4-6 Bligh Street, Sydney Schematic Design Report

Structures

16 December 2022

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Contents

Executive summary 1

1 Introduction 2
1.1 Site Location and Description 3

2 Design Basis and Assumptions 6
2.1 Geotechnical Summary 6
2.1.1 Local Geology 6
2.1.2 Geotechnical Investigation 6
2.1.3 Geotechnical Model 7
2.1.4 Hydrogeological conditions 7
2.2 Site Constraints 8
2.2.1 Sydney Metro Tunnels 8
2.2.2 Proposed Basement Structures 14
2.2.3 Lateral Earth Pressures 15
2.3 Building Foundations Design Basis 15

3 Design Loading 16
3.1 Self-Weight 16
3.2 Floor Loads 16
3.3 Super Imposed Dead Loads and Live Loads 16
3.4 Earthquake 16
3.5 Wind 16
3.6 Structural Robustness 18

4 Design Standards and Criteria 19
4.1 Applicable Australia/New Zealand Standards 19
4.2 Design Criteria 19
4.2.1 Building Classification and Importance Level 19
4.2.2 Design Life 19
4.2.3 Durability 19
4.2.4 Fire 20
4.2.5 Deflection Limits 20
4.2.6 Tolerances 21
4.2.7 Units 21
4.2.8 Material Properties 21

5 Description of Structural Form 22
5.1 Foundations 22

5.2 Excavation and associated basement/retaining structures 25
5.3 Typical Floor Systems 27
5.3.1 Construction Method options 27
5.3.2 Typical Hotel Floor System 28
5.3.3 Typical Commercial Floor System 28
5.4 Tower Lateral Systems 30

6 Next Steps 34

A. Appendix A 35
A.1 References 35

B. Appendix B 36
B.1 Mott MacDonald Schematic Structural Drawings 36

Executive summary

This SSDA Structural Schematic Report has been prepared by Mott MacDonald to accompany a detailed State Significant Development Application (SSDA) for the mixed-use redevelopment proposal at 4-6 Bligh Street, Sydney. The site is legally described as Lot 1 in Deposited Plan 1244245.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-48674209).

This report concludes that the proposed mixed-use hotel and commercial development is suitable and warrants approval subject to the implementation of the following mitigation measures:

- Compliance with Sydney Metro corridor protection guidelines

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

This schematic design report has been established on the following inputs:

- Geotechnical analysis to-date - (*SYDGE205019-AE Rev2* prepared by Coffey)
- Site Constraints – as outlined in Section 2.2
- Loadings, design standards and criteria – as outlined in Section 3 and Section 4
- Wind tunnel test results – (*SLR, Ref: 610.18713-R02, June 2019*)
- Descriptions of the proposed structural form – as outlined in Section 5

At the completion of Schematic Design, the following items have been addressed in terms of coordination between structure, architecture and other design disciplines:

- Column grids and preliminary sizes have been coordinated for the buildings to a preliminary level,
- Floor design systems have been assessed, compared and benchmarked to similar building types
- Lateral stability systems have been adopted based on a detailed study of lateral loads
- Foundation systems have been reviewed and impacts to the CBD Rail Link and Sydney Metro tunnels have been assessed by the project team
- The structural aspects of the development do not have structural impacts on the Martin Place Station

The following schematic design report outlines the proposed structural solution for 4-6 Bligh Street, Sydney (*to a concepot design level of definition*) at the time of the state significant development application submission.

1 Introduction

This report has been prepared to accompany an SSDA for the for the mixed-use redevelopment proposal at 4-6 Bligh Street, Sydney (SSD- 48674209).

The Council of the City of Sydney, as delegate for the Minister for Planning and Public Spaces (the Minister), is the Consent Authority for the SSDA under an Instrument of Delegation issued by the Minister on 3 October 2019.

The application seeks consent for the construction of a 59-storey mixed-use hotel and commercial development. The purpose of the project is to revitalise the site and deliver new commercial floorspace and public realm improvements consistent with the City's vision to strengthen the role of Central Sydney as an international tourism and commercial destination.

A separate development consent (D/2018/892) relating to early works for the proposed application was granted for the site on 31 January 2020. Consent was granted for the demolition of the existing site structures, excavation and shoring of the site for three basement levels (to a depth of RL9.38m) to accommodate the proposed mixed-use hotel and commercial development. As such, this application does not seek consent for these components and instead seeks to rely upon and activate D/2018/892 for early works.

Specifically, development consent is sought for:

- Site establishment, including removal of three existing trees along the Bligh Street frontage and de-commissioning and removal of an existing substation (s2041) on the site.
- Construction of a 59-storey hotel and commercial office tower. The tower will have a maximum building height of RL225.88 (205m) and a total gross floor area (GFA) provision of 26,796sqm, and will include the following elements:
  - Five basement levels accommodating a substation, rainwater tank, hotel back of house, plant and services. A porte cochere and four service bays will be provided on basement level 1, in addition to 137 bicycle spaces and end of trip facilities on basement level 2, and 28 car parking spaces.
  - A 12-storey podium accommodating hotel concierge and arrival at ground level, conference facilities, eight levels of commercial floor space and co-working facilities, and hotel amenities including a pool and gymnasium at level 12.
  - 42 tower levels of hotel facilities including 417 hotel keys comprising standard rooms, suites and a penthouse.
  - Two tower levels accommodating restaurant, bar, back of house and a landscaped terrace at level 57.
  - Plant, servicing and BMU at level 59 and rooftop.
- Increase to the width of the existing Bligh Street vehicular crossover to 4.25m and provision of an additional 4m vehicular crossover on Bligh Street to provide one-way access to the porte cochere and service bays on basement level 1.
- Landscaping and public domain improvements including:
  - Replacement planting of three street trees in the Bligh Street frontage,
  - Construction of a landscape pergola structure on the vertical façade of the north-eastern and south-eastern podium elevations,
  - Awning and podium planters, and
  - Provision of a feature tree at the level 57 terrace.

