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DOCUMENT LEAD SHEET

PROJECT: **No. 35 TEMPLEWOOD AVENUE, LONDON NW3 7UY**

PROJECT NO. **16.848**

DOCUMENT TITLE: **STRUCTURAL METHODOLOGY STATEMENT FOR BASEMENT DEVELOPMENT**

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**STRUCTURAL METHODOLOGY STATEMENT
FOR BASEMENT DEVELOPMENT
AT
No. 35 TEMPLEWOOD AVENUE,
LONDON NW3 7UY**

barrett mahony

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1.0 INTRODUCTION

1.1 General

This report refers to the existing property at 35 Templewood Avenue, London NW3 7UY. The property is located to the west of Hampstead Heath, at the junction of Templewood Avenue and West Heath Road. The property is situated in the London Borough of Camden.

The site is occupied by an existing detached dwelling set within a garden. The existing building is L-shaped on plan and consists of part four storey, part three storey and part two storey segments. The existing building is of modern construction and is understood to have been built in the early 1990s. There is an existing glass domed building within the garden, which houses a sunken swimming pool. The swimming pool structure was constructed in 1968 following the construction of the adjacent Schreiber House. The swimming pool was originally linked to the Schreiber House, but is presently linked to the existing structure at the subject site, following a change in ownership. The Schreiber House and the swimming pool are Grade II listed.

It is proposed to apply for planning permission for the extension and alteration of the existing building at 35 Templewood Avenue. The alterations are associated with proposals to divide the property into three residential units, comprising two flats on the existing east wing and a house on the existing south wing. The principal structural alteration is the proposal to form a new basement under the full extent of the existing building. The basement will be used for parking and a gymnasium, associated with the residential usage.

1.2 Brief

Barrett Mahony Consulting Engineers UK Ltd. (BMCEUK) have been requested to prepare a structural method statement for the basement construction on behalf of Mr. B. Coyne and Ms. K. Mitchell.

1.3 Scope

This report is prepared to provide structural information to the Local Authority, Client and Design Team at planning stage.

The report addresses the outline design strategy for the proposed basement as well as the proposed outline construction methodology.

The report is limited to the above items and is prepared for the benefit of the above named parties only, in respect of planning application matters. The report shall not be used for any other purpose without prior written consent from BMCEUK.

The report is primarily based on a non-intrusive site walkover by BMCEUK, existing swimming pool drawings, and review of site investigation reports. The report is based on the following sources of information:

- Existing and Proposed Architectural Drawings (Prepared by Design West, July 2017)
- Topographic Site Survey (Ref. 16067/T01-01, prepared by EDI Surveys Ltd., November 2016)
- NHBC Standards 2016
- BS EN 1992-3:1996 Eurocode 2 - Design of concrete structures - Liquid retaining and containing structures
- Camden CPG 4 Basements & Lightwells (2015)
- Camden Geological, Hydrogeological and Hydrological Study: Guidance for Subterranean Development" – Arup (2010)
- Site inspection by Shane Linehan of BMCEUK on 05/09/2017, accompanied by Design Team.
- Desk study, Ground investigation & Basement Impact Assessment Report by Jomas Ltd
- 35 Templewood Avenue – Ground Movement Assessment (GMA) by Jomas Ltd

2.0 STRUCTURAL DESIGN & METHOD STATEMENT

2.1 Existing Structure

The existing structure is formed with precast concrete suspended floors supported by the external cavity and internal solid masonry walls. There are also a number of RC beams and columns that support the floors over larger openings. The roof of each section is formed with curved profile timber trusses.

Trail pits adjacent to the existing foundations have been formed on site. The foundations appear to be formed with 900x400mm deep RC ground beams spanning between deeper trench fill foundation pads. The ground floor structure appears to be a suspended RC slab which also spans between the supporting ground beams.

The building supports the internal dead (self-weight) and imposed live loads by transfer of these loads via the suspended floors to the load-bearing walls, which in turn transfer the loads to the ground beam/trench fill pad foundations below.

Lateral loads applied to the building, such as notional horizontal loads and wind loads, are currently supported by the diaphragm action of the internal precast floors which restrain the perimeter walls. The building form then acts as a rigid “box” in turn transferring the lateral loads to the foundations of the perimeter walls.

There are no obvious structural defects visible upon initial inspection. The property is in a good general condition as would be expected given its age and construction.

2.2 Proposed Structure

The principal proposed structural alteration to the property is the formation of a new basement structure under the footprint existing building. There will also be an extension of the basement beyond the existing building footprint at the front garage entrance and at the rear section adjacent to the swimming pool. Further internal structural alterations are proposed at the upper levels.

The existing suspended ground floor will be excavated and removed during the works and reinstated on completion. The new basement floor will be approximately 3.2 m lower than the existing ground floor level.

It is proposed to underpin the external and a some internal walls of the existing building. The proposed underpinning will be designed to resist lateral soil and water pressures, as well as vertical loads from the existing building. A traditional underpinning sequence has been proposed to minimise the effect on existing structures. The underpins will be cast to the soffit level of the existing ground beams. The condition of the trench fill pads will need to be assessed following the initial excavations however it is envisaged that these will be removed and replaced with the new underpin wall sections.

The underpins will be designed to distribute the vertical loads to the subsoils under the basement to limit ground pressures to safe limits obtained from in-situ soil testing. The underpin walls will be designed to resist water pressures for a conservative design water level of 1 m below ground level to allow for an extreme flooding event (e.g. a burst water main). As recommended in the Jomas Basement Impact Assessment report, all bearing foundations will be designed with a maximum ABP of 150kN/m². Sample preliminary calculations are contained in Appendix II.

The basement slab will be designed as a suspended slab spanning between the underpin bays and internal strip footings. Heave board will be provided under the basement slab to allow for clay heave as recommended in the Jomas Basement Impact Assessment report.

Lateral loads due to soil and water pressure are resisted in the permanent case by the reinforced underpin walls. The basement and ground floor slabs act as props to the underpin retaining walls. The ground floor slab will be constructed with steel beams and a concrete slab formed on Comflor 80 metal decking.

Tanking will be provided internally to the basement slab and walls using a proprietary membrane system with drained cavity. The design, detailing and installation of waterproofing will be carried out by a specialist.

2.2 Proposed Temporary Works

It is envisaged that the ground floor slab will first be removed to allow the underpin bays be installed in the required sequence. The underpin bays will each be backfilled and compacted upon compilation to limit any soil movements during this stage.

After completion of the under pin bays, a significant portion of the external and internal structural walls will need to be temporarily supported as the basement excavation extends beyond the existing building footprint on two sides of the structure. It is proposed that the walls and floor slabs are temporarily supported at first floor soffit level by a series of the steel beams and plunge columns to basement level as shown on indicative drawings contained in Appendix III. The plunge columns will either be supported on the previously constructed underpin bays or by temporary piles bored from ground floor level.

It is envisaged that two levels of temporary propping will be required to provide stability to the underpin walls during the excavation. The propping arrangement is to provide diaphragm action at ground and basement level and limit any potential ground movements. The remaining first floor structure will provide a ridged diaphragm to transfer lateral loads to the remaining stabilising walls. The precise arrangement of all temporary propping will be designed by the contractor. However, an indicative temporary works scheme is appended in Appendix III of this report.

2.4 Proposed Sequence of Works for Basement Construction

It is proposed to carry out the works in the following sequence, to enable the safe excavation of the proposed basement and the protection of adjoining structures during the works. This is to be read in conjunction with drawings contained in Appendix III:

1. Erect hoarding to secure the site.
2. Submit detailed temporary works design proposals for engineer's review and approval prior to installation of temporary works elements.
3. Carry out 'soft-strip' of existing property to remove existing furnishings, fittings, ceilings, floor finishes etc.
4. Remove RC ground floor concrete slab and reduce level by 0.6m.
5. Carry out underpinning to existing walls noted on plan as per traditional sequence outlined in Steps 6-14 below, in maximum 1 m wide bays.
6. Working at existing ground floor level, excavate bays "1" to basement formation level using trench sheeting / propped trench boxes to retain the side faces of the excavation. Fix reinforcement as per engineer's drawings.
7. Cast the concrete for the underpins from basement formation level to 75mm below the underside of the existing ground beams at ground floor level. Leave new concrete for a minimum of 12 hours before proceeding with the next stage. Ensure any temporary plunge columns required to support the first floor structure are also installed at this stage.
8. In bays "1" place dry pack at top of wall to fill the gap with the existing foundation overhead. Back-fill bays "1" to maintain safe working platform at ground floor level and to ensure lateral support to the base of the existing wall.
9. Repeat steps 6-8 for bays "2".
10. Repeat steps 6-8 for bays "3".
11. Repeat steps 6-8 for bays "4".
12. Repeat steps 6-8 for bays "5".
13. Repeat steps 6-8 for bays "6".
14. Repeat steps 6-8 for bays "7".
15. Install the remaining steel plunge columns in 450mm diameter piles from ground floor level.
16. Install the contagious pile wall at the proposed car park entrance area.
17. Install the high level steel beams at first floor soffit level to support all walls and floor above. The temporary steel beams are to be supported by the steel plunge columns or onto bearing pads installed in the existing masonry walls.
18. Cast the RC capping beam at the car park entrance area.
19. Demolish all structural walls and columns between ground floor and first floor soffit that have not been underpinned to basement level. The existing lift shaft and stair flights are to be completely removed on all levels.
20. Install high level temporary to the underpins at ground floor level.

21. Excavate and reduce level to 2.7m below ground. In the event that ground water is encountered during the course of excavation a localised excavated sump of size 1m x 1m x 1m is to be formed at a level lower than the progressive base of excavation being carried out.
22. Install low level temporary props.
23. Excavate to formation level.
24. Place and blinding for proposed basement slab.
25. Install below-ground drainage elements and heave board.
26. Fix steel reinforcement for proposed reinforced concrete basement slab and pour slab.
27. When slab has attained sufficient strength, remove low level temporary propping.
28. Fix steel reinforcement for proposed reinforced concrete internal rising elements. Pour walls between basement and ground floor soffit.
29. Install steel beams, metal decking and reinforcement for the proposed ground floor slab and pour slab. Temporary 'box out' opening to be included around the first floor temporary columns.
30. Remove upper level temporary propping to underpin walls when ground floor slab has attained sufficient strength.
31. Construct load bearing masonry walls and columns between ground and first floor level.
32. Installed new first floor level steel beams.
33. Remove steel beam props between first floor and basement.
34. Infill 'box out' openings in ground floor slab.
35. Primary structural basement works are now complete – proceed with the upper level works and internal fit-out.

3.5 <u>Assessment of Effect on Ground Conditions</u>

The proposed basement is a single-storey basement of modest proportions. The basement will be designed and constructed to minimise the effects on the ground conditions of the surrounding area.

The Basement Impact Assessment carried out on site indicates that the subsoil at basement formation level comprises a medium dense Sand Bagshot Formation with an allowable bearing capacity of 150kN/m² which will be sufficient to support the building loads. Preliminary calculations for the underpin walls and foundation pads are contained in Appendix II of this report.

As discussed in section 2.2, it is envisaged that two levels of temporary propping will be installed to provide stability to the underpin walls during the excavation. This propping arrangement will provide diaphragm action at ground and basement level and limit any potential ground movements.

A ground movement analysis has been carried out on this basis by Jomas Associated Ltd

3.6 **Assessment of Effect on Neighbouring Properties**

The ground movement analysis carried out by Jomas Associated Ltd indicates negligible damage on the majority of the facades. A very limited number of structures/facades have been classified as Category 1, representative of Very Slight damage with crack width less than 1 mm that can be treated during normal decoration.
No damage category higher than this has been assessed.

APPENDIX II

Preliminary Underpin Wall Calculations

Project Title	Templewood Avenue				
Client	-				
Part of Structure	Line loads				
Made by	Date	Page No	Checked	Revision	Job No
OA	31.08.2017		SL		16.848

Line Load 1

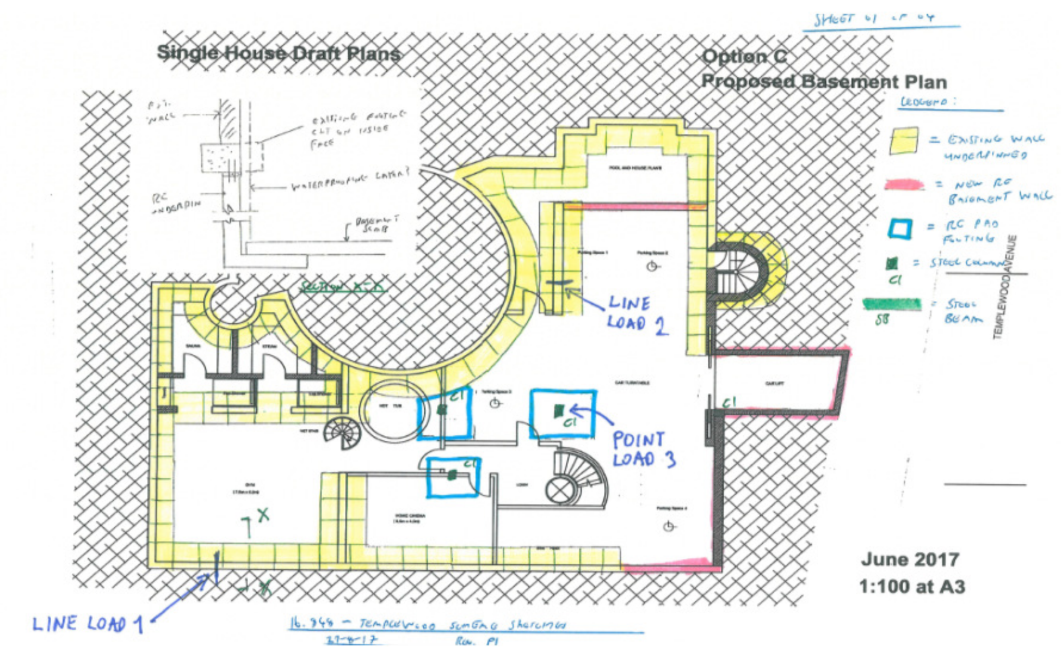
ROOF	Roof Dead Load	1.50	kN/m²
	Roof Live Load	0.75	kN/m²
	Influence Length	2.65	m
	Roof line Load - Dead	**3.98**	**kN/m**
	Roof line Load - Live	**1.99**	**kN/m**
LEVEL 3	**Stud Partition**		
	Stud - Dead	0.50	kN/m²
	Stud - Height	2.50	m
	Stud - Line Load	**1.25**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
LEVEL 2	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.10	m
	Cavity Wall - Line Load	**12.40**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
LEVEL 1	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.11	m
	Cavity Wall - Line Load	**12.42**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**

GROUND	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	2.90	m
	Cavity Wall - Line Load	**11.60**	**kN/m**
	200 mm overall deep Comflor 80 Slab		
	Self Weight(3.9)+50mm screed(1.25)+finishes (0.75)	5.90	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**20.65**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
BASEMENT	**300 mm RC Underpin**		
	300 mm RC Underpin (0.30x25)	7.50	kN/m²
	Underpin - Height	3.00	m
	Underpin - Line Load	**22.50**	**kN/m**
	250 mm Basement Slab		
	Self Weight (0.25x25)	6.25	kN/m²
	Super imposed Dead	1.50	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**27.13**	**kN/m**
	Live Line Load	**8.75**	**kN/m**

TOTAL LINE LOAD 1 - DEAD	**165.47**	**kN/m**
TOTAL LINE LOAD 1 - LIVE	**45.74**	**kN/m**

$$DL\ top\ underpin = Total\ Line\ Load1\ (Dead) - RC\ Underpin\ self\ weight$$

Dead Load on top of the Underpin	**143**	**kN/m**



Project Title	Templewood Avenue				
Client	-				
Part of Structure	Line loads				
Made by	Date	Page No	Checked	Revision	Job No
OA	31.08.2017		SL		16.848

Line Load 2

ROOF	Roof Dead Load	1.50	kN/m²
	Roof Live Load	0.75	kN/m²
	Influence Length	3.00	m
	Roof line Load - Dead	**4.50**	**kN/m**
	Roof line Load - Live	**2.25**	**kN/m**
LEVEL 1	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.11	m
	Cavity Wall - Line Load	**12.42**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.00	m
	Dead Line Load	**15.3**	**kN/m**
	Live Line Load	**7.5**	**kN/m**
GROUND	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	2.90	m
	Cavity Wall - Line Load	**11.60**	**kN/m**
	200 mm overall deep Comflor 80 Slab		
	Self Weight(3.9)+50mm screed(1.25)+finishes (0.75)	5.90	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.00	m
	Dead Line Load	**17.7**	**kN/m**
	Live Line Load	**7.5**	**kN/m**
BASEMENT	**300 mm RC Underpin**		
	300 mm RC Underpin (0.30x25)	7.50	kN/m²
	Underpin - Height	3.00	m
	Underpin - Line Load	**22.50**	**kN/m**
	250 mm Basement Slab		
	Self Weight (0.25x25)	6.25	kN/m²
	Super imposed Dead	1.50	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.00	m
	Dead Line Load	**23.25**	**kN/m**
	Live Line Load	**7.5**	**kN/m**

TOTAL LINE LOAD 2 - DEAD	**107.27**	**kN/m**
TOTAL LINE LOAD 2 - LIVE	**24.75**	**kN/m**

$$DL\ top\ underpin = Total\ Line\ Load2\ (Dead) - RC\ Underpin\ self\ weight$$

Dead Load on top of the Underpin	**85**	**kN/m**

Project Title	Templewood Avenue				
Client	-				
Part of Structure	Point load				
Made by	Date	Page No	Checked	Revision	Job No
OA	31.08.2017		SL		16.848

Point Load 3

Line Load 1

ROOF	Roof Dead Load	1.50	kN/m²
	Roof Live Load	0.75	kN/m²
	Influence Length	2.65	m
	Roof line Load - Dead	**3.98**	**kN/m**
	Roof line Load - Live	**1.99**	**kN/m**
LEVEL 3	**Stud Partition**		
	Stud - Dead	0.50	kN/m²
	Stud - Height	2.50	m
	Stud - Line Load	**1.25**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
LEVEL 2	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.10	m
	Cavity Wall - Line Load	**12.40**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
LEVEL 1	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.11	m
	Cavity Wall - Line Load	**12.42**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**

GROUND	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	2.90	m
	Cavity Wall - Line Load	**11.60**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.50	m
	Dead Line Load	**17.85**	**kN/m**
	Live Line Load	**8.75**	**kN/m**
	TOTAL LINE LOAD 1 - DEAD	**113.05**	**kN/m**
	TOTAL LINE LOAD 1 - LIVE	**36.99**	**kN/m**
	Beam SB1 Span	4.40	m

Point Load from Line load 1

Dead	**248.70**	**kN**
Live	**81.37**	**kN**

Line Load 2

ROOF	Roof Dead Load	1.50	kN/m²
	Roof Live Load	0.75	kN/m²
	Influence Length	3.00	m
	Roof line Load - Dead	**4.50**	**kN/m**
	Roof line Load - Live	**2.25**	**kN/m**
LEVEL 1	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	3.11	m
	Cavity Wall - Line Load	**12.42**	**kN/m**
	Precast Unit 150mm		
	Self Weight(3.1)+50mm screed(1.25)+finishes (0.75)	5.10	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.00	m
	Dead Line Load	**15.30**	**kN/m**
	Live Line Load	**7.50**	**kN/m**

