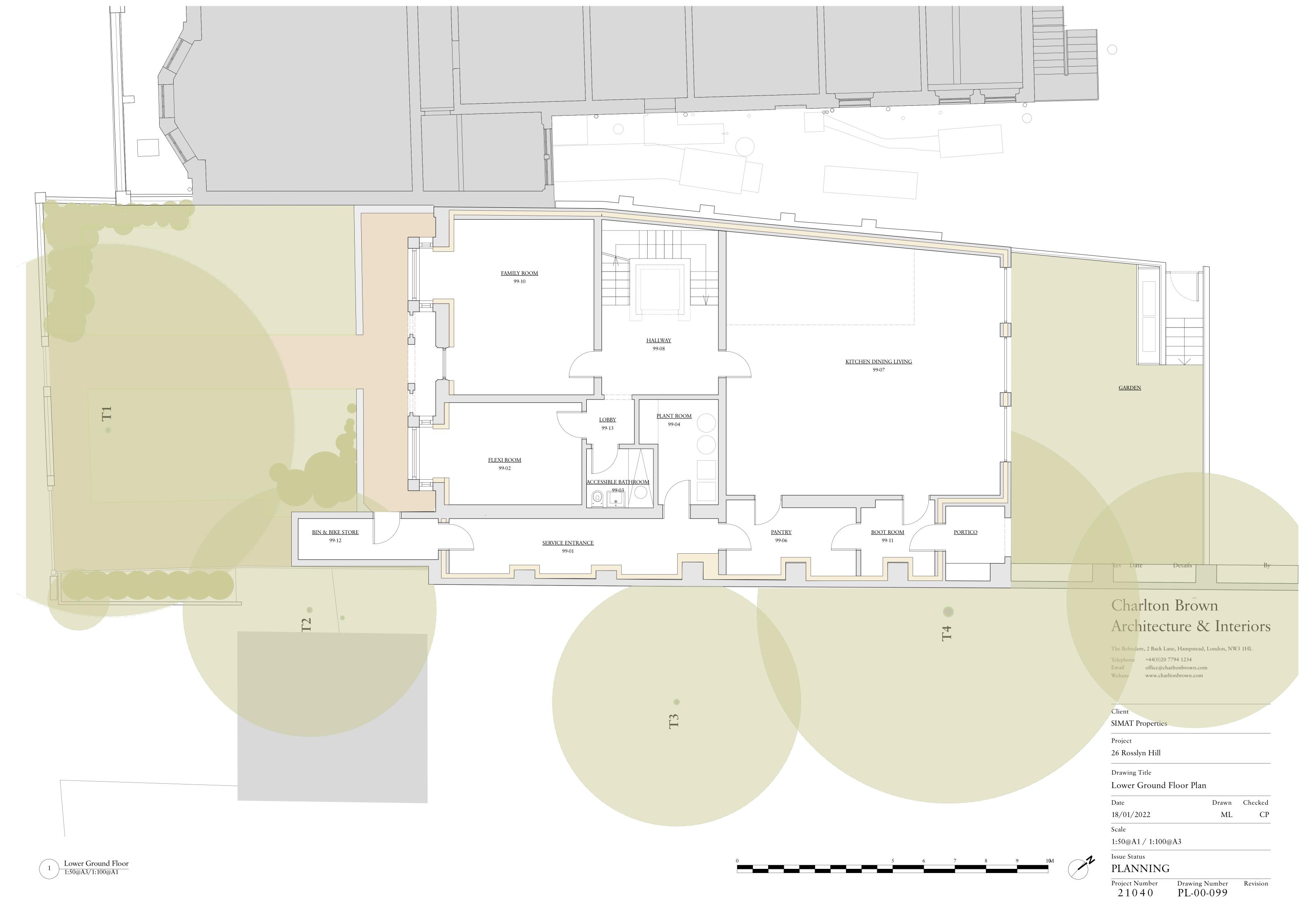
DENOTES TOP OF CONCRETE