- Identification of two top of awning building identification signage zones with a maximum dimension of 1200mm x 300mm. Consent for detailed signage installation will form part of a separate development application.
- Utilities and service provision.
- Installation of public art on the site, indicatively located at ground level.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 1 October 2022 and issued for the SSDA (SSD48674209).

1.1 Site Location and Description

The site for the purposes of this SSDA is a single allotment identified as 4-6 Bligh Street, Sydney and known as Lot 1 in Deposited Plan 1244245. The site has an area of 1,218sqm, and is identified in Figure 1.

The site is relatively flat, with a slight slope ranging from 21m AHD in the north-western corner to 19.5m AHD in the south-western corner.

The site is located within the north-eastern part of Central Sydney in a block bound by Bligh Street to the west, Hunter Street to the south, Chifley Square/Phillip Street to the east, and Bent Street to the north. The surrounding buildings are generally characterised by a mix of commercial office and hotel uses with ground level retail, restaurant and café uses and are of varying heights, ages and styles, including a number of State and local listed heritage buildings.

The site is also located in proximity to a number of Sydney Metro City & Southwest (opening 2024) and Sydney Metro West (opening 2030) station sites.

Specifically, the site is located to the immediate east of the Sydney Metro Hunter Street station (east site), which is located on the corner of Hunter Street and Bligh Street, and approximately 350m east of the Sydney Metro Hunter Street station (west site). The Hunter Street station sites are part of the Sydney Metro West project. SEARs for the preparation of Concept SSDAs for the sites were issued in August 2022.

Approximately 150m to the south of the site is Sydney Metro Martin Place Station site, located to the south of Hunter Street between Castlereagh Street and Elizabeth Street. The Martin Place Station site is currently under construction and forms part of the Sydney Metro City & Southwest project.

The site is occupied by a vacant commercial office building with ground floor retail and basement car parking known as "Bligh House". Completed in 1964, Bligh House is a 17-storey tower inclusive of a three-storey podium with the podium levels built to the Bligh Street alignment and the tower setback from the street frontage. The building was designed by Peddle Thorp and Walker and was constructed as part of the post-World War II development boom in the Sydney CBD. The podium overhang along the footpath provides continuous pedestrian protection. Vehicle access to the site is off Bligh Street via a single 2.6m wide driveway that is restricted by a security gate under one-lane, two-way access arrangements. The driveway provides access to the basement car park, containing 21 car parking spaces.

The site contains no vegetation; however, two existing street trees are located adjacent to the site boundary on Bligh Street.

Development consent for the demolition of the existing site structures, excavation and shoring of the site for three basement levels (to a depth of RL9.38m) was granted by City of Sydney on 31 January 2022 (D/2018/892).

Figure 1: Site Identification Plan

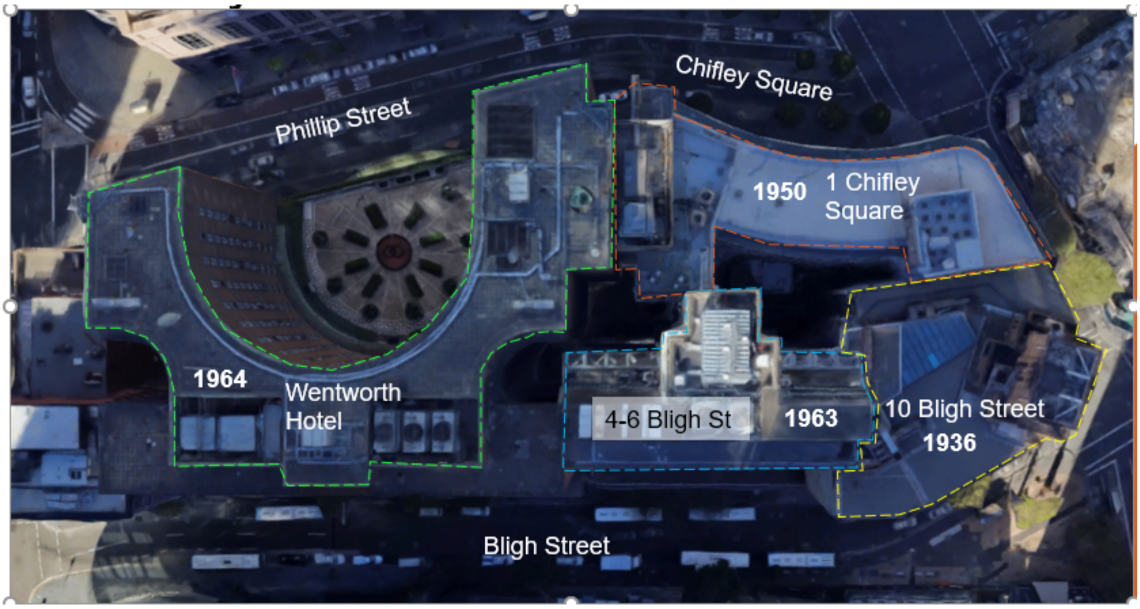


Figure 2: Site surround plan

Figure 3: Development rendering

2 Design Basis and Assumptions

2.1 Geotechnical Summary

A Geotechnical investigation of the site was completed by Coffey in September 2018 and a report (*SYDGE205019-AE Rev2)* was published in November 2018, with the following summary made:

2.1.1 Local Geology

The Sydney 1:100,000 Geological Sheet indicates that the site locality is underlain by Hawkesbury Sandstone that is typically medium to coarse grained quartzose sandstone with beds 1m to 3m thick. Major joint sets trending north-south and east-west in an orthogonal pattern, with a subordinate northwest-southeast trending set. The north-south (trending about 10° to 15° east of north) joint set is more dominant set, with a subvertical dip and typical spacing of 1m to 5m. The east-west trending joints tend to be spaced at 5m to 15m intervals.