GROUND	**Cavity Wall**		
	100 mm Inner Block Leaf (0.10x20)	2.00	kN/m²
	100 mm Outer Block leaf (0.10x20)	2.00	kN/m²
	Cavity Wall - Height	2.90	m
	Cavity Wall - Line Load	**11.60**	**kN/m**
	200 mm overall deep Comflor 80 Slab		
	Self Weight(3.9)+50mm screed(1.25)+finishes (0.75)	5.90	kN/m²
	Live	2.50	kN/m²
	Influence Length	3.00	m
	Dead Line Load	**17.70**	**kN/m**
	Live Line Load	**7.50**	**kN/m**
	TOTAL LINE LOAD 2 - DEAD	**61.52**	**kN/m**
	TOTAL LINE LOAD 2 - LIVE	**17.25**	**kN/m**
	Beam SB2 Span	4.00	m
	Point Load from Line load 2		
	Dead	**123.0**	**kN**
	Live	**34.5**	**kN**
BASEMENT			
	250 mm Basement Slab		
	Self Weight (0.25x25)	6.25	kN/m²
	Super imposed Dead	1.50	kN/m²
	Live	2.50	kN/m²
	Influence Length(A)	6.80	m
	Influence Length(B)	5.50	m
	Dead Point Load	**289.9**	**kN**
	Live Point Load	**93.5**	**kN**
	Point Load 3 - Dead	**661.6**	**kN**
	Point Load 3 - Live	**209.4**	**kN**

Load on Columns SC1

$$Load\ Column\ SC1 = \frac{Point\ Load\ 3}{N\ columns\ on\ Pad\ Footing}$$

Load on Columns SC1 - Dead	**331**	**kN**
Load on Columns SC1 - Live	**105**	**kN**
N Columns on Pad footing	**2**	

RETAINING WALL ANALYSIS

In accordance with EN1997-1:2004 incorporating Corrigendum dated February 2009 and the UK National Annex incorporating Corrigendum No.1

Tedds calculation version 2.6.05

Retaining wall details

Stem type	Propped cantilever
Stem height	h_{stem} = **3500** mm
Prop height	h_{prop} = **3400** mm
Stem thickness	t_{stem} = **300** mm
Angle to rear face of stem	α = **90** deg
Stem density	γ_{stem} = **25** kN/m^3
Toe length	l_{toe} = **1500** mm
Base thickness	t_{base} = **300** mm
Base density	γ_{base} = **25** kN/m^3
Height of retained soil	h_{ret} = **3200** mm
Angle of soil surface	β = **0** deg
Depth of cover	d_{cover} = **300** mm
Height of water	h_{water} = **2300** mm
Water density	γ_w = **9.8** kN/m^3

Retained soil properties

Soil type	Firm clay
Moist density	γ_{mr} = **18** kN/m^3
Saturated density	γ_{sr} = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{r.k}$ = **35** deg
Characteristic wall friction angle	$\delta_{r.k}$ = **9** deg

Base soil properties

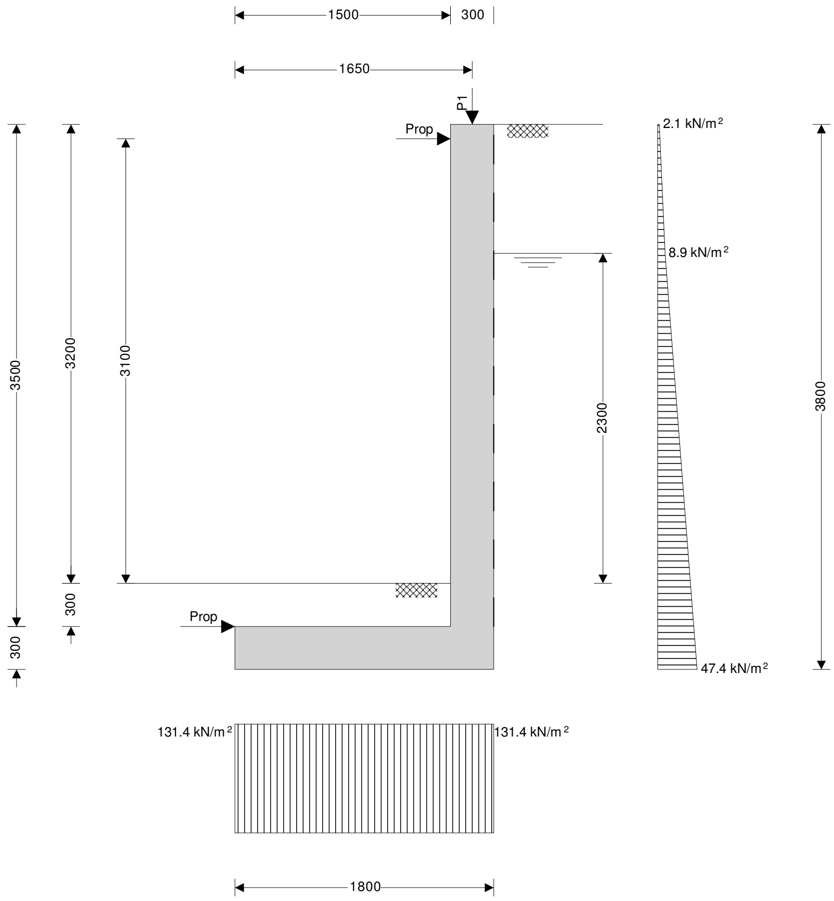
Soil type	Firm clay
Soil density	γ_b = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{b.k}$ = **35** deg
Characteristic wall friction angle	$\delta_{b.k}$ = **9** deg
Characteristic base friction angle	$\delta_{bb.k}$ = **12** deg
Presumed bearing capacity	$P_{bearing}$ = **150** kN/m^2

Loading details

Variable surcharge load	$Surcharge_Q$ = **5** kN/m^2
Vertical line load at 1650 mm	P_{G1} = **143** kN/m
	P_{Q1} = **45.7** kN/m

barrett mahony

Project				Job no.	
Templewood Avenue				16.848	
Calcs for				Start page no./Revision	
Underpin at Section 1				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
OA	07/09/2017				



Calculate retaining wall geometry

Base length	$l_{base} = l_{toe} + t_{stem} = \mathbf{1800}$ mm
Saturated soil height	$h_{sat} = h_{water} + d_{cover} = \mathbf{2600}$ mm
Moist soil height	$h_{moist} = h_{ret} - h_{water} = \mathbf{900}$ mm
Length of surcharge load	$l_{sur} = l_{heel} = \mathbf{0}$ mm
- Distance to vertical component	$x_{sur\_v} = l_{base} - l_{heel} / 2 = \mathbf{1800}$ mm
Effective height of wall	$h_{eff} = h_{base} + d_{cover} + h_{ret} = \mathbf{3800}$ mm
- Distance to horizontal component	$x_{sur\_h} = h_{eff} / 2 = \mathbf{1900}$ mm
Area of wall stem	$A_{stem} = h_{stem} \times t_{stem} = \mathbf{1.05}$ m^2
- Distance to vertical component	$x_{stem} = l_{toe} + t_{stem} / 2 = \mathbf{1650}$ mm
Area of wall base	$A_{base} = l_{base} \times t_{base} = \mathbf{0.54}$ m^2
- Distance to vertical component	$x_{base} = l_{base} / 2 = \mathbf{900}$ mm
Area of base soil	$A_{pass} = d_{cover} \times l_{toe} = \mathbf{0.45}$ m^2
- Distance to vertical component	$x_{pass\_v} = l_{base} - (d_{cover} \times l_{toe} \times (l_{base} - l_{toe} / 2)) / A_{pass} = \mathbf{750}$ mm
- Distance to horizontal component	$x_{pass\_h} = (d_{cover} + h_{base}) / 3 = \mathbf{200}$ mm
Area of excavated base soil	$A_{exc} = h_{pass} \times l_{toe} = \mathbf{0.45}$ m^2
- Distance to vertical component	$x_{exc\_v} = l_{base} - (h_{pass} \times l_{toe} \times (l_{base} - l_{toe} / 2)) / A_{exc} = \mathbf{750}$ mm
- Distance to horizontal component	$x_{exc\_h} = (h_{pass} + h_{base}) / 3 = \mathbf{200}$ mm

Using Coulomb theory

At rest pressure coefficient	$K_0 = 1 - \sin(\phi'_{r.k}) = \mathbf{0.426}$

Passive pressure coefficient $K_P = \sin(90 - \phi'_{b.k})^2 / (\sin(90 + \delta_{b.k}) \times [1 - \sqrt{[\sin(\phi'_{b.k} + \delta_{b.k}) \times \sin(\phi'_{b.k}) / (\sin(90 + \delta_{b.k}))]]^2}) =$ **5.103**

Bearing pressure check

Vertical forces on wall

Wall stem $F_{stem} = A_{stem} \times \gamma_{stem} =$ **26.3** kN/m

Wall base $F_{base} = A_{base} \times \gamma_{base} =$ **13.5** kN/m

Line loads $F_{P\_v} = P_{G1} + P_{Q1} =$ **188.7** kN/m

Base soil $F_{pass\_v} = A_{pass} \times \gamma_b' =$ **8.1** kN/m

Total $F_{total\_v} = F_{stem} + F_{base} + F_{pass\_v} + F_{water\_v} + F_{P\_v} =$ **236.6** kN/m

Horizontal forces on wall

Surcharge load $F_{sur\_h} = K_0 \times \cos(\delta_{r.d}) \times Surcharge_Q \times h_{eff} =$ **8** kN/m

Saturated retained soil $F_{sat\_h} = K_0 \times \cos(\delta_{r.d}) \times (\gamma_{sr}' - \gamma_w') \times (h_{sat} + h_{base})^2 / 2 =$ **14.5** kN/m

Water $F_{water\_h} = \gamma_w' \times (h_{water} + d_{cover} + h_{base})^2 / 2 =$ **41.3** kN/m

Moist retained soil $F_{moist\_h} = K_0 \times \cos(\delta_{r.d}) \times \gamma_{mr}' \times ((h_{eff} - h_{sat} - h_{base})^2 / 2 + (h_{eff} - h_{sat} - h_{base}) \times (h_{sat} + h_{base})) =$ **22.9** kN/m

Base soil $F_{pass\_h} = -K_P \times \cos(\delta_{b.d}) \times \gamma_b' \times (d_{cover} + h_{base})^2 / 2 =$ **-16.3** kN/m

Total $F_{total\_h} = F_{sat\_h} + F_{moist\_h} + F_{pass\_h} + F_{water\_h} + F_{sur\_h} =$ **70.3** kN/m

Moments on wall

Wall stem $M_{stem} = F_{stem} \times x_{stem} =$ **43.3** kNm/m

Wall base $M_{base} = F_{base} \times x_{base} =$ **12.2** kNm/m

Surcharge load $M_{sur} = -F_{sur\_h} \times x_{sur\_h} =$ **-15.2** kNm/m

Line loads $M_P = (P_{G1} + P_{Q1}) \times p_1 =$ **311.4** kNm/m

Saturated retained soil $M_{sat} = -F_{sat\_h} \times x_{sat\_h} =$ **-14** kNm/m

Water $M_{water} = -F_{water\_h} \times x_{water\_h} =$ **-39.9** kNm/m

Moist retained soil $M_{moist} = -F_{moist\_h} \times x_{moist\_h} =$ **-38.5** kNm/m

Base soil $M_{pass} = F_{pass\_v} \times x_{pass\_v} =$ **6.1** kNm/m

Total $M_{total} = M_{stem} + M_{base} + M_{sat} + M_{moist} + M_{pass} + M_{water} + M_{sur} + M_P =$ **265.3** kNm/m

Check bearing pressure

Propping force to stem $F_{prop\_stem} = \min((F_{total\_v} \times l_{base} / 2 - M_{total}) / (h_{prop} + t_{base}), F_{total\_h}) =$ **-14.2** kN/m

Propping force to base $F_{prop\_base} = F_{total\_h} - F_{prop\_stem} =$ **84.4** kN/m

Moment from propping force $M_{prop} = F_{prop\_stem} \times (h_{prop} + t_{base}) =$ **-52.4** kNm/m

Distance to reaction $\bar{x} = l_{base} / 2 =$ **900** mm

Eccentricity of reaction $e = \bar{x} - l_{base} / 2 =$ **0** mm

Loaded length of base $l_{load} = l_{base} =$ **1800** mm

Bearing pressure at toe $q_{toe} = F_{total\_v} / l_{base} =$ **131.4** kN/m²

Bearing pressure at heel $q_{heel} = F_{total\_v} / l_{base} =$ **131.4** kN/m²

Factor of safety $FoS_{bp} = P_{bearing} / \max(q_{toe}, q_{heel}) =$ **1.141**

PASS - Allowable bearing pressure exceeds maximum applied bearing pressure

RETAINING WALL ANALYSIS

In accordance with EN1997-1:2004 incorporating Corrigendum dated February 2009 and the UK National Annex incorporating Corrigendum No.1

Tedds calculation version 2.6.05

Retaining wall details

Stem type	Propped cantilever
Stem height	h_{stem} = **3500** mm
Prop height	h_{prop} = **3400** mm
Stem thickness	t_{stem} = **300** mm
Angle to rear face of stem	α = **90** deg
Stem density	γ_{stem} = **25** kN/m^3
Toe length	l_{toe} = **1300** mm
Base thickness	t_{base} = **300** mm
Base density	γ_{base} = **25** kN/m^3
Height of retained soil	h_{ret} = **3200** mm
Angle of soil surface	β = **0** deg
Depth of cover	d_{cover} = **300** mm
Height of water	h_{water} = **2300** mm
Water density	γ_w = **9.8** kN/m^3

Retained soil properties

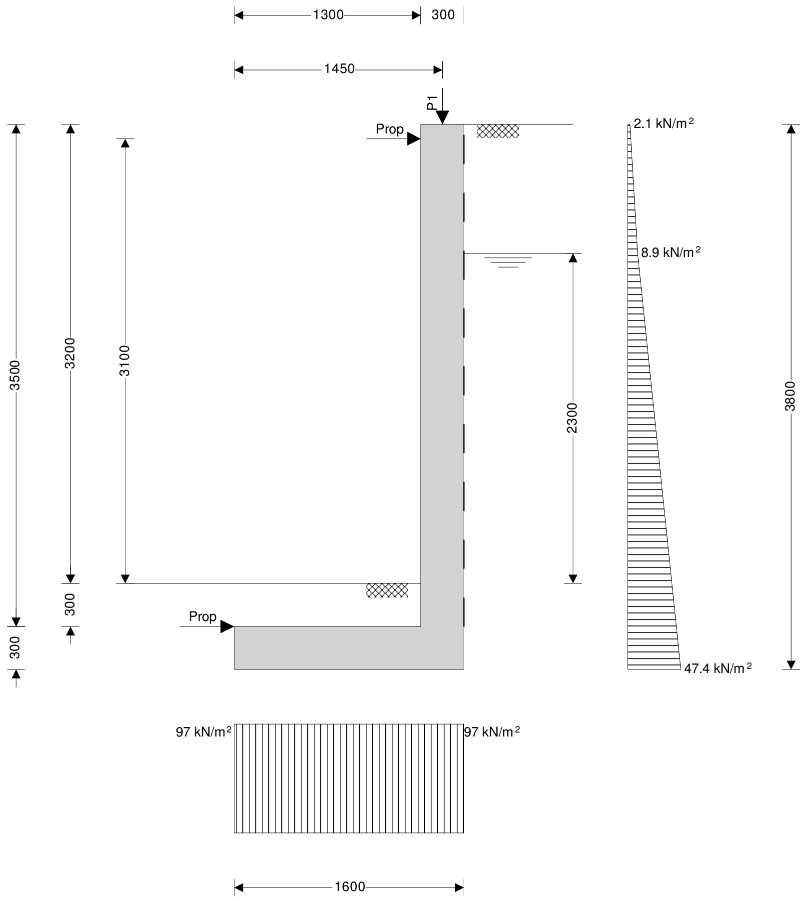
Soil type	Firm clay
Moist density	γ_{mr} = **18** kN/m^3
Saturated density	γ_{sr} = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{r.k}$ = **35** deg
Characteristic wall friction angle	$\delta_{r.k}$ = **9** deg

Base soil properties

Soil type	Firm clay
Soil density	γ_b = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{b.k}$ = **35** deg
Characteristic wall friction angle	$\delta_{b.k}$ = **9** deg
Characteristic base friction angle	$\delta_{bb.k}$ = **12** deg
Presumed bearing capacity	$P_{bearing}$ = **150** kN/m^2

Loading details

Variable surcharge load	$Surcharge_Q$ = **5** kN/m^2
Vertical line load at 1450 mm	P_{G1} = **85** kN/m
	P_{Q1} = **25** kN/m



Calculate retaining wall geometry

Base length	$l_{base} = l_{toe} + t_{stem} =$ **1600** mm
Saturated soil height	$h_{sat} = h_{water} + d_{cover} =$ **2600** mm
Moist soil height	$h_{moist} = h_{ret} - h_{water} =$ **900** mm
Length of surcharge load	$l_{sur} = l_{heel} =$ **0** mm
- Distance to vertical component	$x_{sur\_v} = l_{base} - l_{heel} / 2 =$ **1600** mm
Effective height of wall	$h_{eff} = h_{base} + d_{cover} + h_{ret} =$ **3800** mm
- Distance to horizontal component	$x_{sur\_h} = h_{eff} / 2 =$ **1900** mm
Area of wall stem	$A_{stem} = h_{stem} \times t_{stem} =$ **1.05** m^2
- Distance to vertical component	$x_{stem} = l_{toe} + t_{stem} / 2 =$ **1450** mm
Area of wall base	$A_{base} = l_{base} \times t_{base} =$ **0.48** m^2
- Distance to vertical component	$x_{base} = l_{base} / 2 =$ **800** mm
Area of base soil	$A_{pass} = d_{cover} \times l_{toe} =$ **0.39** m^2
- Distance to vertical component	$x_{pass\_v} = l_{base} - (d_{cover} \times l_{toe} \times (l_{base} - l_{toe} / 2)) / A_{pass} =$ **650** mm
- Distance to horizontal component	$x_{pass\_h} = (d_{cover} + h_{base}) / 3 =$ **200** mm
Area of excavated base soil	$A_{exc} = h_{pass} \times l_{toe} =$ **0.39** m^2
- Distance to vertical component	$x_{exc\_v} = l_{base} - (h_{pass} \times l_{toe} \times (l_{base} - l_{toe} / 2)) / A_{exc} =$ **650** mm
- Distance to horizontal component	$x_{exc\_h} = (h_{pass} + h_{base}) / 3 =$ **200** mm

Using Coulomb theory

At rest pressure coefficient	$K_0 = 1 - \sin(\phi'_{r.k}) =$ **0.426**

Passive pressure coefficient — $K_P = \sin(90 - \phi'_{b.k})^2 / (\sin(90 + \delta_{b.k}) \times [1 - \sqrt{[\sin(\phi'_{b.k} + \delta_{b.k}) \times \sin(\phi'_{b.k}) / (\sin(90 + \delta_{b.k}))]}]^2)$ = **5.103**