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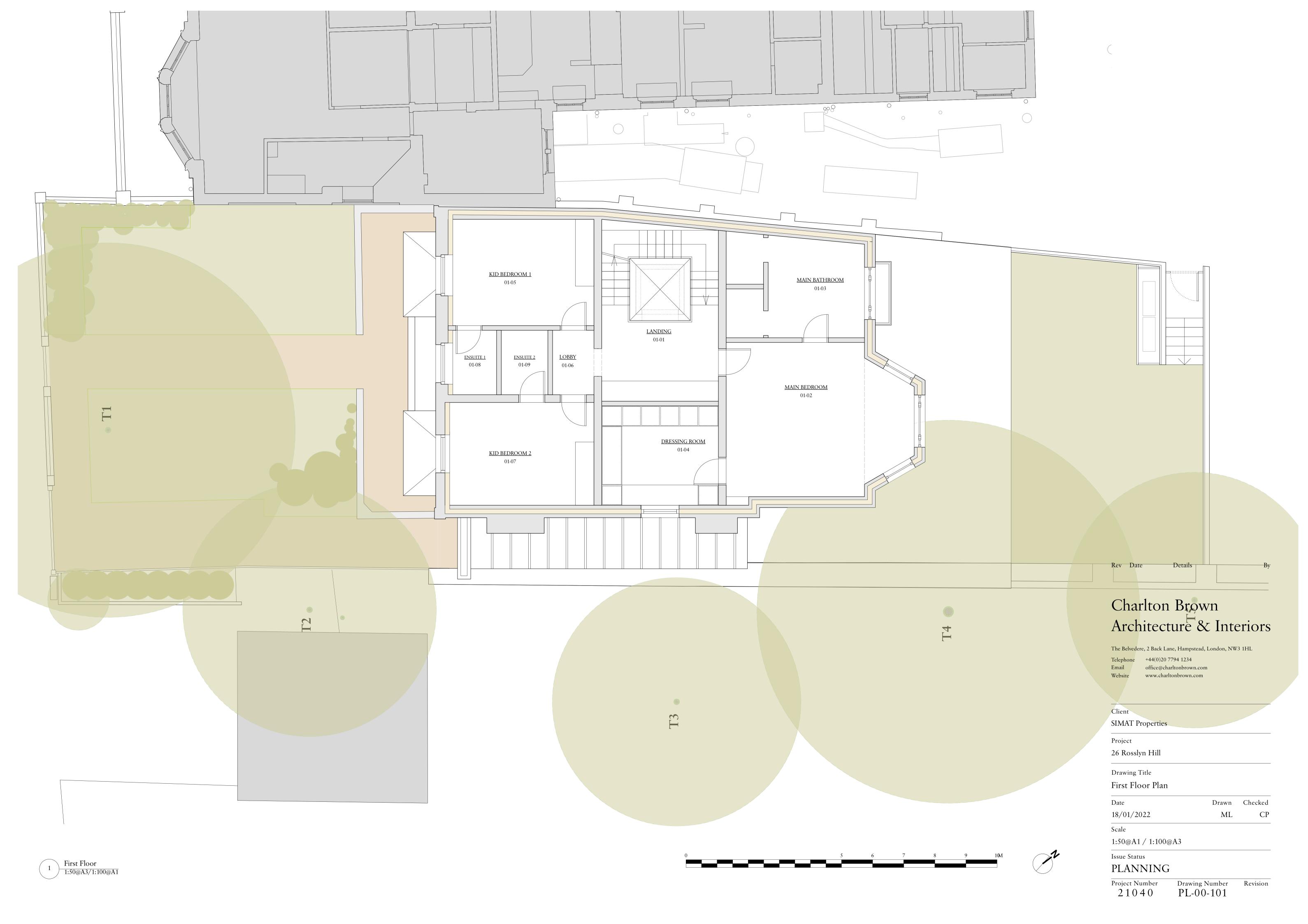