2.1.2 Geotechnical Investigation

Three Boreholes were drilled within the site BH101, BH102, BH103 as shown in Figure 4.

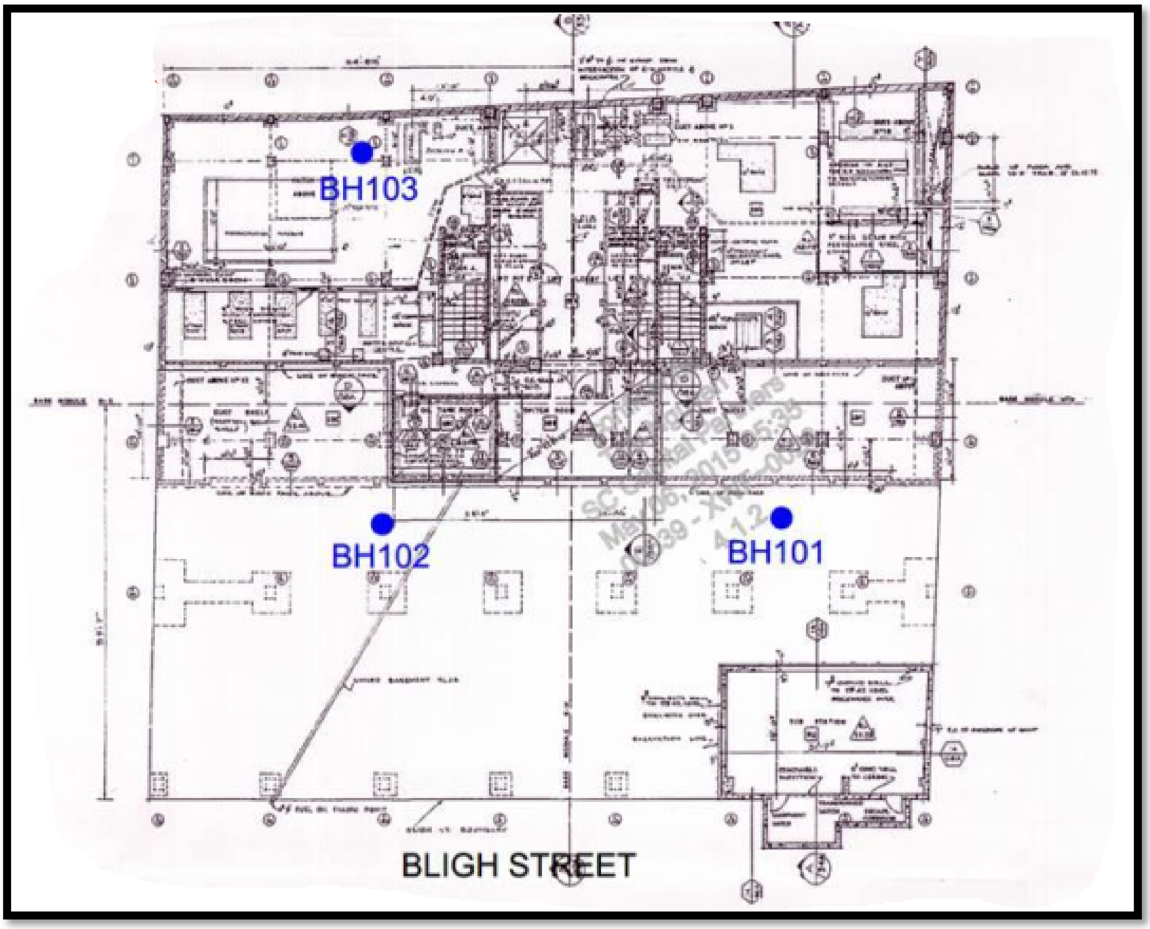


Figure 4: Approximate borehole locations

2.1.3 Geotechnical Model

Table 1 shows the detail of the undertaken geotechnical model.

Table 1: Geotechnical Model

Geotechnical Unit	Materials	Rock classification	Base of Unit
Unit 0	Unobserved ground. Likely to comprise fill including surface concrete, pavements & asphalt overlying residual soil grading to sandstone	Not applicable for soil strength materials. Sandstone could vary from Class V to Class II	Above 17.9m AHD in BH101 and BH102. Unknown in BH103
Unit 1	Moderately weathered to fresh, medium and high strength sandstone	Class II and Class I Sandstone	5.1m AHD in BH101 6.2m AHD in BH102 5m AHD in BH103
Unit 2	Interbedded sandstone, shale and shale breccia, varies from highly to slightly weathered, and from low to high strength, fractured	Class III Shale based on defect patterns and variable strength	2.7m AHD in BH101 2.3m AHD in BH102 3.2m AHD in BH103
Unit 3	Fresh medium and high strength sandstone	Class II and Class I Sandstone	Below -11.4m AHD in BH101 Below -4.5m AHD in BH102 Below -2.5m AHD in BH103

2.1.4 Hydrogeological conditions

The closest identified surface water body is Sydney Harbour which is located approximately 500m to the north of the site. Standpipe piezometers were installed in BH101, BH102, and BH103 to enable groundwater level monitoring. Table 2 - presents the measured groundwater level from manual readings.