Bearing pressure check

Vertical forces on wall

Wall stem — $F_{stem} = A_{stem} \times \gamma_{stem}$ = **26.3** kN/m

Wall base — $F_{base} = A_{base} \times \gamma_{base}$ = **12** kN/m

Line loads — $F_{P\_v} = P_{G1} + P_{Q1}$ = **110** kN/m

Base soil — $F_{pass\_v} = A_{pass} \times \gamma_b'$ = **7** kN/m

Total — $F_{total\_v} = F_{stem} + F_{base} + F_{pass\_v} + F_{water\_v} + F_{P\_v}$ = **155.3** kN/m

Horizontal forces on wall

Surcharge load — $F_{sur\_h} = K_0 \times \cos(\delta_{r.d}) \times Surcharge_Q \times h_{eff}$ = **8** kN/m

Saturated retained soil — $F_{sat\_h} = K_0 \times \cos(\delta_{r.d}) \times (\gamma_{sr}' - \gamma_w') \times (h_{sat} + h_{base})^2 / 2$ = **14.5** kN/m

Water — $F_{water\_h} = \gamma_w' \times (h_{water} + d_{cover} + h_{base})^2 / 2$ = **41.3** kN/m

Moist retained soil — $F_{moist\_h} = K_0 \times \cos(\delta_{r.d}) \times \gamma_{mr}' \times ((h_{eff} - h_{sat} - h_{base})^2 / 2 + (h_{eff} - h_{sat} - h_{base}) \times (h_{sat} + h_{base}))$ = **22.9** kN/m

Base soil — $F_{pass\_h} = -K_P \times \cos(\delta_{b.d}) \times \gamma_b' \times (d_{cover} + h_{base})^2 / 2$ = **-16.3** kN/m

Total — $F_{total\_h} = F_{sat\_h} + F_{moist\_h} + F_{pass\_h} + F_{water\_h} + F_{sur\_h}$ = **70.3** kN/m

Moments on wall

Wall stem — $M_{stem} = F_{stem} \times x_{stem}$ = **38.1** kNm/m

Wall base — $M_{base} = F_{base} \times x_{base}$ = **9.6** kNm/m

Surcharge load — $M_{sur} = -F_{sur\_h} \times x_{sur\_h}$ = **-15.2** kNm/m

Line loads — $M_P = (P_{G1} + P_{Q1}) \times p_1$ = **159.5** kNm/m

Saturated retained soil — $M_{sat} = -F_{sat\_h} \times x_{sat\_h}$ = **-14** kNm/m

Water — $M_{water} = -F_{water\_h} \times x_{water\_h}$ = **-39.9** kNm/m

Moist retained soil — $M_{moist} = -F_{moist\_h} \times x_{moist\_h}$ = **-38.5** kNm/m

Base soil — $M_{pass} = F_{pass\_v} \times x_{pass\_v}$ = **4.6** kNm/m

Total — $M_{total} = M_{stem} + M_{base} + M_{sat} + M_{moist} + M_{pass} + M_{water} + M_{sur} + M_P$ = **104.1** kNm/m

Check bearing pressure

Propping force to stem — $F_{prop\_stem} = \min((F_{total\_v} \times l_{base} / 2 - M_{total}) / (h_{prop} + t_{base}), F_{total\_h})$ = **5.4** kN/m

Propping force to base — $F_{prop\_base} = F_{total\_h} - F_{prop\_stem}$ = **64.8** kN/m

Moment from propping force — $M_{prop} = F_{prop\_stem} \times (h_{prop} + t_{base})$ = **20.1** kNm/m

Distance to reaction — $\bar{x} = l_{base} / 2$ = **800** mm

Eccentricity of reaction — $e = \bar{x} - l_{base} / 2$ = **0** mm

Loaded length of base — $l_{load} = l_{base}$ = **1600** mm

Bearing pressure at toe — $q_{toe} = F_{total\_v} / l_{base}$ = **97** kN/m²

Bearing pressure at heel — $q_{heel} = F_{total\_v} / l_{base}$ = **97** kN/m²

Factor of safety — $FoS_{bp} = P_{bearing} / \max(q_{toe}, q_{heel})$ = **1.546**

PASS - Allowable bearing pressure exceeds maximum applied bearing pressure

Project	Templewood Avenue	NG NEER & Partners
Client	Brian Coyne and kirsty Mitchell	
Location	Foundation PAD	

PAD FOUNDATION DESIGN to EN 1992-1 : 2004 (without UK NA) **Combined base**

Originated from RCCen81.xls v4.1 on CD © 2003 - 2017 TCC

mpa The Concrete Centre

eurocode 2

Made by	Date	Page
OA	07-Sep-17	1
Checked	**Revision**	**Job No**
SL	-	16848

Usage: Office

MATERIALS								
fck	35	MPa	dg	20	mm	γc	1.5	concrete
fyk	500	MPa	cover	50	mm	γs	1.15	steel
Densities - Concrete	25	kN/m³	Soil	18	kN/m³	teel class	A	
Bearing pressure	150	kN/m² (net allowable)						

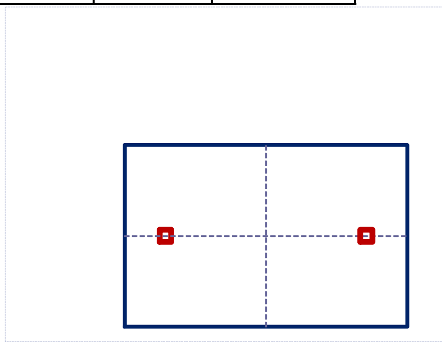
COLUMN REACTIONS kN, kNm *characteristic*

Column 1 (rhs)	DEAD	IMPOSED	WIND
Axial	331.0	105.0	
Mx			
My			
Hx			
Hy			

Column 2 (lhs)	DEAD	IMPOSED	WIND
Axial	331.0	105.0	
Mx			
My			
Hx			
Hy			

DIMENSIONS mm

BASE	COLUMN 1 (rhs)	COLUMN 2 (lhs)
L = 3600	h1 = 150	h2 = 150
B = 2300	b1 = 150	b2 = 150
depth H = 300		
∑ex = 2562	ex1 = 1281	ex2 = 1281
∑ey = 0	ey1 = 0	ey2 = 0



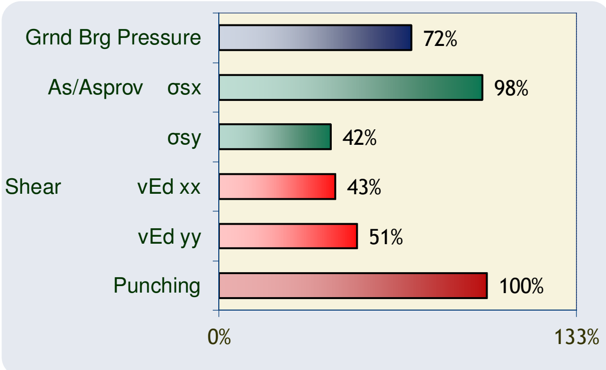
PLOT (to scale)

STATUS VALID DESIGN

BEARING PRESSURES kN/m² *characteristic*

CORNER	1	2	3	4
no wind	107.4	107.4	107.4	107.4
with wind	107.4	107.4	107.4	107.4

TR/GEO max bearing pressure = 147.2 kN/m²



Efficiency

REINFORCEMENT

Btm Mxx -	31.3	kNm	Myy -	286.8	
b =	2300	mm	b =	3600	
d =	246	mm	d =	236	
As =	308	mm²	As =	2942	

PROVIDE 10H8 @ 250 B1 & 27H12 @ 75 & 200 B2

A_s prov = 503 mm² A_s prov = 3054

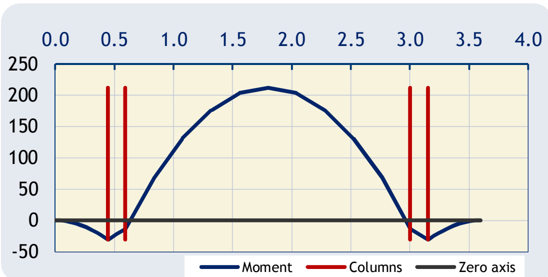
Detail to clause 3.11.3.2 *Detail to clause 3.11.3.*

Top Mxx +	513.8	kNm	Myy +	0.0
d =	240	mm	d =	226
As =	5531	mm²	As =	0

PROVIDE 80H20 @ 0 & 25 T1 & 122H8 @ 0 & 25 T2

As,prov = 25133 mm² As,prov = 6132

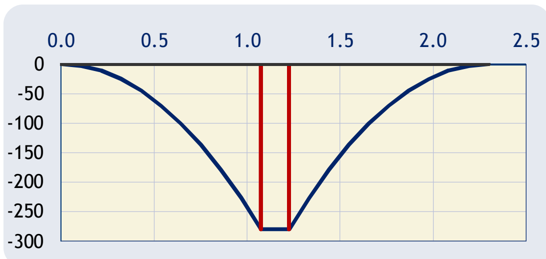
As +349.8% for shear



Mx Diagram (1.35G+1.05Q)

BEAM SHEAR

Vxx =	304.4	kN at d	Vyy =	416.5
vEd =	0.552	N/mm²	vEd =	0.490
or Vxx =	226.4	kN at 2d	or Vyy =	299.3
vEd =	0.410	N/mm²	vEd =	0.352
vRdc =	0.946	N/mm²	vRdc =	0.686



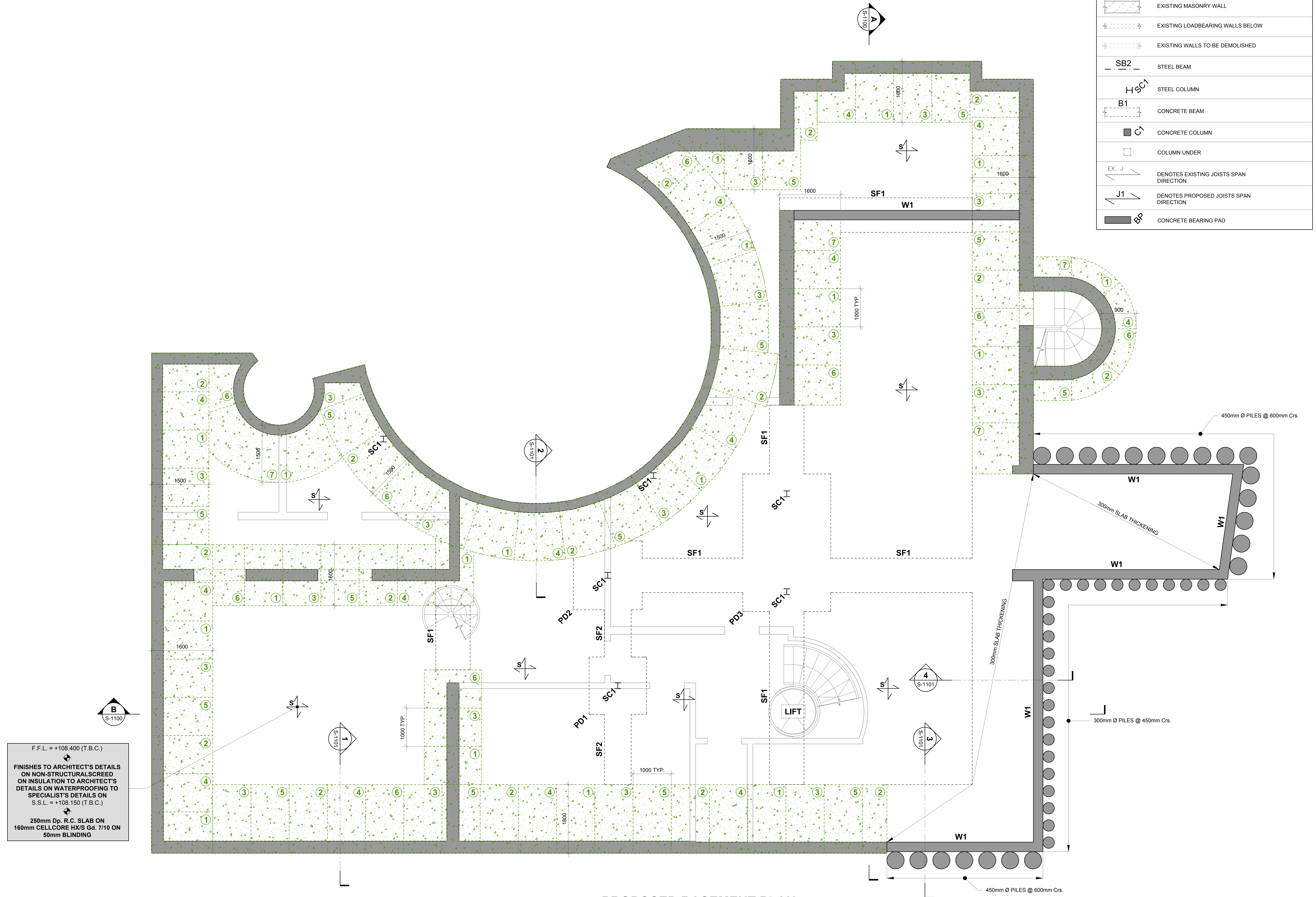
My Diagram (1.35G+1.05Q)

PUNCHING SHEAR

d ave =	241	mm	u crit =	3002	mm
A_s prov =	1.853	%	vmax =	4.590	N/mm² at col face
vEd =	0.919	N/mm²	vRdc =	0.921	N/mm²

APPENDIX III

Construction Sequence Drawings



PROPOSED BASEMENT PLAN

SCALE @ A1: 1:50
SCALE @ A3: 1:100

LEGEND

- NEW REINFORCED CONCRETE WALL
- NEW LOADBEARING BLOCKWORK WALL
- NEW NON-LOADBEARING WALL
- EXISTING MASONRY WALL
- EXISTING LOADBEARING WALLS BELOW
- EXISTING WALLS TO BE DEMOLISHED
- SB2 — STEEL BEAM
- SC1 — STEEL COLUMN
- B1 — CONCRETE BEAM
- C1 — CONCRETE COLUMN
- COLUMN UNDER
- EX. J — DENOTES EXISTING JOISTS SPAN DIRECTION
- J1 — DENOTES PROPOSED JOISTS SPAN DIRECTION
- BP — CONCRETE BEARING PAD

PRELIMINARY

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECT'S DRAWINGS.FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

SCHEDULE OF CONCRETE MEMBERS

CONCRETE WALLS

REF.	SIZE	COMMENT
W1	250mm THK. R.C. WALL	-

CONCRETE PAD FOOTINGS

REF.	SIZE	COMMENT
PD1	1500 x 1500 x 300mm Dp. PAD FOOTING	-
PD2	1800 x 1800 x 300mm Dp. PAD FOOTING	-
PD3	3600 x 2300 x 300mm Dp. PAD FOOTING	-

CONCRETE STRIP FOOTINGS

REF.	SIZE	COMMENT
SF1	900 x 300mm Dp. STRIP FOOTING	-
SF2	700 x 300mm Dp. STRIP FOOTING	-

SCHEDULE OF STEEL MEMBERS

STEEL COLUMNS

REF.	SIZE	COMMENT
SC1	152 UC 37kg.	-
SC2	203 UC 46kg.	-

STEEL BEAMS

REF.	SIZE	COMMENT
SB1	203 UC 46kg.	-
SB2	203 UC 86kg.	-
SB3	152 UC 30kg.	-
SB4	406 x 178 UB 54kg.	-
SB5	150 x 90 UEA 10.0	-

S — DENOTES 250mm THK. R.C. SLAB ON 160mm Dp. CELLCORE HX/S Gd. 7/10 ON 50mm BLINDING

CF — DENOTES 200mm O/A Dp. R.C. SLAB FORMED ON COMFLOOR 80 METAL DECK

NOTE:
- ALL UNDERPIN BASES 300mm THK. U.N.O.
- EXTERNAL WALL UNDERPIN STEM MIN. THICKNESS = 300mm (TO MATCH EXISTING WALL THICKNESS)
- INTERNAL WALL UNDERPIN STEM MIN. THICKNESS = 215mm (TO MATCH EXISTING WALL THICKNESS)

ISSUE	DATE	DESCRIPTION	DRN / CHKD	ORIG / P.E.
P1	08.09.17	ISSUED FOR COMMENT	M.A. / S.L.	S.L. / V.B.

ISSUE STATUS: ☒ PRELIMINARY (P1, P2, P3 etc.,) ☐ PLANNING (PL1, PL2, PL3 etc.,) ☐ TENDER (T1,T2, T3 etc.,) ☐ CONSTRUCTION (0, 1, 2 etc.,)

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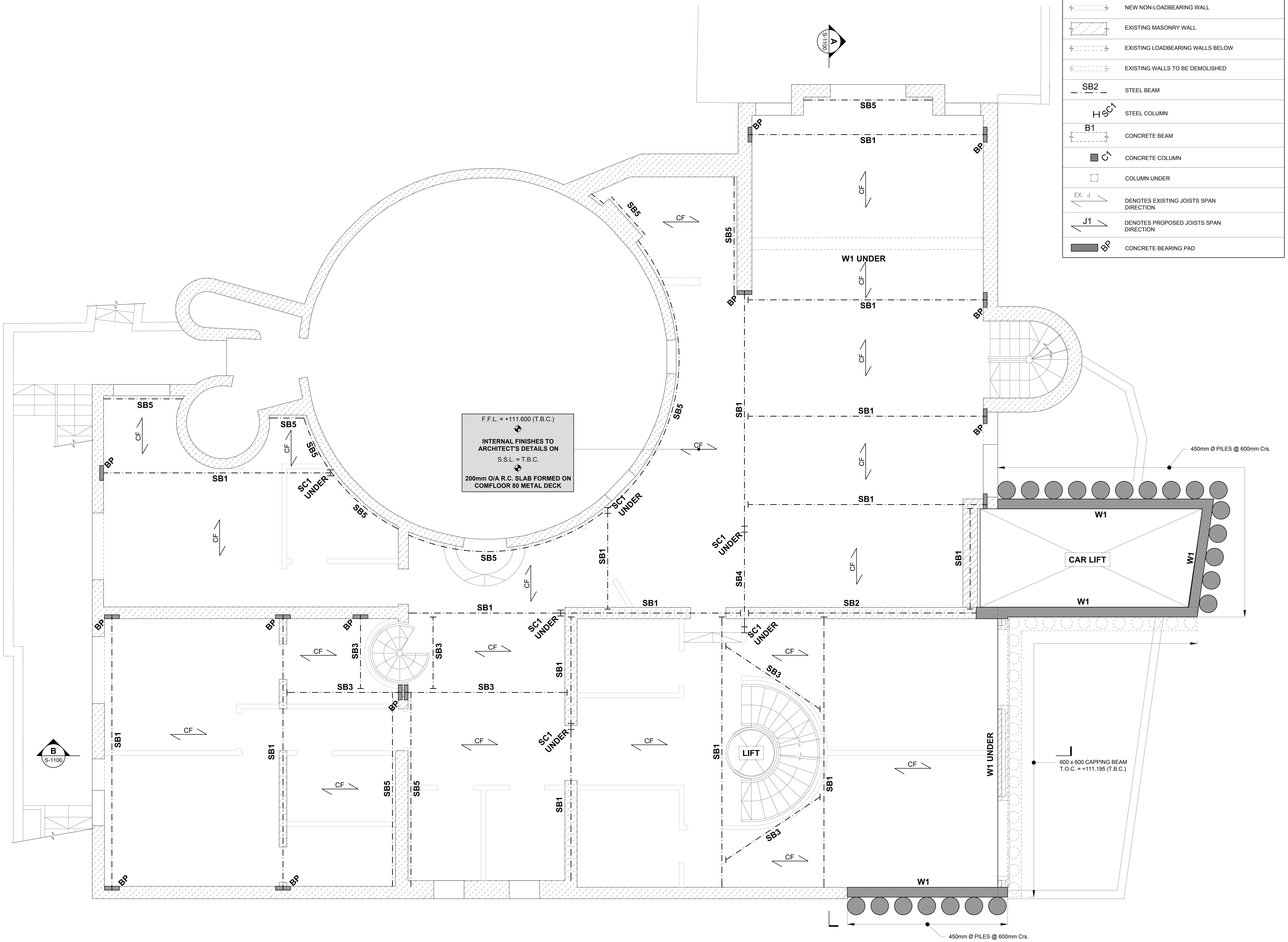
BM barrett mahony

CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7UY

DRAWING TITLE
PROPOSED BASEMENT PLAN

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	S-1000	P1



PROPOSED GROUND FLOOR PLAN

SCALE @ A1: 1:50
SCALE @ A3: 1:100

LEGEND

- NEW REINFORCED CONCRETE WALL
- NEW LOADBEARING BLOCKWORK WALL
- NEW NON-LOADBEARING WALL
- EXISTING MASONRY WALL
- EXISTING LOADBEARING WALLS BELOW
- EXISTING WALLS TO BE DEMOLISHED
- SB2 — STEEL BEAM
- SC1 — STEEL COLUMN
- B1 — CONCRETE BEAM
- C1 — CONCRETE COLUMN
- COLUMN UNDER
- EX. J — DENOTES EXISTING JOISTS SPAN DIRECTION
- J1 — DENOTES PROPOSED JOISTS SPAN DIRECTION
- BP — CONCRETE BEARING PAD

PRELIMINARY

NOTES

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2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

SCHEDULE OF CONCRETE MEMBERS

CONCRETE WALLS

REF.	SIZE	COMMENT
W1	250mm THK. R.C. WALL	-

CONCRETE PAD FOOTINGS

REF.	SIZE	COMMENT
PD1	1500 x 1500 x 300mm Dp. PAD FOOTING	-
PD2	1800 x 1800 x 300mm Dp. PAD FOOTING	-
PD3	3600 x 2300 x 300mm Dp. PAD FOOTING	-

CONCRETE STRIP FOOTINGS

REF.	SIZE	COMMENT
SF1	900 x 300mm Dp. STRIP FOOTING	-
SF2	700 x 300mm Dp. STRIP FOOTING	-

SCHEDULE OF STEEL MEMBERS

STEEL COLUMNS

REF.	SIZE	COMMENT
SC1	152 UC 37kg.	-
SC2	203 UC 46kg.	-

STEEL BEAMS

REF.	SIZE	COMMENT
SB1	203 UC 46kg.	-
SB2	203 UC 86kg.	-
SB3	152 UC 30kg.	-
SB4	406 x 178 UB 54kg.	-
SB5	150 x 90 UEA 10.0	-

- S — DENOTES 250mm THK. R.C. SLAB ON 160mm Dp. CELLCORE HX/S Gd. 7/10 ON 50mm BLINDING
- CF — DENOTES 200mm O/A Dp. R.C. SLAB FORMED ON COMFLOOR 80 METAL DECK

NOTE:
- ALL UNDERPIN BASES 300mm THK. U.N.O.
- EXTERNAL WALL UNDERPIN STEM MIN. THICKNESS = 300mm (TO MATCH EXISTING WALL THICKNESS)
- INTERNAL WALL UNDERPIN STEM MIN. THICKNESS = 215mm (TO MATCH EXISTING WALL THICKNESS)

ISSUE	DATE	DESCRIPTION	DRN / DRIG	P.E. / P.D.
P1	08.09.17	ISSUED FOR COMMENT	M.A. / S.L.	S.L. / V.B.

ISSUE STATUS: ☒ PRELIMINARY (P1, P2, P3 etc.,) ☐ PLANNING (PL1, PL2, PL3 etc.,) ☐ TENDER (T1,T2, T3 etc.,) ☐ CONSTRUCTION (0, 1, 2 etc.,)

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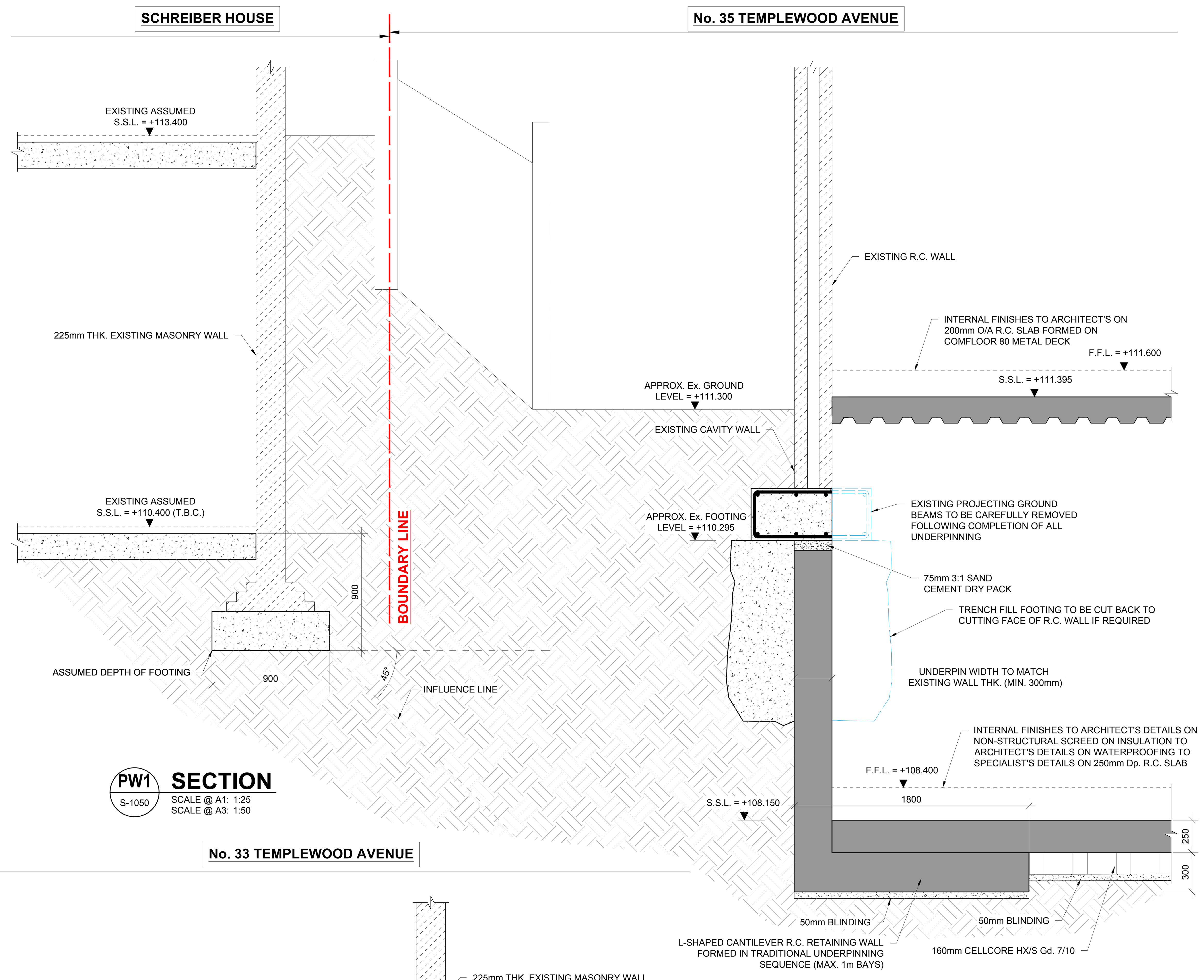
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

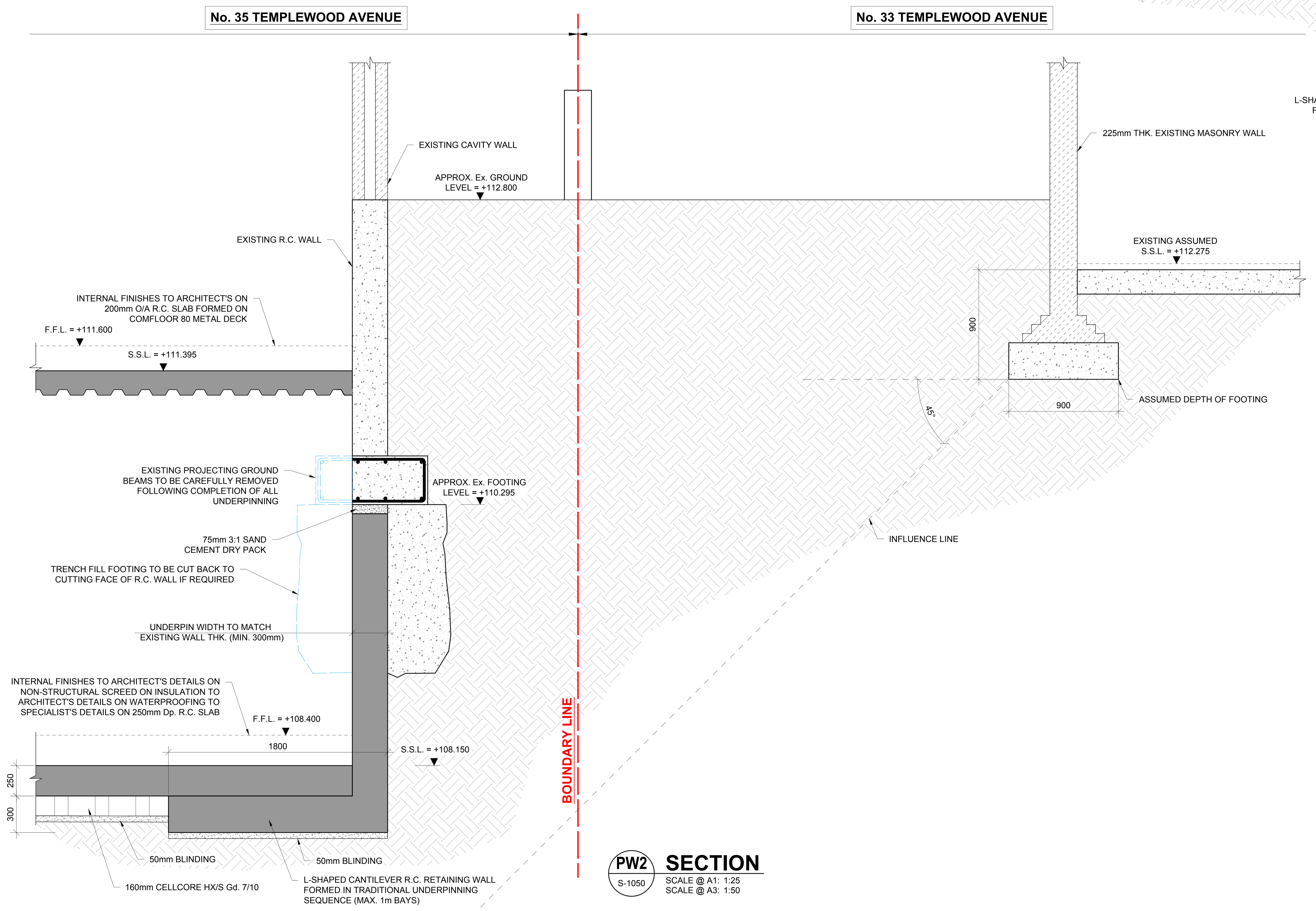
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
PROPOSED GROUND FLOOR PLAN

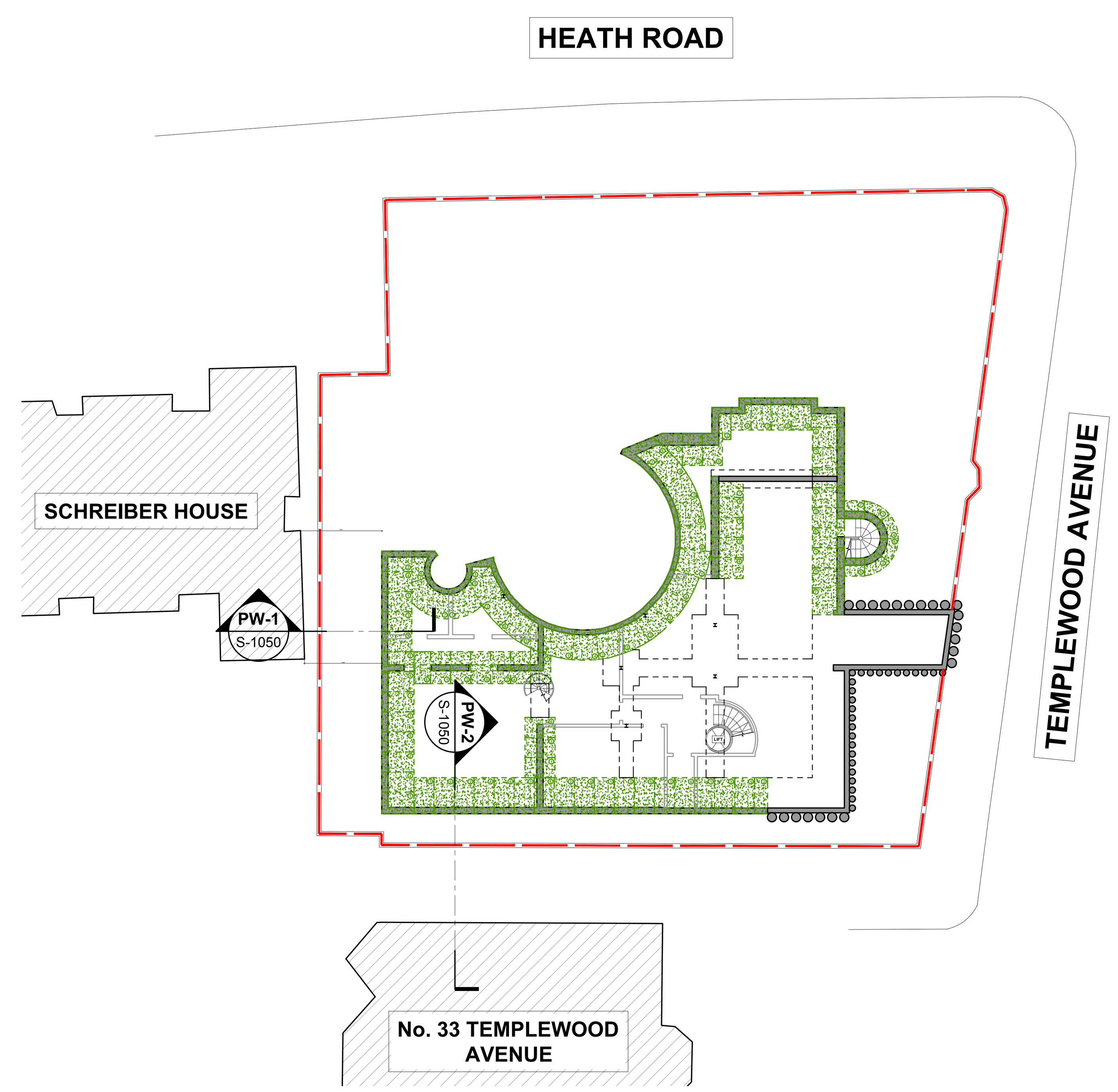
SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	S-1001	P1



PW1 SECTION
S-1050
SCALE @ A1: 1:25
SCALE @ A3: 1:50



PW2 SECTION
S-1050
SCALE @ A1: 1:25
SCALE @ A3: 1:50



KEY PLAN
SCALE @ A1: N.T.S.
SCALE @ A3: N.T.S.

PRELIMINARY

NOTES

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ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	08.09.17	ISSUED FOR COMMENT	M.A. / S.L.	S.L. / V.B.

ISSUE STATUS ☒ PRELIMINARY (P1, P2, P3 etc.,) ☐ PLANNING (PL1, PL2, PL3 etc.,) ☐ TENDER (T1,T2, T3 etc.,) ☐ CONSTRUCTION (0, 1, 2 etc.,)

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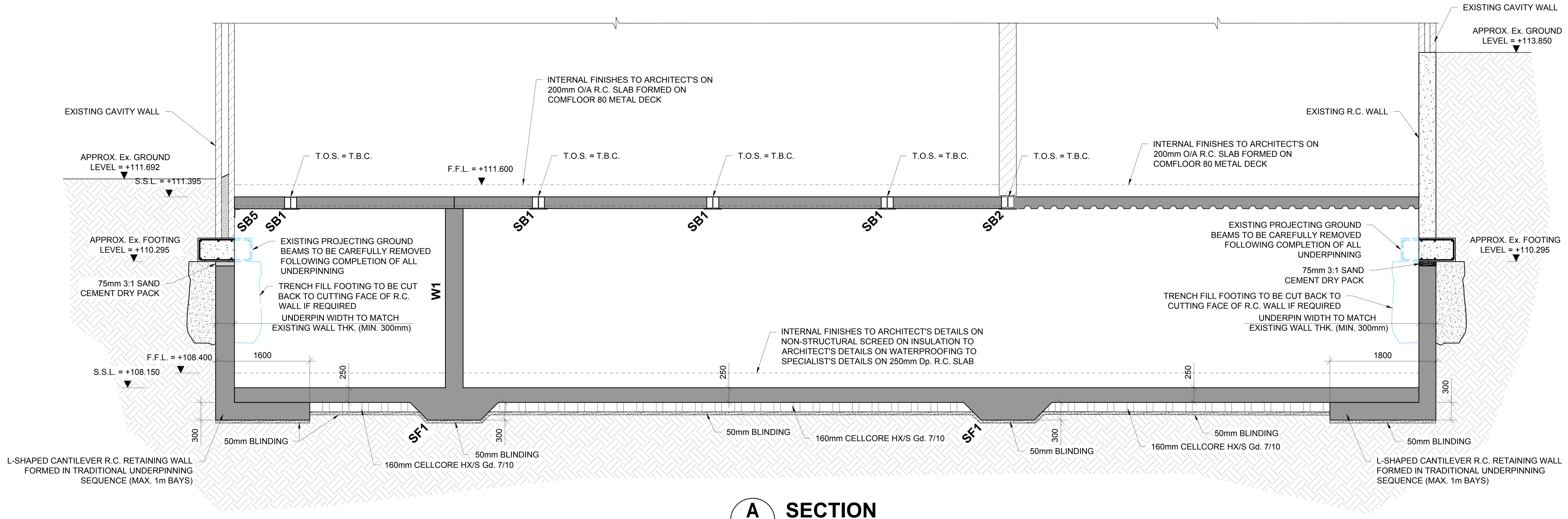
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