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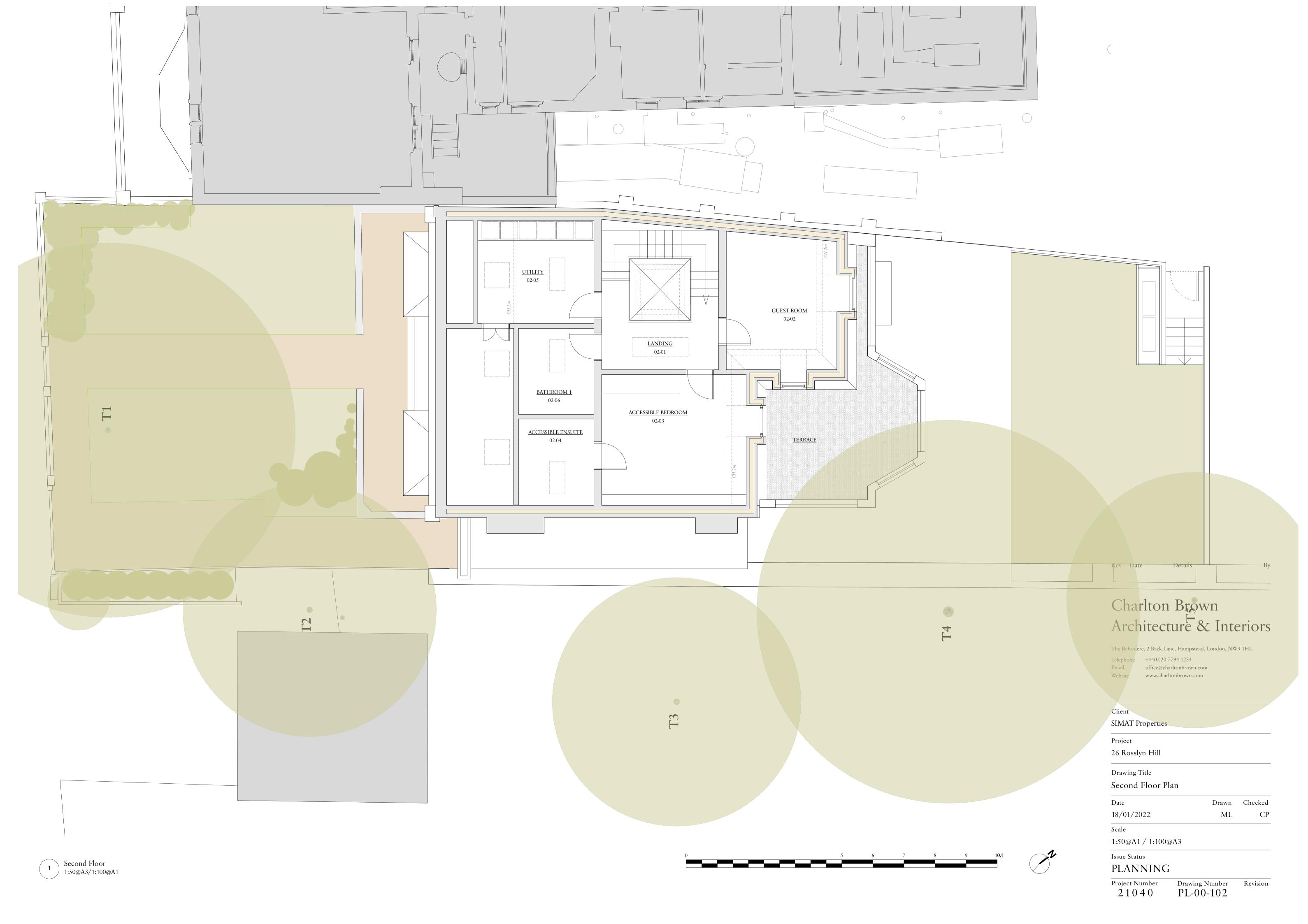