Table 2: Groundwater Level from manual readings

Borehole	Date of measurement	Recorded groundwater level (m AHD)
BH101	2 November 2018	7.80
	4 November 2018	7.36
	5 November 2018	7.33
	12 November 2018	7.27
BH102	2 November 2018	7.58
	4 November 2018	7.74
	5 November 2018	7.72
	12 November 2018	7.52
BH103	5 November 2018	8.19
	12 November 2018	7.21

2.2 Site Constraints

2.2.1 Sydney Metro Tunnels

There are two Sydney Metro lines which underlay the proposed development:

- The City & Southwest line which runs north-south has dual 7m diameter tunnels with the crown at about -1m AHD and is anticipated to be approximately 5m vertical below the lowest basement floor level of 2.68m AHD. The eastern corner of the basement has a triangular area about 14m² that encroaches into the acquisition zone but does not overlap the tunnel structure. This line can be seen in purple in Figure 5 below.

- The Sydney Metro West line runs east-west and has dual 7m diameter tunnels. These tunnels sit deeper than the City & Southwest lines with a tunnel crown at about -14.5m AHD. These tunnels can be seen in green and orange in Figure 5 below.

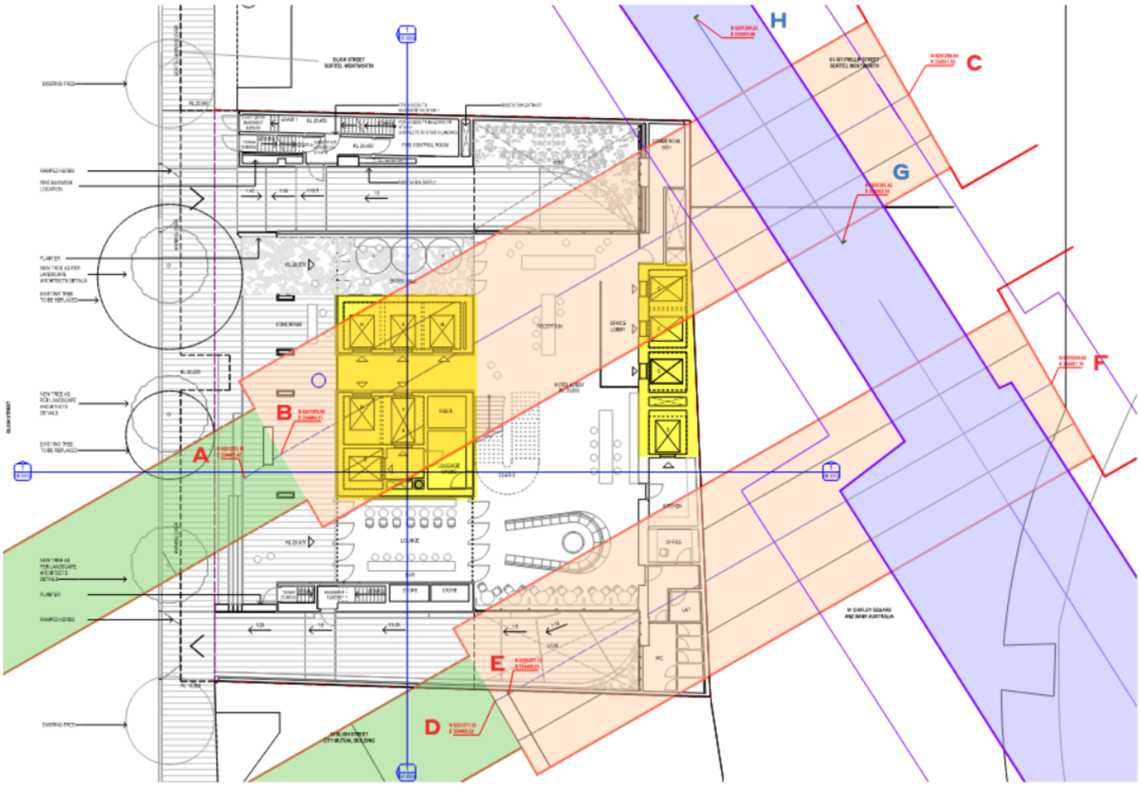


Figure 5: Sydney Metro Tunnel Layouts overlay with development

Figure 6 also shows a potential underground structure which connects the Martin Place Station to Bligh Street.