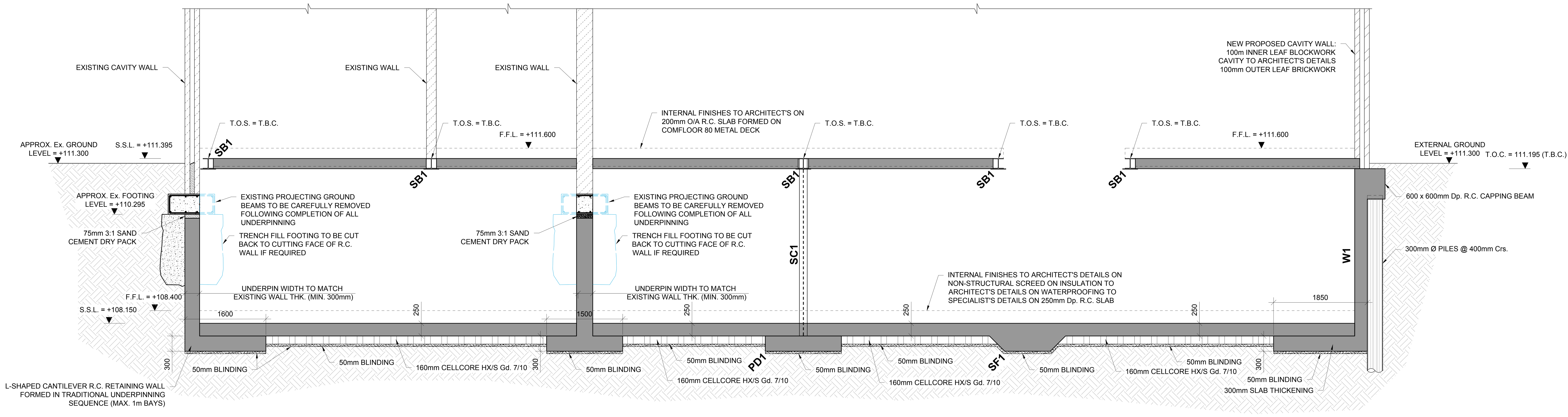
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
PARTY WALL SECTIONS

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	S-1050	P1



A S-1000 **SECTION**
SCALE @ A1: 1:50
SCALE @ A3: 1:100



B S-1000 **SECTION**
SCALE @ A1: 1:50
SCALE @ A3: 1:100

PRELIMINARY

NOTES

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SCHEDULE OF CONCRETE MEMBERS

CONCRETE WALLS

REF.	SIZE	COMMENT
W1	250mm THK. R.C. WALL	-

CONCRETE PAD FOOTINGS

REF.	SIZE	COMMENT
PD1	1500 x 1500 x 300mm Dp. PAD FOOTING	-
PD2	1800 x 1800 x 300mm Dp. PAD FOOTING	-
PD3	3600 x 2300 x 300mm Dp. PAD FOOTING	-

CONCRETE STRIP FOOTINGS

REF.	SIZE	COMMENT
SF1	900 x 300mm Dp. STRIP FOOTING	-
SF2	700 x 300mm Dp. STRIP FOOTING	-

SCHEDULE OF STEEL MEMBERS

STEEL COLUMNS

REF.	SIZE	COMMENT
SC1	152 UC 37kg.	-
SC2	203 UC 46kg.	-

STEEL BEAMS

REF.	SIZE	COMMENT
SB1	203 UC 46kg.	-
SB2	203 UC 86kg.	-
SB3	152 UC 30kg.	-
SB4	406 x 178 UB 54kg.	-
SB5	150 x 90 UEA 10.0	-

S — DENOTES 250mm THK. R.C. SLAB ON 160mm Dp. CELLCORE HX/S Gd. 7/10 ON 50mm BLINDING

CF — DENOTES 200mm O/A Dp. R.C. SLAB FORMED ON COMFLOOR 80 METAL DECK

NOTE:
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ISSUE	DATE	DESCRIPTION	DRN / CHKD	DRIG / P.D.
P1	08.09.17	ISSUED FOR COMMENT	M.A. / S.I.	S.L. / V.B.

ISSUE STATUS ☒ PRELIMINARY (P1, P2, P3 etc.,) ☐ PLANNING (PL1, PL2, PL3 etc.,) ☐ TENDER (T1,T2, T3 etc.,) ☐ CONSTRUCTION (0, 1, 2 etc.,)

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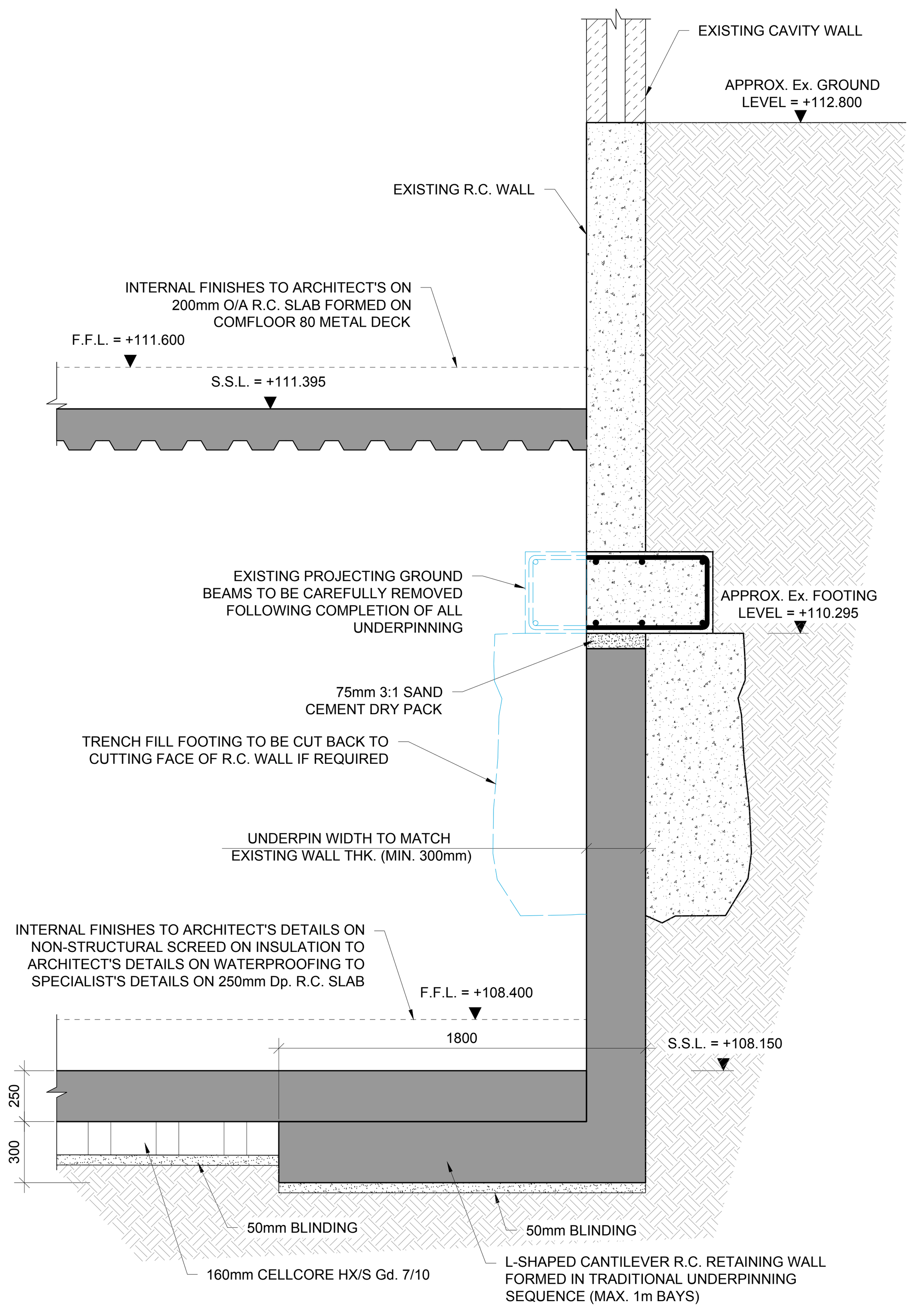
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

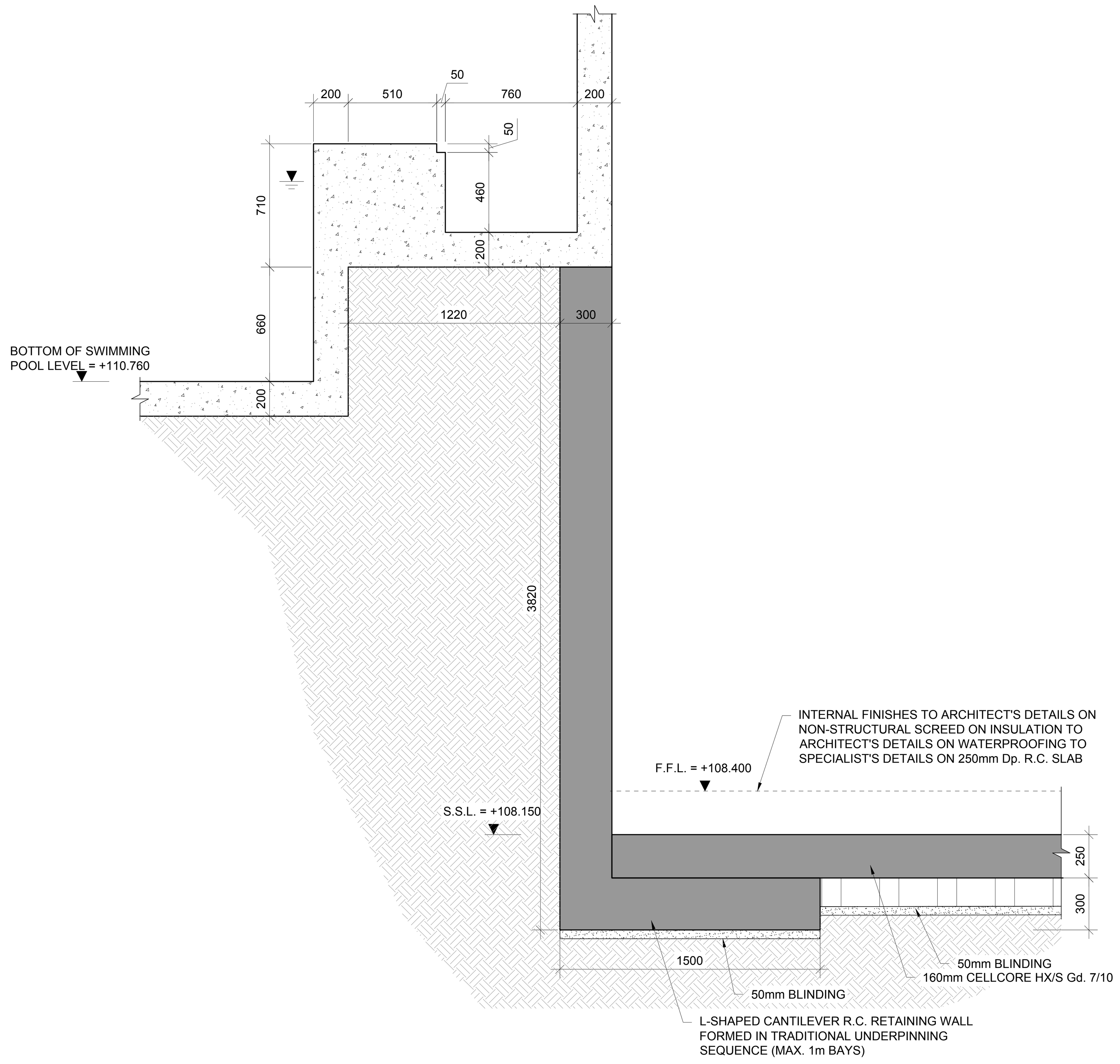
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
FULL HEIGHT SECTIONS AND B

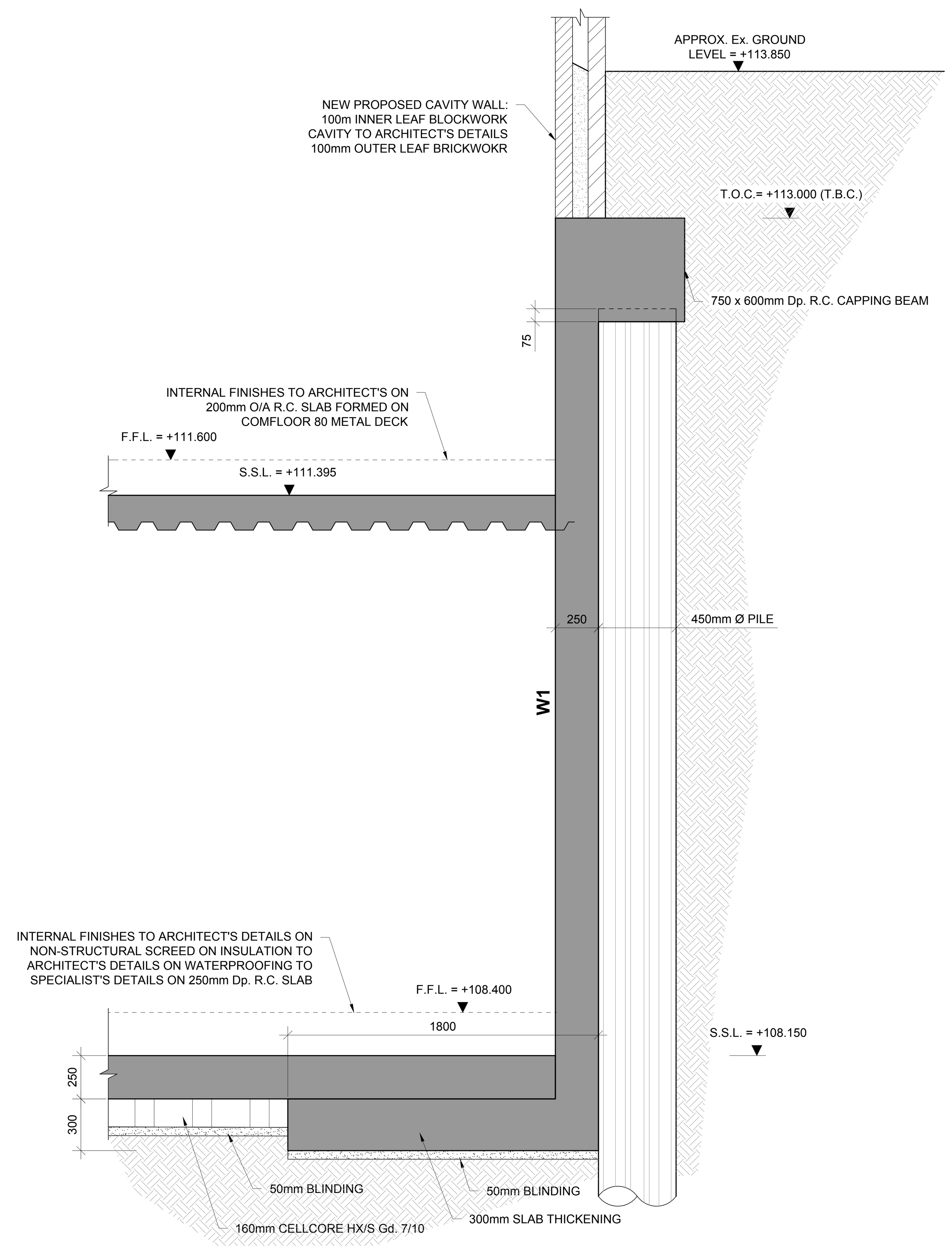
SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	S-1100	P1



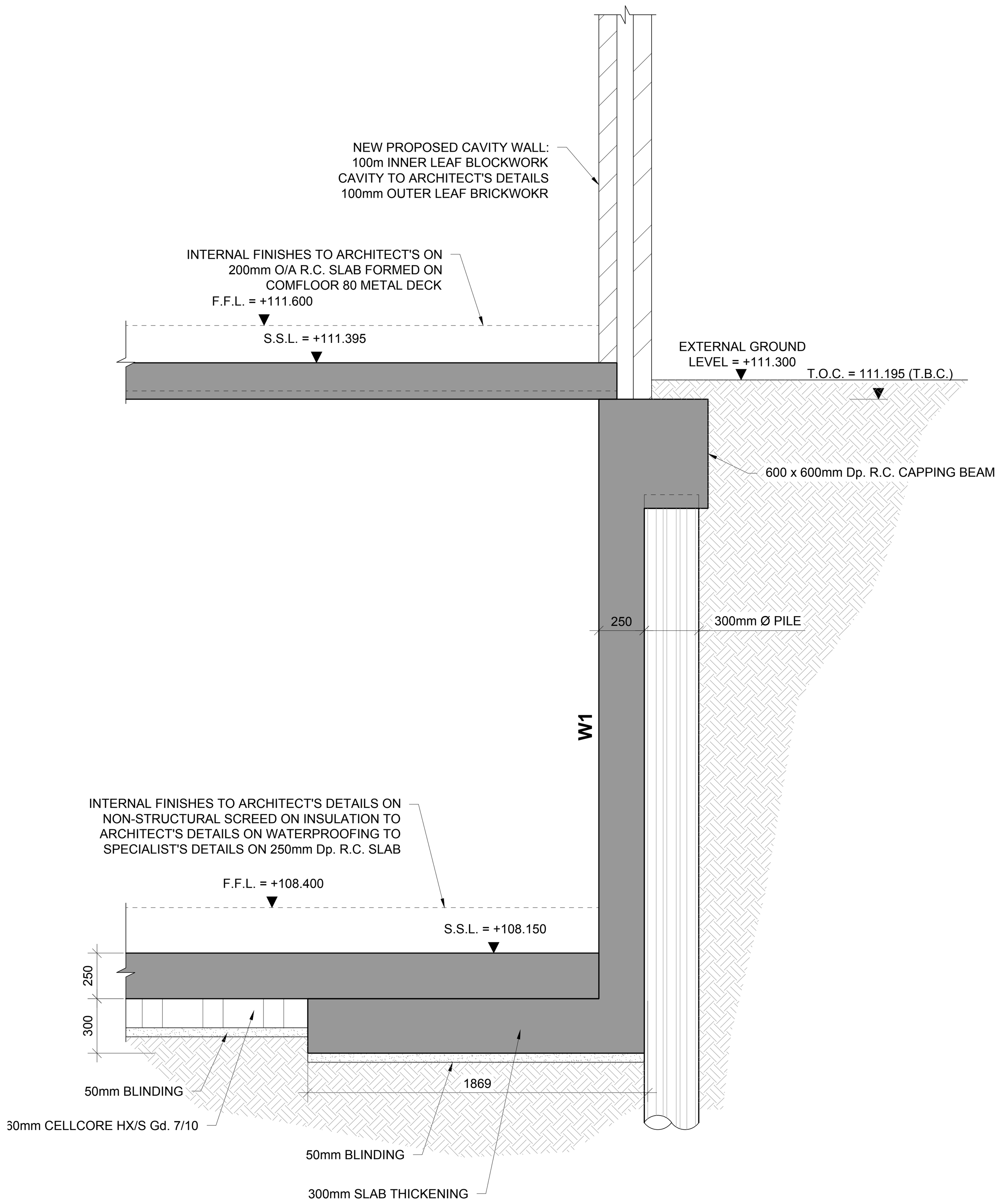
1 S-1000 **SECTION**
SCALE @ A1: 1:25
SCALE @ A3: 1:50



2 S-1000 **SECTION**
SCALE @ A1: 1:25
SCALE @ A3: 1:50



3 S-1000 **SECTION**
SCALE @ A1: 1:25
SCALE @ A3: 1:50



4 S-1000 **SECTION**
SCALE @ A1: 1:25
SCALE @ A3: 1:50

PRELIMINARY

NOTES

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CONCRETE PAD FOOTINGS

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REF.	SIZE	COMMENT
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STEEL COLUMNS