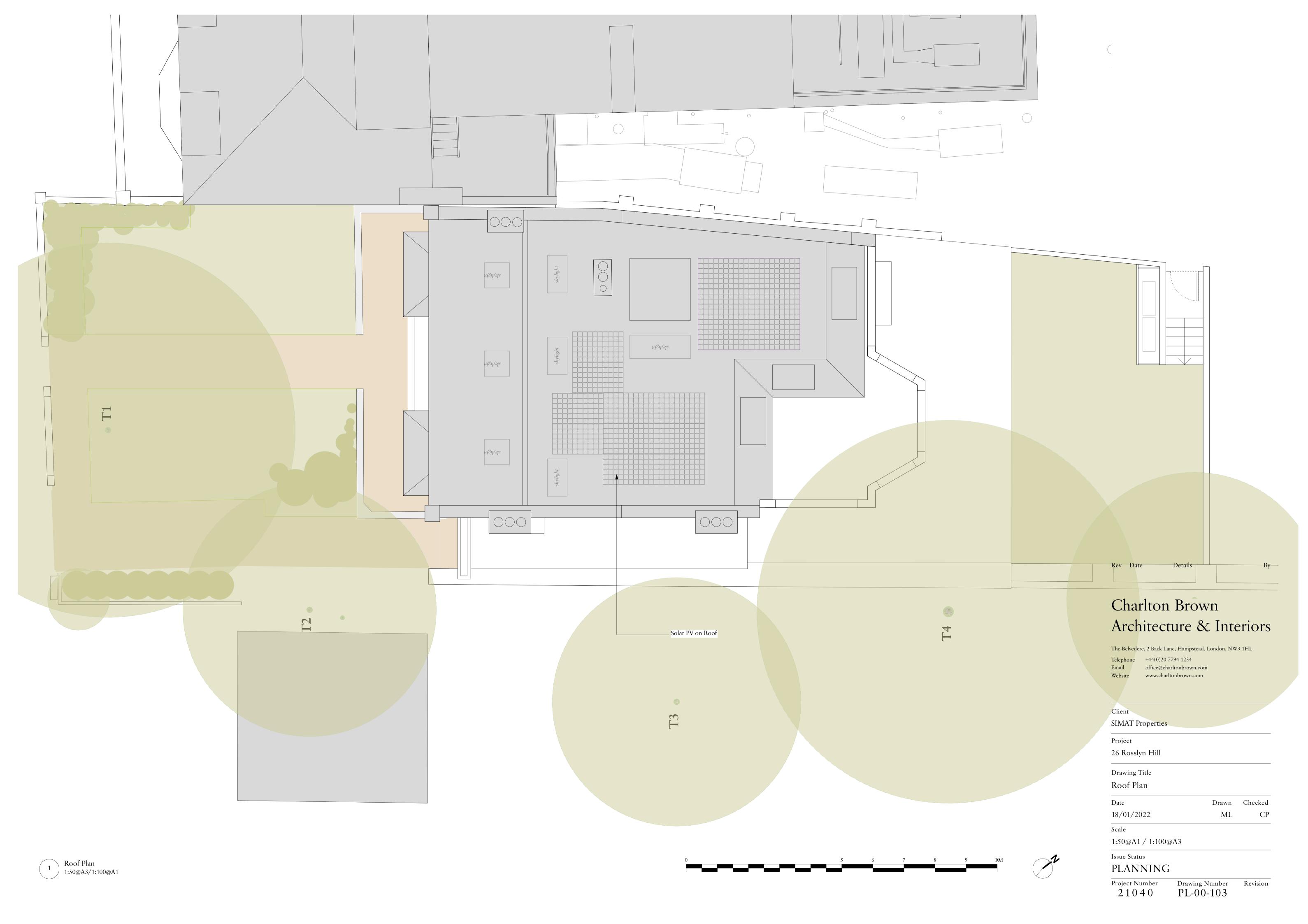
Appendix 2: Architectural Drawings

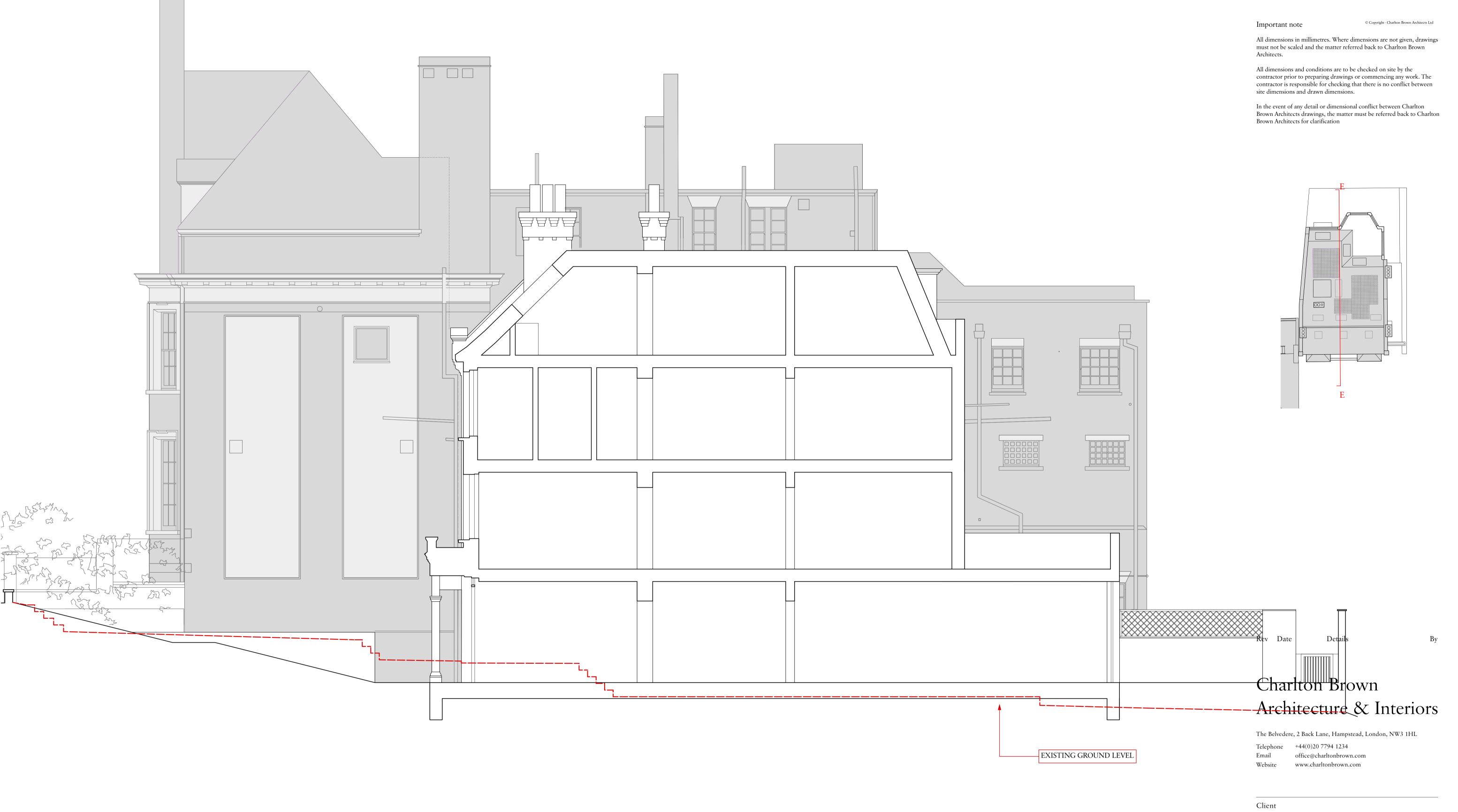


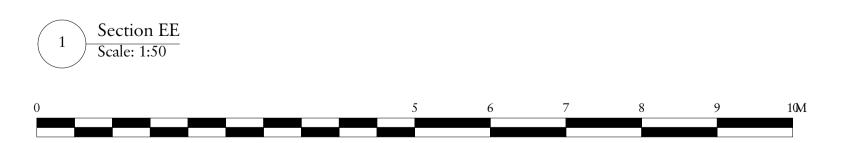












SIMAT Properties

Project

26 Rosslyn Hill

Drawing Title

Proposed Section EE

Date Drawn Checked 14/09/2022 TG SI

Scale

1:50 @ A1/ 1:100 @ A3

Issue Status

PLANNING

Project Number Drawing Number Revision PL-00-205