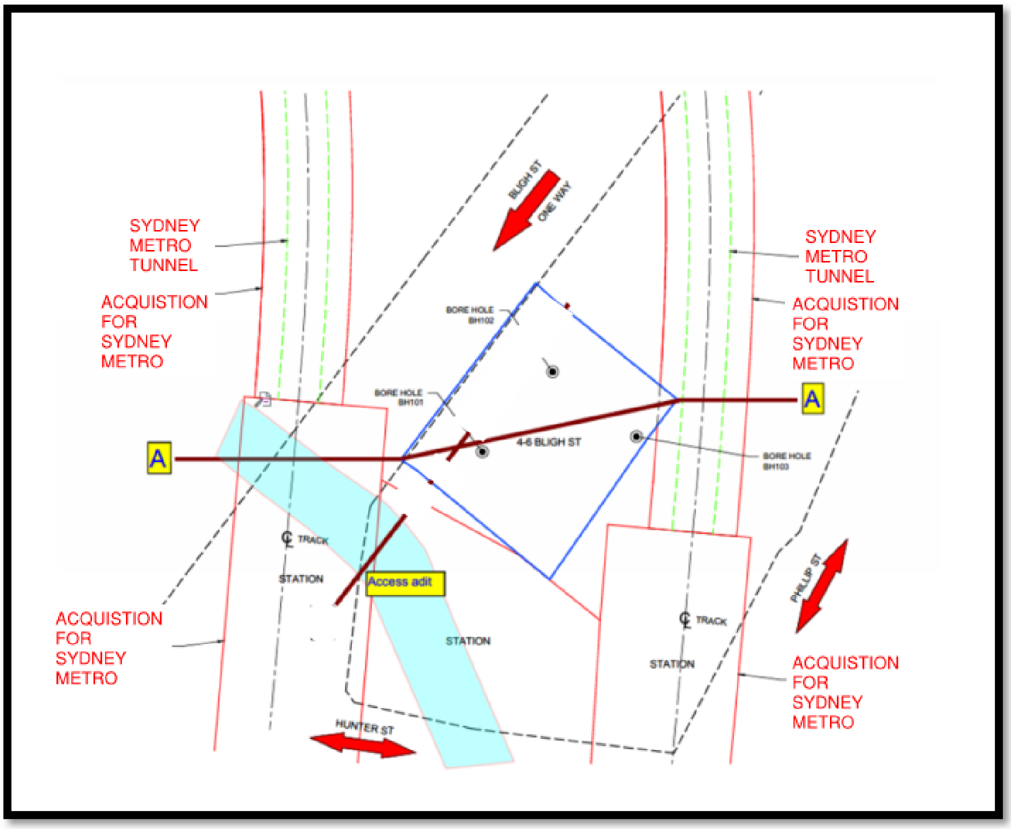


Figure 6: Potential underground structure connecting Martin Place and Bligh St

Prior to the Sydney Metro West tunnel information, the geotechnical engineer (Coffey/Tetra tech) assessed the potential impact of the proposed 4-6 Bligh Street development upon the City & South West Metro tunnels and the associated Martin Place station, by carrying out 2-dimensional (2D) numerical analyses of two critical sections through the City & Southwest line. The Coffey analysis simulated the condition of the tunnel (stress and displacement) based on the following assumptions:

- The building at 4-6 Bligh Street will be constructed after the rail tunnel;
- The insitu stresses are assumed based on recommended values provided in Geotech report;
- The building loads at and surrounding 4-6 Bligh Street are modelled as uniformaly distributed.

The following surcharges are applied at the lower basement levels:

- A surcharge load of 10 kPa on Bligh Street;
- The groundwater table is assumed to be at RL 7.2m AHD and water drawdown due to tunnelling process is not considered in the modelling.

The geotechnical analysis performed by Coffey has detailed results assessing the impact on the metro tunnels of the City & Southwest line. An excerpt of that is illstrated within Figure 7 to Figure 9 below (*extracted from Coffey report*).

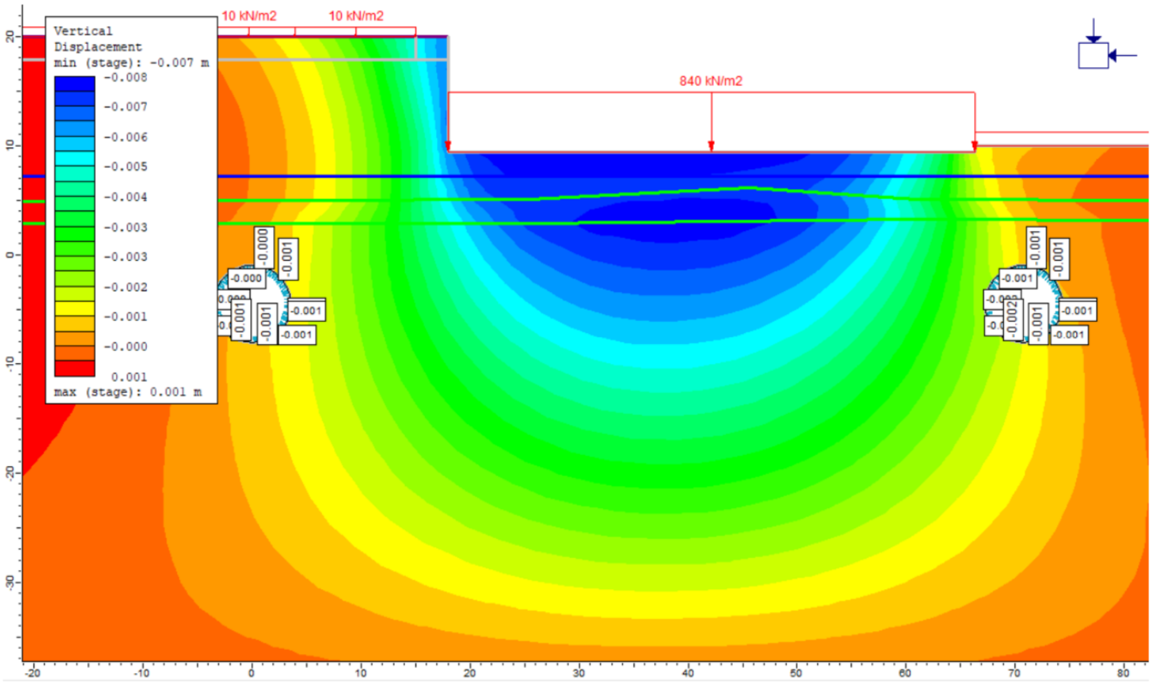


Figure 7: Vertical displacement after loading of proposed building (*City & Southwest - Coffey report*)