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SC2	203 UC 46kg.	-

STEEL BEAMS

REF.	SIZE	COMMENT
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SB2	203 UC 86kg.	-
SB3	152 UC 30kg.	-
SB4	406 x 178 UB 54kg.	-
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ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
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ISSUE STATUS ☒ **PRELIMINARY** (P1, P2, P3 etc,,) ☐ **PLANNING** (PL1, PL2, PL3 etc,,)
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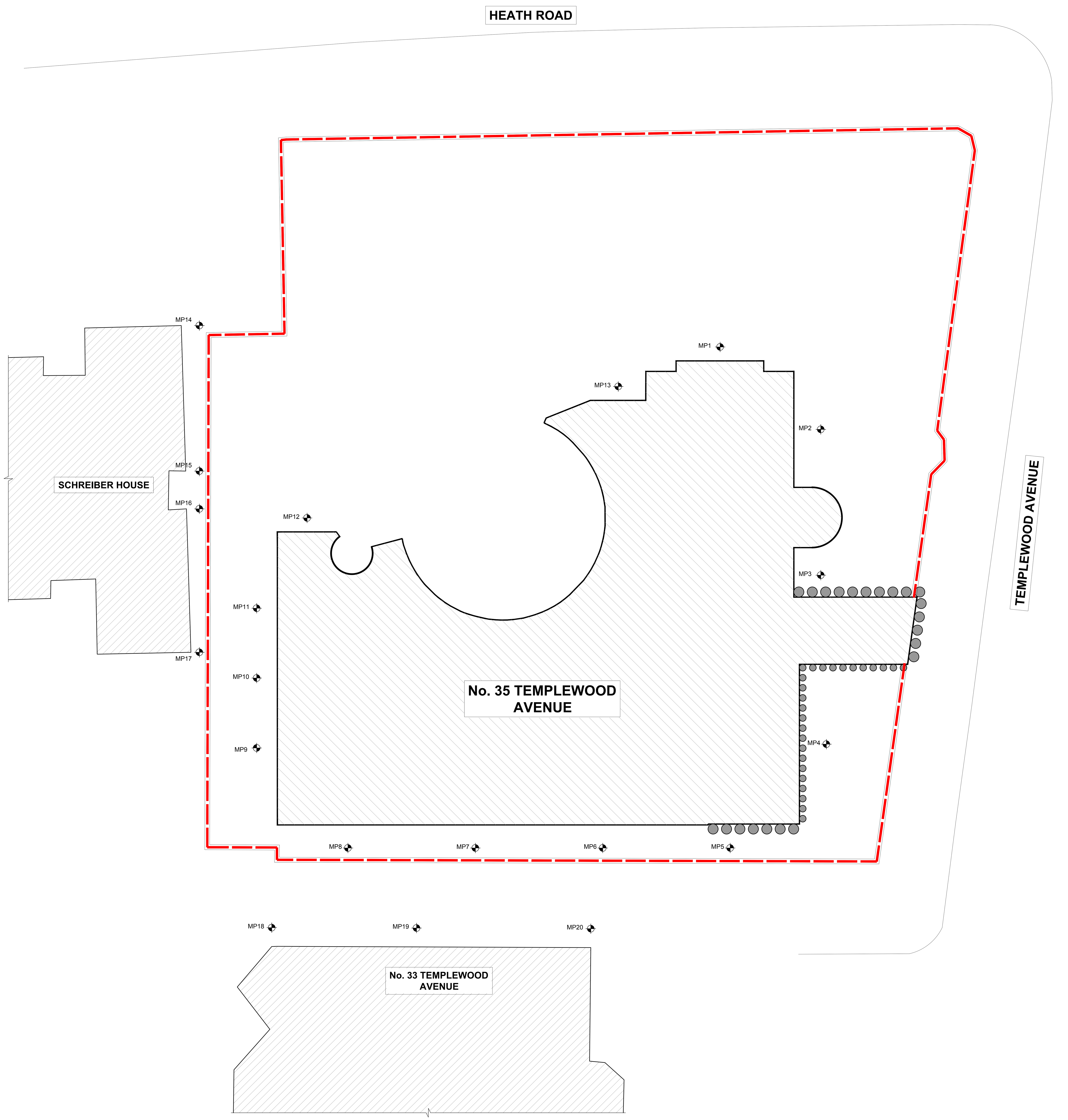
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
SECTIONS SHEET 1

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	S-1101	P1



MONITORING POINTS LOCATION PLAN

SCALE @ A1: N.T.S.
SCALE @ A3: N.T.S.

PRELIMINARY

NOTES

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MONITORING LEGEND

1) PROVIDE MONITORING POINTS TO EXISTING WALL AT SPECIFIED LOCATIONS. MONITORING POINTS ARE TO RECORD BOTH VERTICAL AND HORIZONTAL MOVEMENTS OF THE FACADE DURING THE CONSTRUCTION PERIOD. AT THE OUTSET OF THE PROJECT, PRIOR TO EXCAVATION WORKS COMMENCING THE CONTRACTOR IS TO TAKE BASE-LINE READINGS AT EACH MONITORING POINT. EACH MONITORING POINT IS INDICATED THUS:

MP

2) THE PERIMETER WALLS SHALL BE MONITORED REGULARLY FOR SIGNS OF MOVEMENT BY FOLLOWING METHODS

A - VISUAL INSPECTION
B - ACCURATE SURVEY TECHNIQUES

LOCATION OF TARGETS FOR MONITORING SHALL BE AGREED PRIOR TO COMMENCING WORKS AND SHALL BE RECORDED ON SURVEY DRAWINGS AND RESULTS TABULATED AND PRESENTED GRAPHICALLY AND SUBMITTED TO THE CA ON A WEEKLY BASIS.

3) MONITORING OF MOVEMENT SHALL HAVE A MINIMUM ACCURACY OF +/-0.2mm.

4) MONITORING IS TO BE UNDERTAKEN FOR A SUITABLE PERIOD PRIOR TO MAIN EXCAVATION WORKS COMMENCING TO ENABLE BASE MOVEMENT DUE TO DAILY THERMAL EFFECTS TO BE ESTABLISHED.

5) READINGS ARE TO BE TAKEN AT THE SAME TIME EACH DAY TO MINIMIZE THE EFFECTS OF TEMPERATURE FLUCTUATIONS.
6) OVER THE COURSE OF THE BASEMENT WORKS THE CONTRACTOR IS TO RECORD MONITOR READINGS ON A WEEKLY BASIS.
7) IF THE MONITOR READINGS INDICATE EVIDENCE OF MOVEMENTS, THE CONTRACTOR IS TO REFER TO TRIGGER VALUES BELOW. IT IS ALSO ESSENTIAL THAT THE CONTRACTOR RECORDS ACCUMULATIVE MOVEMENTS AT EACH MONITOR.
8) THE FOLLOWING TRIGGER VALUES OUTLINE THE ACTIONS TO BE TAKEN.

TRIGGER VALUE	TOTAL VERTICAL MOVEMENTS	TOTAL HORIZONTAL MOVEMENTS
GREEN	MOVEMENT LESS THAN 3mm ACTION - OK TO PROCEED	MOVEMENT LESS THAN 3mm ACTION - OK TO PROCEED
AMBER	EXCEEDS 5mm ACTION - CONTRACTOR TO MONITOR MORE FREQUENTLY, REVIEW CONSTRUCTION METHODS AND START IMPLEMENTING CONTINGENCY MEASURES IF TRENDS INDICATE THE RED TRIGGER MAY SHORTLY BE REACHED	EXCEEDS 5mm ACTION - CONTRACTOR TO MONITOR MORE FREQUENTLY, REVIEW CONSTRUCTION METHODS AND START IMPLEMENTING CONTINGENCY MEASURES IF TRENDS INDICATE THE RED TRIGGER MAY SHORTLY BE REACHED
RED	EXCEEDS 5mm ACTION - CONTRACTOR TO IMPLEMENT MEASURES TO CEASE MOVEMENTS AND STOP WORKS.	EXCEEDS 5mm ACTION - CONTRACTOR TO IMPLEMENT MEASURES TO CEASE MOVEMENTS AND STOP WORKS.

9) FOLLOWING COMPLETION OF THE STRUCTURAL WORKS MOVEMENT MONITORING SHOULD CONTINUE ON A MONTHLY BASIS FOR A PERIOD OF 6 MONTHS.

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	08.09.17	ISSUED FOR COMMENT	M.A. / S.L.	S.L. / V.B.

ISSUE STATUS ☒ **PRELIMINARY** (P1, P2, P3 etc,,) ☐ **PLANNING** (PL1, PL2, PL3 etc,,)
☐ **TENDER** (T1,T2, T3 etc,,) ☐ **CONSTRUCTION** (0, 1, 2 etc,,)

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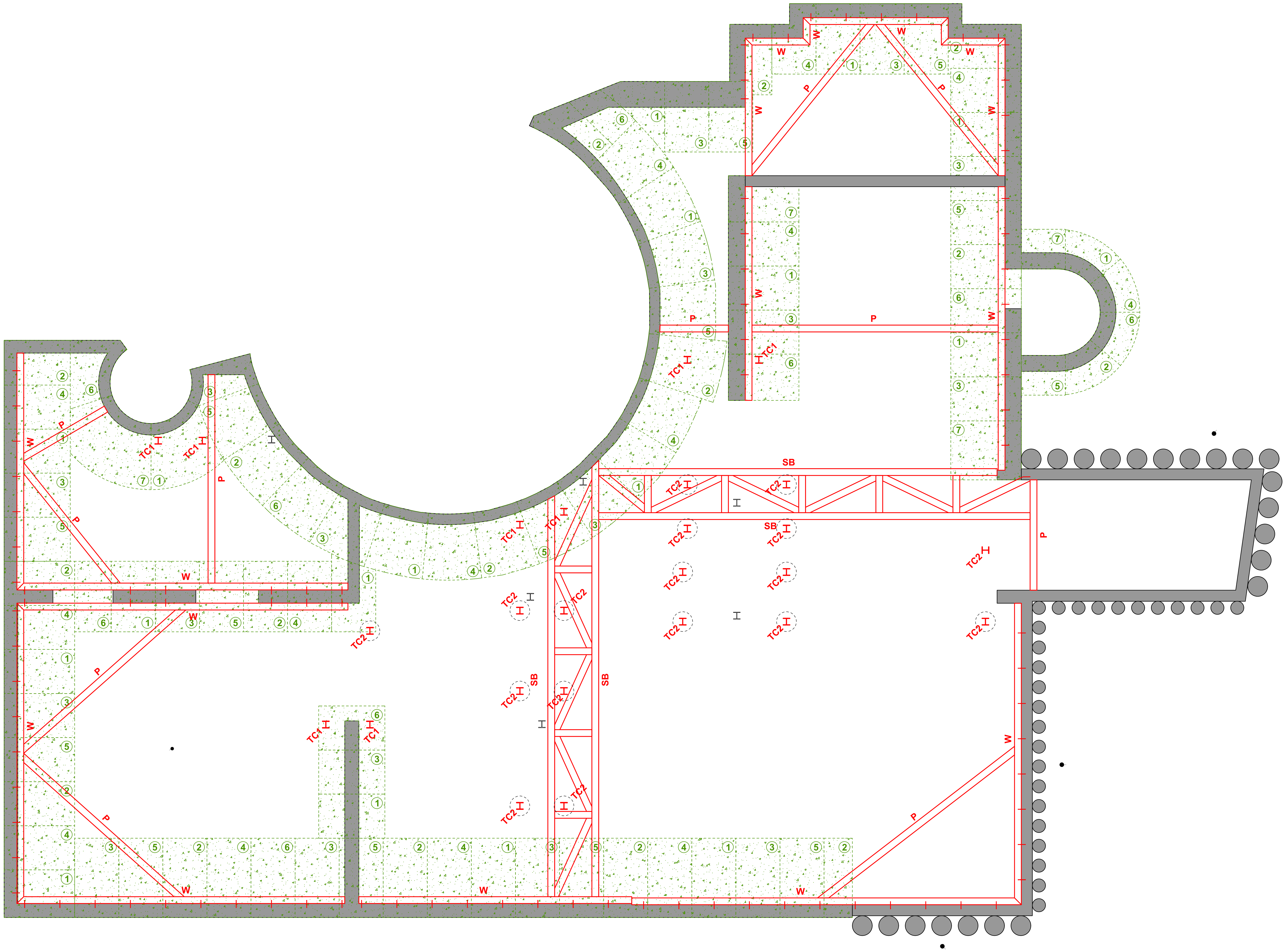
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS MONITORING LOCATION PLAN

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4000	P1



BASEMENT TEMPORARY PROPPING LOWER AND HIGHER LEVELS PLAN

SCALE @ A1: 1:50
SCALE @ A3: 1:100

PRELIMINARY

NOTES

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LEGEND

W	DENOTES TEMPORARY WALLER
SB	DENOTES TEMPORARY BEAMS
P	DENOTES TEMPORARY PROPS AND NEEDLES
BP	CONCRETE BEARING PAD
	DENOTES STRUCTURE TO BE DEMOLISHED
	DENOTES 450mm Ø PILE

SCHEDULE OF TEMPORARY MEMBERS

TEMPORARY COLUMNS

REF.	SIZE	COMMENT
TC1	152 UC 30kg.	SUPPORTED ON UNDERPINNING
TC2	152 UC 30kg. PLUNGE COLUMN INSTALLED IN 450mm Ø PILE	-

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	11.09.17	ISSUED FOR COMMENT	M.A. / O.A.	S.L. / V.B.

ISSUE STATUS ☒ PRELIMINARY (P1, P2, P3 etc,,) ☐ PLANNING (PL1, PL2, PL3 etc,,) ☐ TENDER (T1,T2, T3 etc,,) ☐ CONSTRUCTION (0, 1, 2 etc,,)

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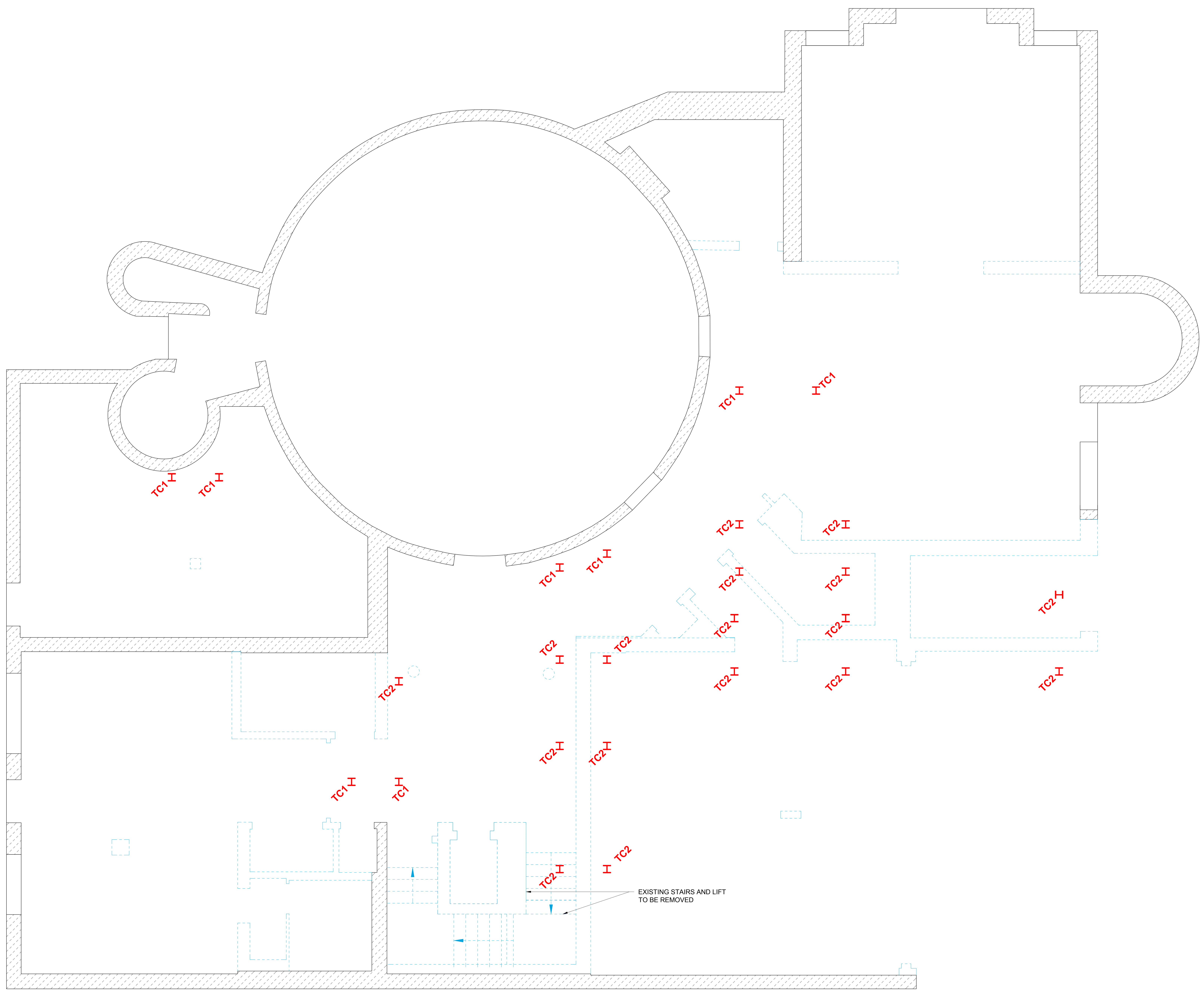
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS
BASMENT TEMPORARY PROPPING
LOWER AND HIGHER LEVELS PLAN

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4001	P1



EXISTING GROUND FLOOR DEMOLITION PLAN

SCALE @ A1: 1:50
SCALE @ A3: 1:100

PRELIMINARY

NOTES

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LEGEND

W	DENOTES TEMPORARY WALLER
SB	DENOTES TEMPORARY BEAMS
P	DENOTES TEMPORARY PROPS AND NEEDLES
BP	CONCRETE BEARING PAD
	DENOTES STRUCTURE TO BE DEMOLISHED
	DENOTES 450mm Ø PILE

SCHEDULE OF TEMPORARY MEMBERS

TEMPORARY COLUMNS

REF.	SIZE	COMMENT
TC1	152 UC 30kg.	SUPPORTED ON UNDERPINNING
TC2	152 UC 30kg. PLUNGE COLUMN INSTALLED IN 450mm Ø PILE	-

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	11.09.17	ISSUED FOR COMMENT	M.A. / O.A.	S.L. / V.B.