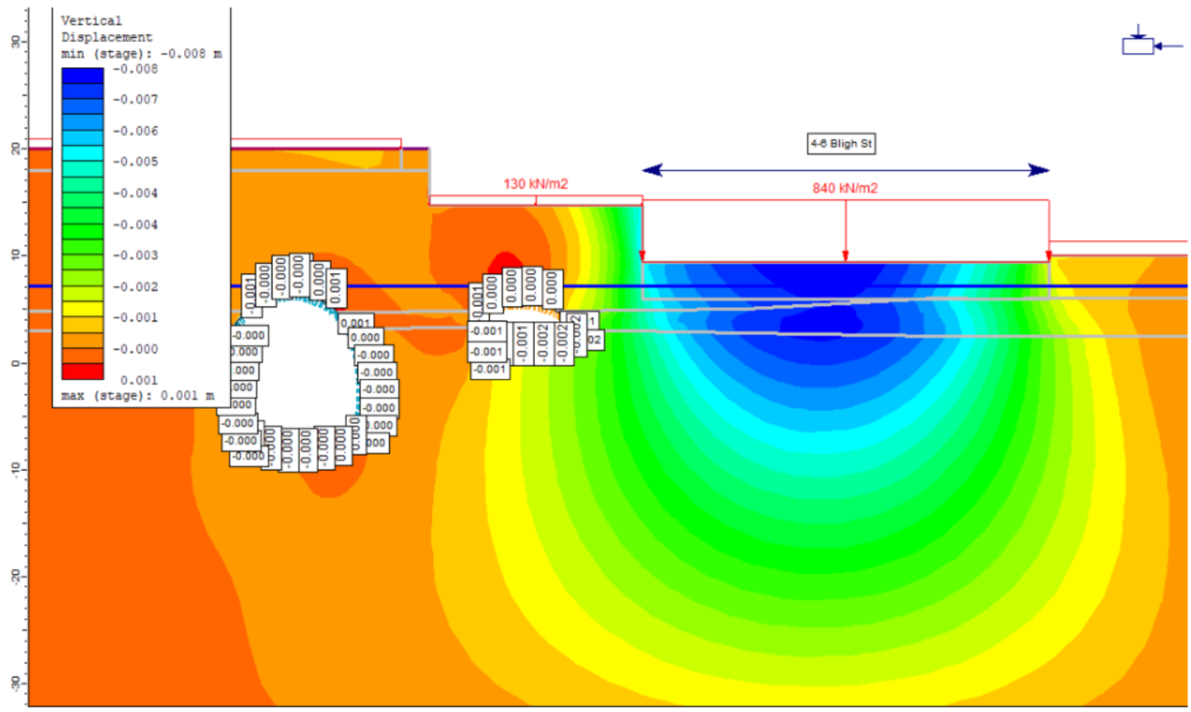


Figure 27 Vertical displacement contours after loading of proposed building (Section DD-Stage 10)

Figure 8: Vertical displacement after loading of proposed building (*City & Southwest - Coffey report*)

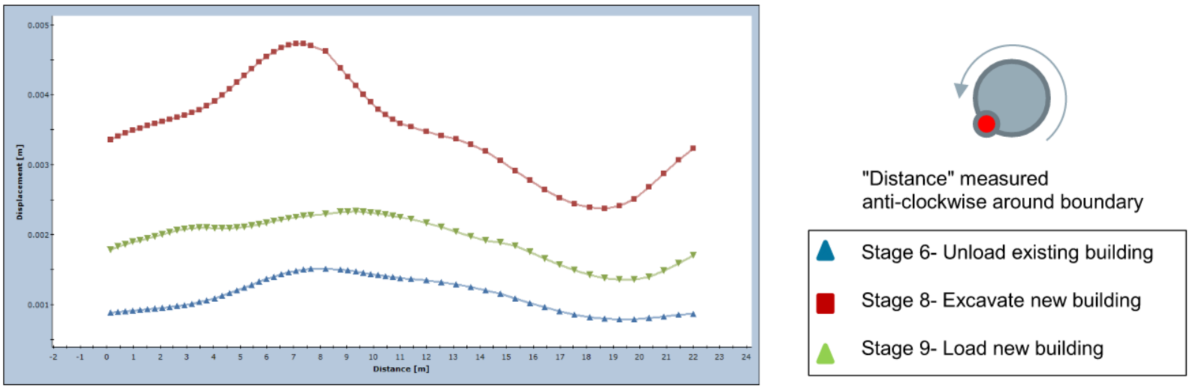


Figure 14 Total displacement in tunnel liner (East) (Note – Values are NOT relative to stages)

Figure 9: Total displacement in tunnel liner (**City & Southwest - Coffey report*****)***

In addition to the analysis through the City & Southwest line, Coffey has performed a number of 2D numerical analysis through two critical sections of the Metro West line. As the proposed development directly overlays the Sydney Metro west tunnels it is anticipated that the vertical loads from the tower will disperse through the insitu rock strata and will load the tunnel liners. The analyses (completed by Coffey) has assessed the impacts of the proposoed development on the propsoed tunnel specifically investigating the rock stress, deformations and stresses imposed on the tunnel liners. The sections analysed are illustrated in Figure 10 below.

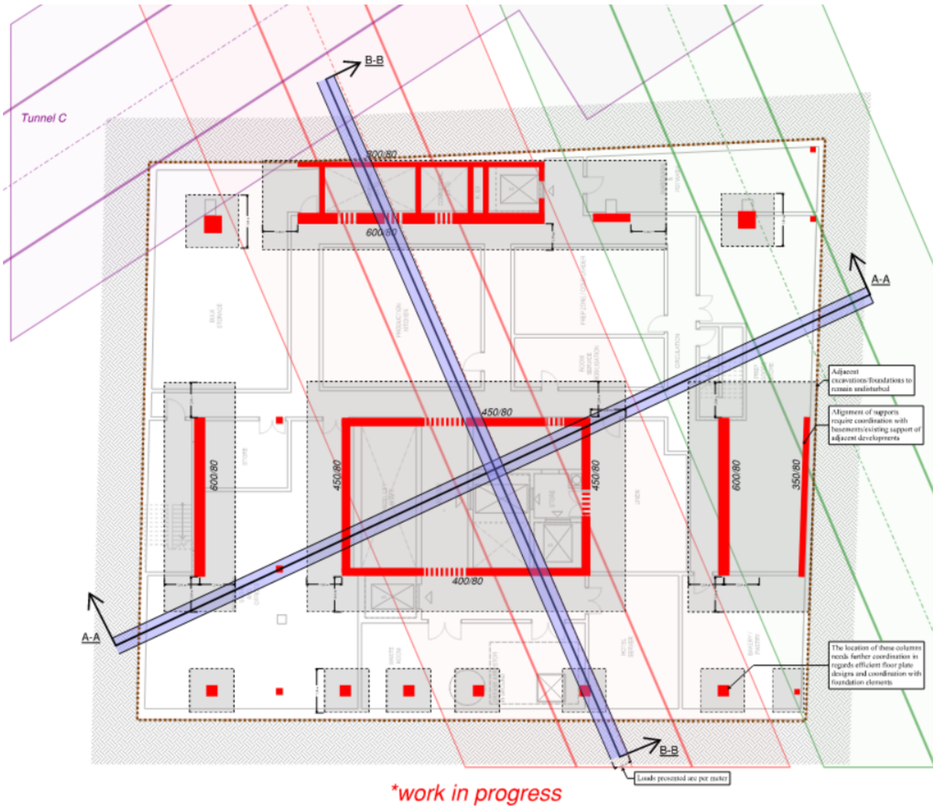


Figure 10: Proposed 2D analyses sections for Metro West tunnels

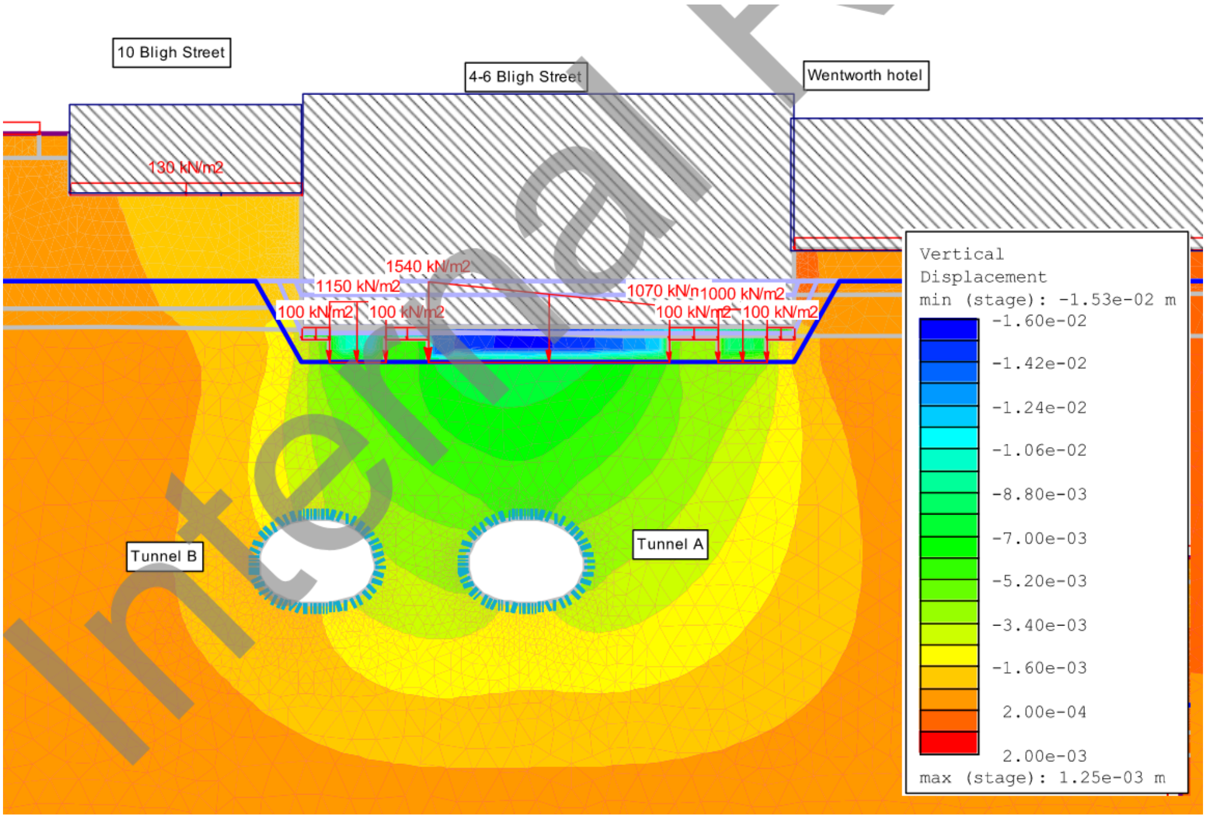


Figure 11: Vertical displacement after loading of proposed building (Metro West - Coffey report)