ISSUE STATUS ☒ PRELIMINARY (P1, P2, P3 etc,,) ☐ PLANNING (PL1, PL2, PL3 etc,,) ☐ TENDER (T1,T2, T3 etc,,) ☐ CONSTRUCTION (0, 1, 2 etc,,)

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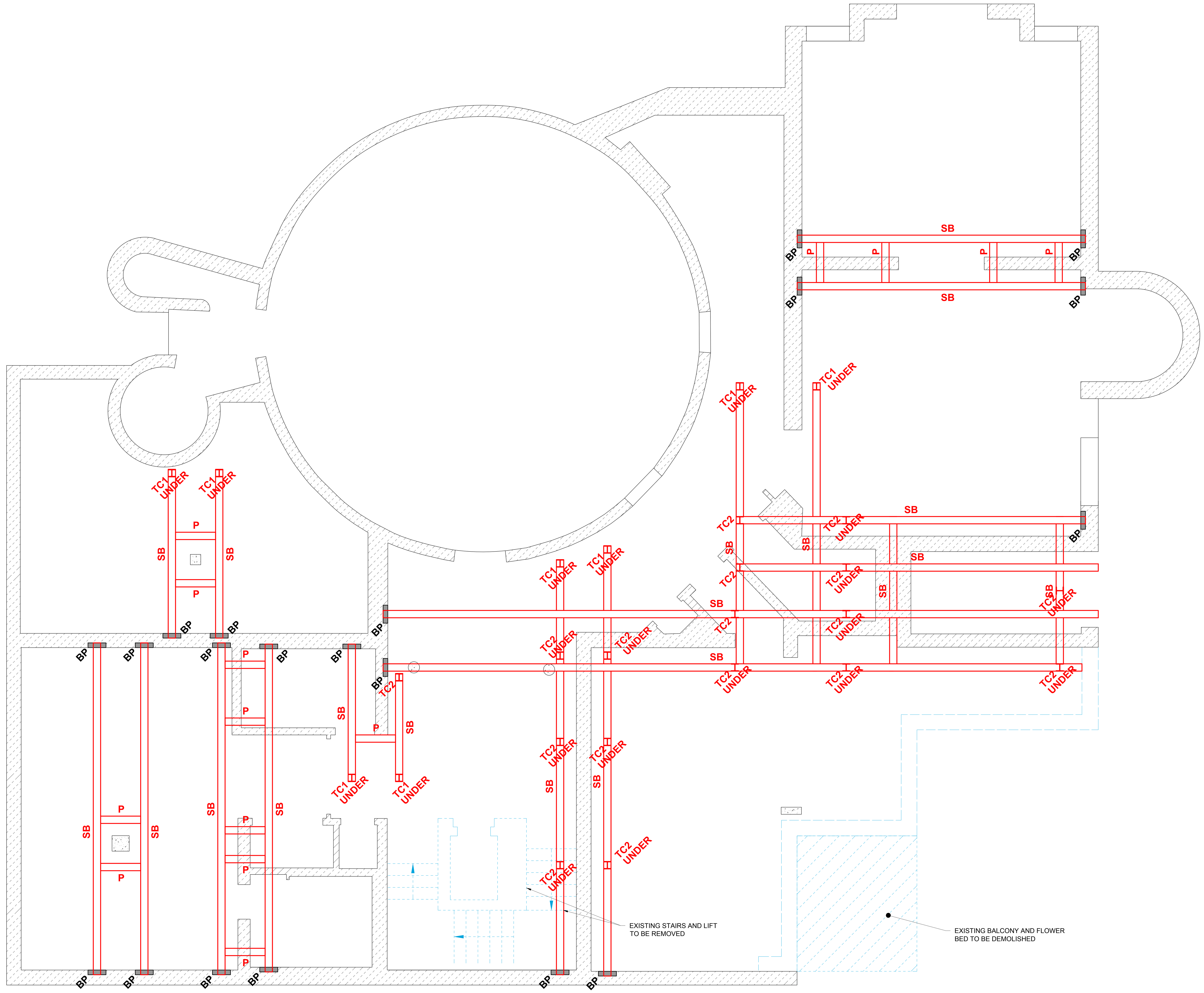
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS EXISTING GROUND FLOOR DEMOLITION PLAN

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4002	P1



EXISTING FIRST FLOOR DEMOLITION PLAN

SCALE @ A1: 1:50
SCALE @ A3: 1:100

PRELIMINARY

NOTES

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LEGEND

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SB	DENOTES TEMPORARY BEAMS
P	DENOTES TEMPORARY PROPS AND NEEDLES
BP	CONCRETE BEARING PAD
	DENOTES STRUCTURE TO BE DEMOLISHED
	DENOTES 450mm Ø PILE

SCHEDULE OF TEMPORARY MEMBERS

TEMPORARY COLUMNS

REF.	SIZE	COMMENT
TC1	152 UC 30kg.	SUPPORTED ON UNDERPINNING
TC2	152 UC 30kg. PLUNGE COLUMN INSTALLED IN 450mm Ø PILE	-

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	11.09.17	ISSUED FOR COMMENT	M.A. / O.A.	S.L. / V.B.

ISSUE STATUS ☒ **PRELIMINARY** (P1, P2, P3 etc,,) ☐ **PLANNING** (PL1, PL2, PL3 etc,,) ☐ **TENDER** (T1,T2, T3 etc,,) ☐ **CONSTRUCTION** (0, 1, 2 etc,,)

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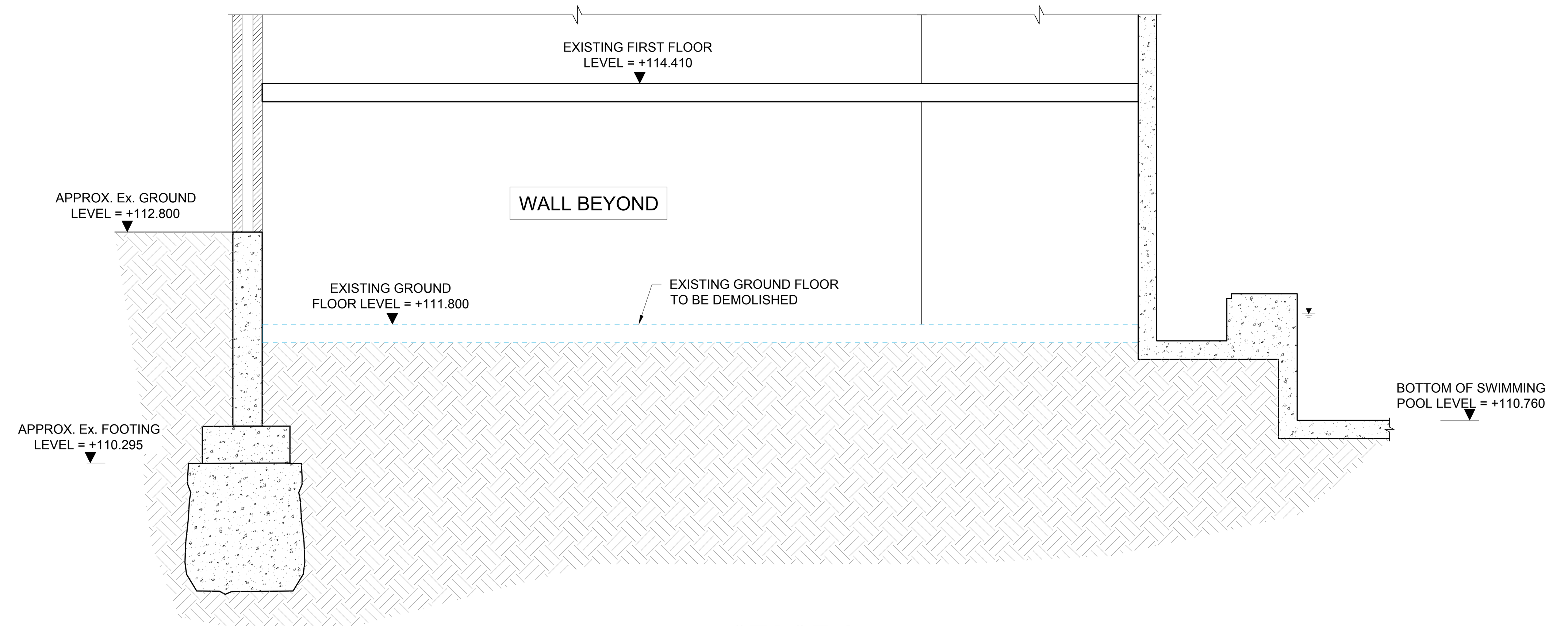
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

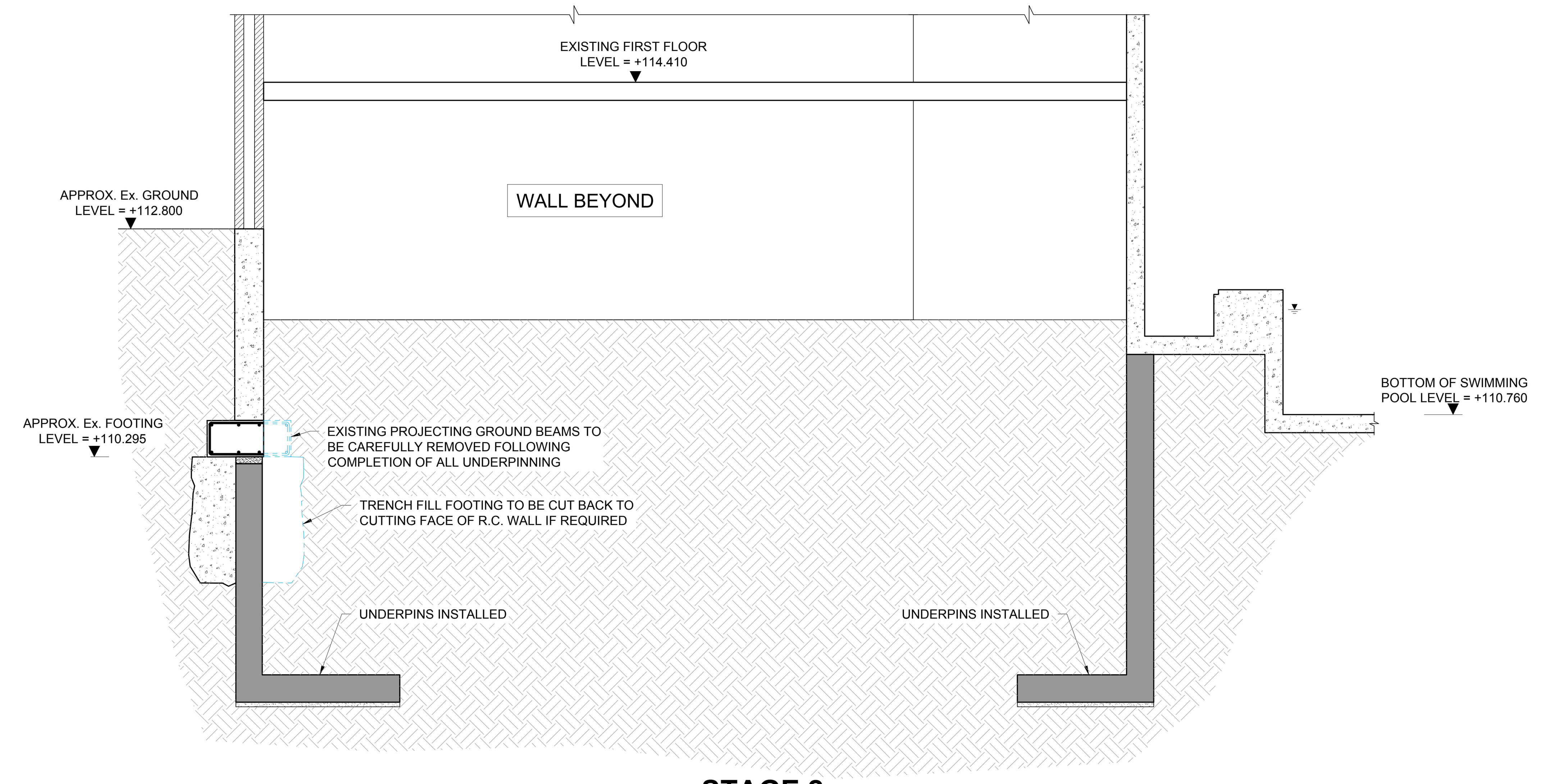
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS EXISTING FIRST FLOOR DEMOLITION PLAN

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4003	P1



STAGE 1



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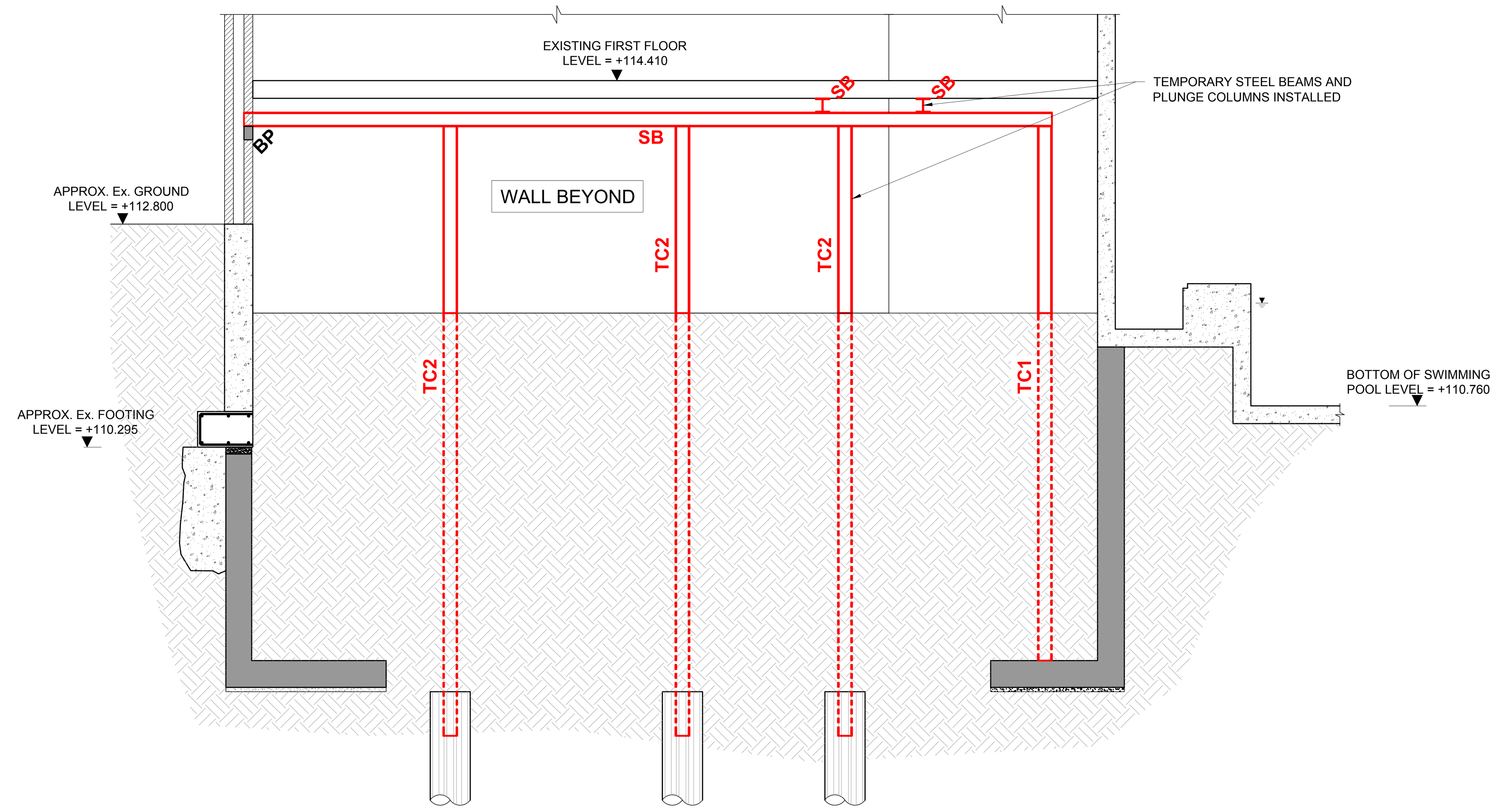

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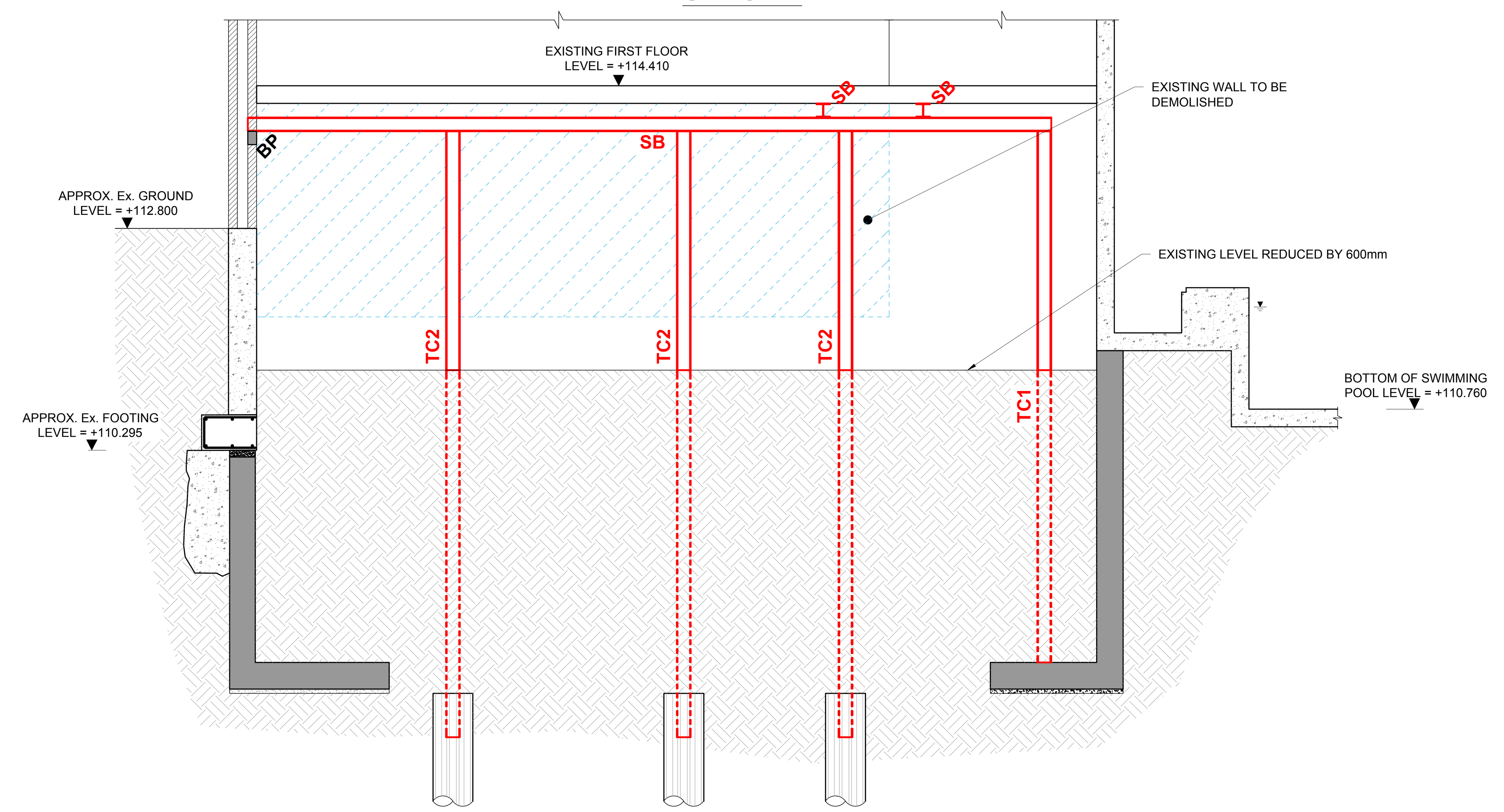

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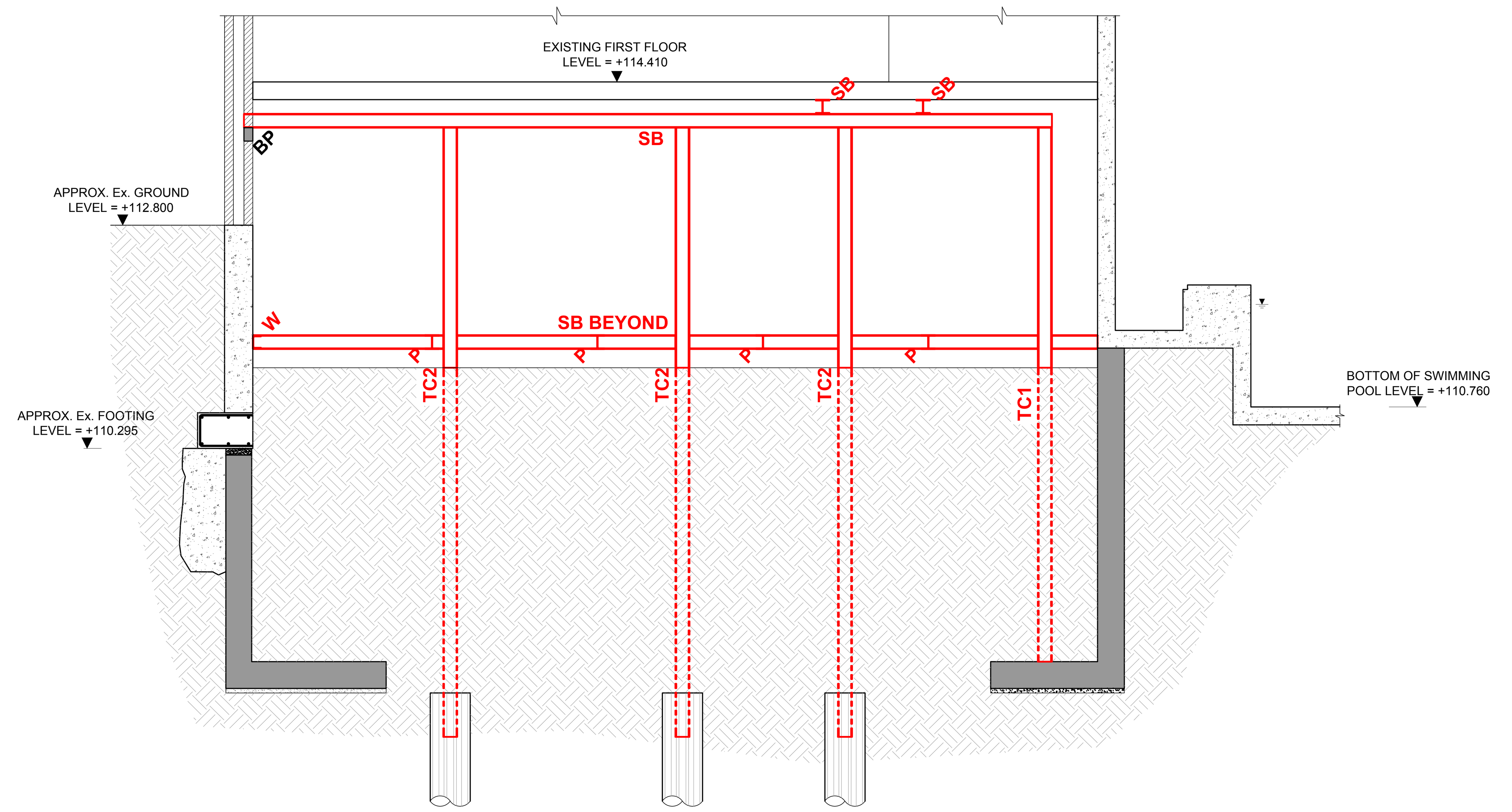

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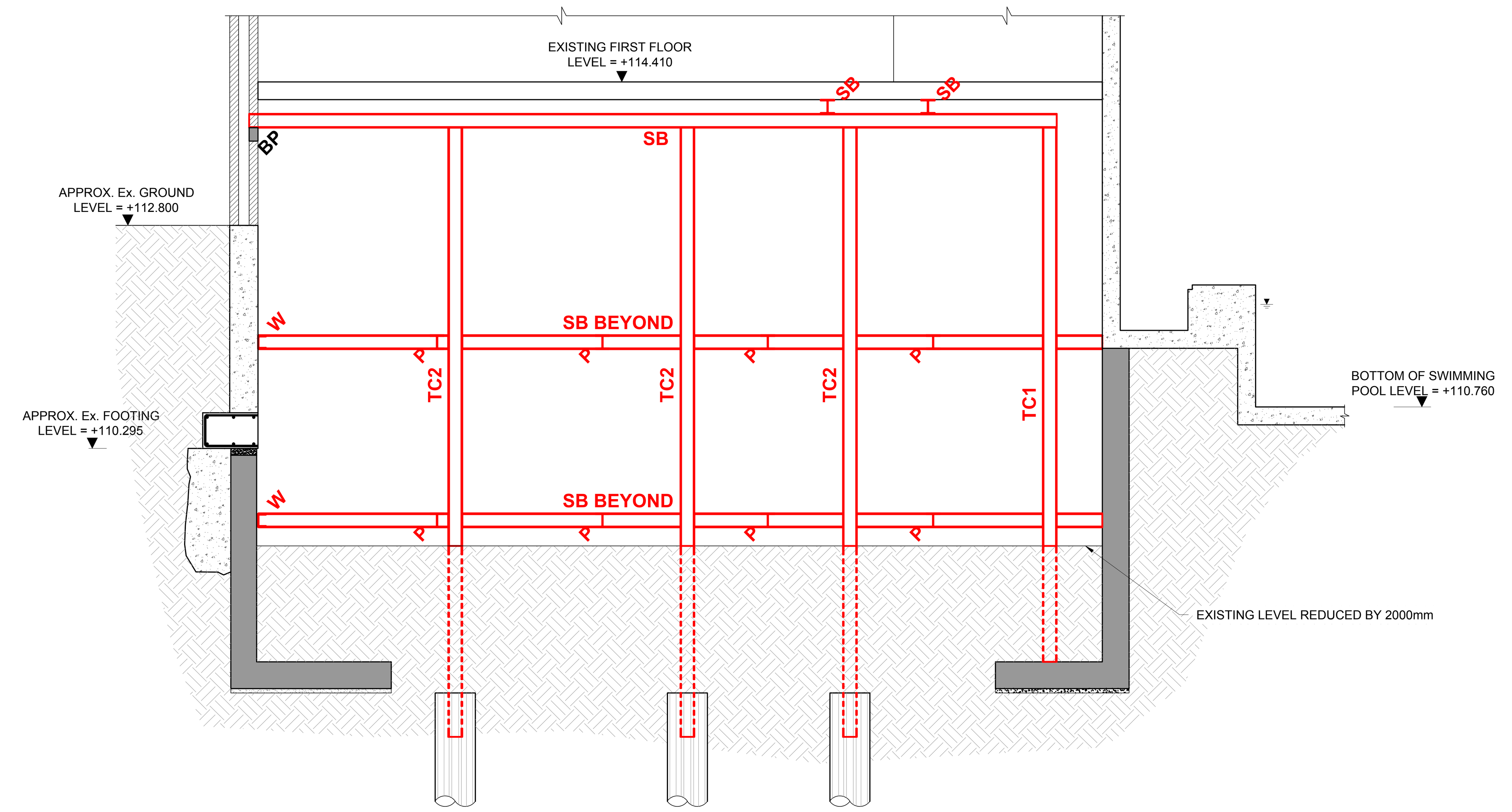

STAGE 6

PRELIMINARY

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECT'S DRAWINGS.FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

LEGEND

W	DENOTES TEMPORARY WALLER
SB	DENOTES TEMPORARY BEAMS
P	DENOTES TEMPORARY PROPS AND NEEDLES
BP	CONCRETE BEARING PAD
	DENOTES STRUCTURE TO BE DEMOLISHED
	DENOTES 450mm Ø PILE

SCHEDULE OF TEMPORARY MEMBERS

TEMPORARY COLUMNS

REF.	SIZE	COMMENT
TC1	152 UC 30kg.	SUPPORTED ON UNDERPINNING
TC2	152 UC 30kg. PLUNGE COLUMN INSTALLED IN 450mm Ø PILE	-

OUTLINE METHOD STATEMENT:

STAGE 1: I) FIRST FLOOR STRUCTURE IS PROPPED TO GROUND FLOOR
II) EXISTING GROUND FLOOR IS REMOVED

STAGE 2: I) EXISTING PROJECTING GROUND BEAMS TO BE CAREFULLY REMOVED BY FOLLOWING COMPLETION OF ALL UNDERPINNING

STAGE 3: I) PLUNGE COLUMNS INSTALLED
II) STEEL BEAMS AT FIRST FLOOR LEVEL INSTALLED

STAGE 4: I) EXISTING INTERNAL WALLS DEMOLISHED
II) REDUCED LEVEL TO 600mm BELOW GROUND

STAGE 5: HIGHER LEVEL OF BRACED FRAME INSTALLED

STAGE 6: I) LEVEL REDUCED BY 2000mm
II) LOWER LEVEL OF BRACED FRAME INSTALLED

STAGE 7: I) LEVEL REDUCED TO FORMATION LEVEL
II) BASEMENT, SLAB, STRIP FOOTING AND PAD FOOTING CAST
III) LOWER LEVEL BRACED FRAME REMOVED

STAGE 8: I) HIGHER LEVEL BRACED FRAME REMOVED
II) PERMANENT STEEL COLUMNS INSTALLED AND RC WALLS CAST
III) GROUND FLOOR INSTALLED

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	11.09.17	ISSUED FOR COMMENT	M.A. / O.A.	S.L. / V.B.

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☐ TENDER (T1,T2, T3 etc,,) ☐ CONSTRUCTION (0, 1, 2 etc,,)

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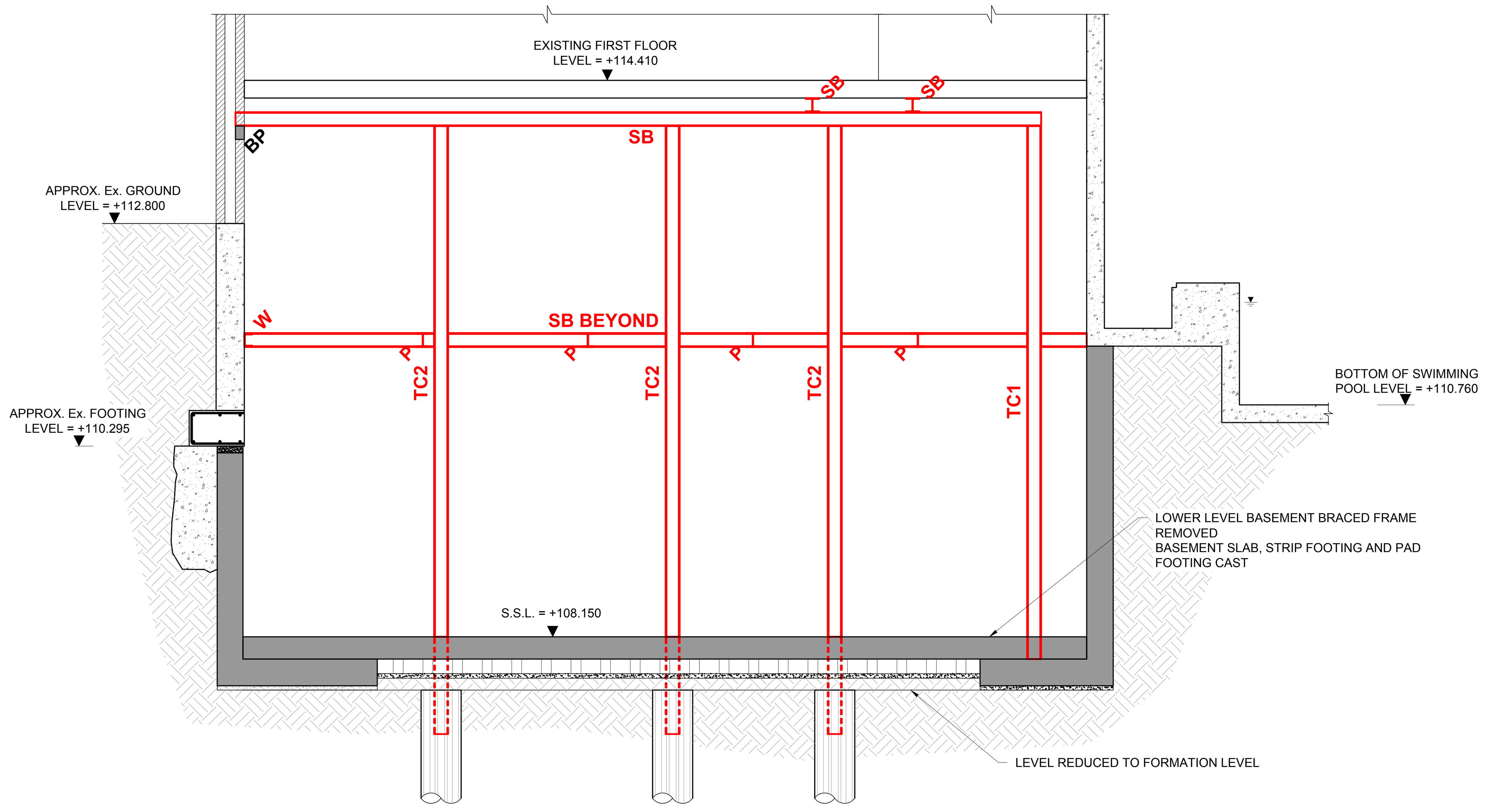
CLIENT
BRIAN COYNE AND KIRSTY MITCHELL

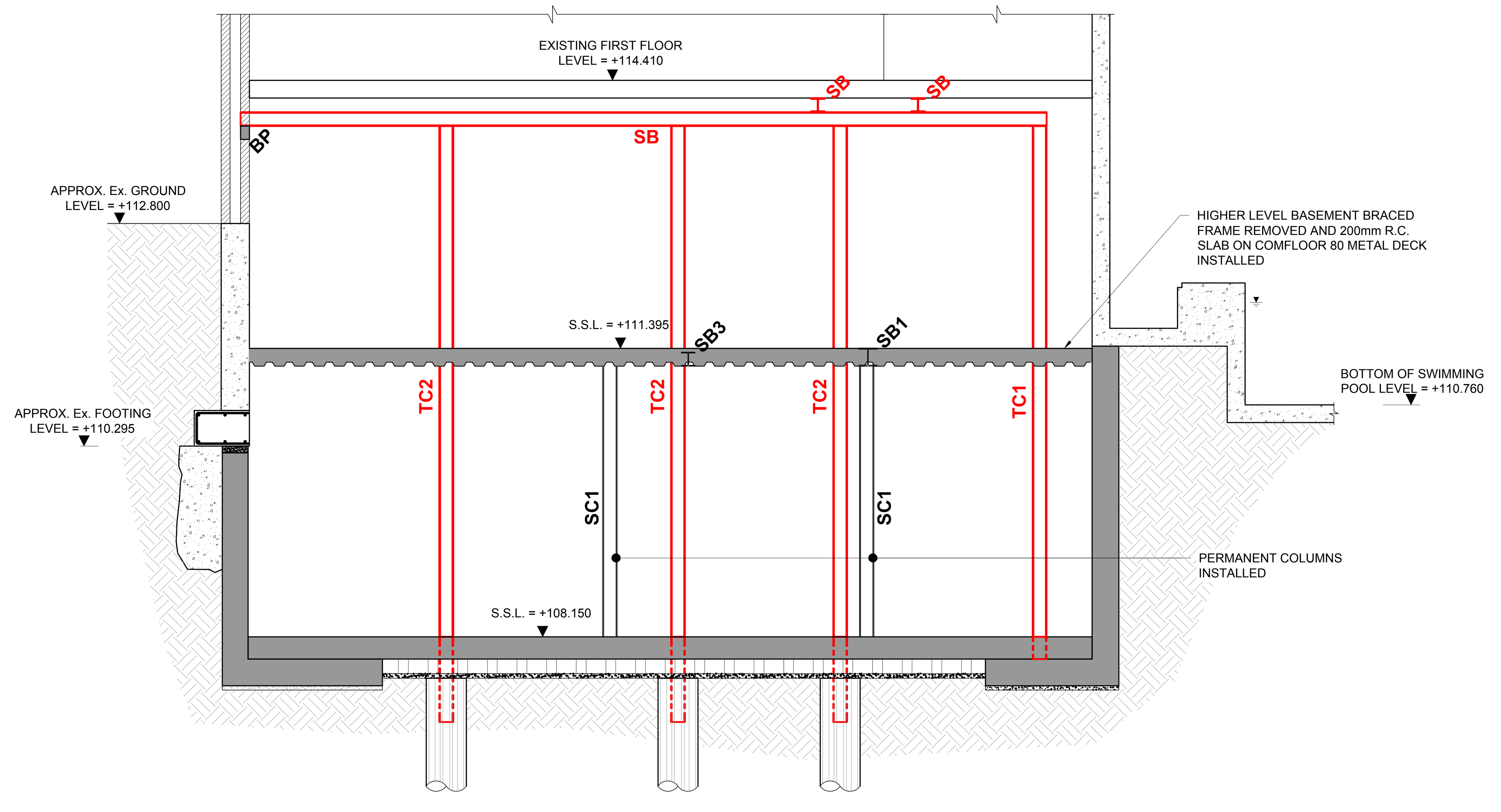
PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS SEQUENCE PLAN SHEET 1

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4005	P1



STAGE 7



STAGE 8

PRELIMINARY

NOTES

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LEGEND

W	DENOTES TEMPORARY WALLER
SB	DENOTES TEMPORARY BEAMS
P	DENOTES TEMPORARY PROPS AND NEEDLES
BP	CONCRETE BEARING PAD
	DENOTES STRUCTURE TO BE DEMOLISHED
	DENOTES 450mm Ø PILE

SCHEDULE OF TEMPORARY MEMBERS

TEMPORARY COLUMNS

REF.	SIZE	COMMENT
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TC2	152 UC 30kg. PLUNGE COLUMN INSTALLED IN 450mm Ø PILE	-

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STAGE 6: I) LEVEL REDUCED BY 2000mm
II) LOWER LEVEL OF BRACED FRAME INSTALLED

STAGE 7: I) LEVEL REDUCED TO FORMATION LEVEL
II) BASEMENT, SLAB, STRIP FOOTING AND PAD FOOTING CAST
III) LOWER LEVEL BRACED FRAME REMOVED

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II) PERMANENT STEEL COLUMNS INSTALLED AND RC WALLS CAST
III) GROUND FLOOR INSTALLED

ISSUE	DATE	DESCRIPTION	DRN / ORIG	P.E. / P.D.
P1	11.09.17	ISSUED FOR COMMENT	M.A. / O.A.	S.L. / V.B.

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PROJECT TITLE
No. 35 TEMPLEWOOD AVENUE, LONDON, NW3 7 UY

DRAWING TITLE
TEMPORARY WORKS SEQUENCE PLAN SHEET 2

SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	16848	T-4006	P1