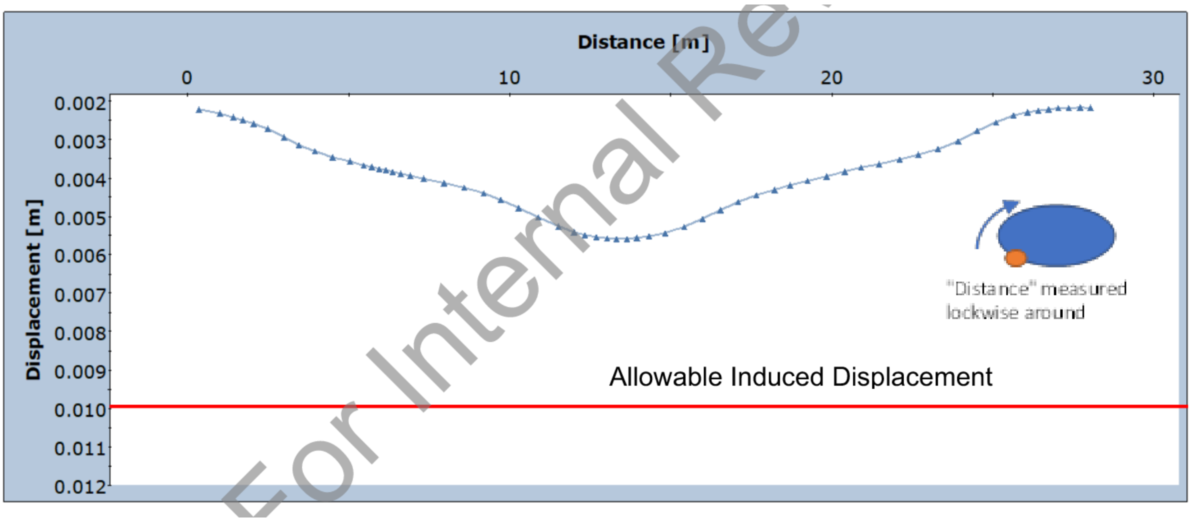


Figure 12: Total displacement in tunnel liner (Metro West - Coffey report)

The geotechnical analysis (performed by Coffey) has detailed results assessing the impact on the metro tunnels of the Metro West line. An excerpt of that report can be seen in Figure 11, Figure 12 and Figure 13 (*extracted from Coffey report*). The results indicate that the proposed shallow foundation solution is satisfying the Sydney Metro tunnel impact design criteria for differential settlements.

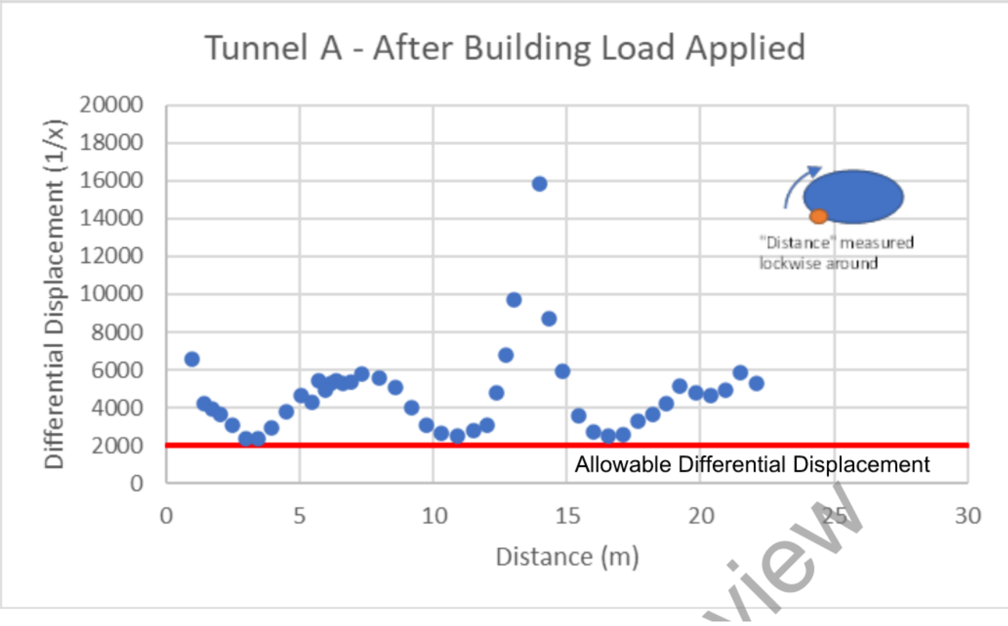


Figure 13: Liner induced differential displacement (Metro West - Coffey report)

During the concept design state, the design team attended multiple meetings with Sydney Metro to discuss the geotechnical design criteria and compliance of the proposed development with the corridor protection guidelines. Sydney Metro did not flag any non-compliances related to the geotechnical parameters of the design. However, it was noted that the current design for the tunnel liner (an unreinforced liner) does not have adequate capacity to support the increased imposed loads. The design was noted as marginally close and with further coordination with Sydney Metro it may be possible to optimise the imposed loads further to within the acceptable limits.

The geotechnical analysis was completed on the assumption that the building is built after the completion of the Sydney Metro tunnels. In this case, the imposed stresses from the building would be predominantly transferred to the tunnel liner. In reality, this sequence of work may not be the case and the development could potentially be completed priolr to the installation of the tunnel liners. In this scenario, the imposed stresses would be predominantly resisted by the rock. It is noted that further analysis may be required to show that any end-of-life demolition of the building, and thus stress relief in the rock, will not adversely affect the tunnel liners.

2.2.2 Proposed Basement Structures

The proposed development contains a 5-Level subterranean basement which will be founded at approximately RL3.38 – refer to Figure 14 for reference. Due to its proposed depth relative to the adjacent properties the construction strategy to achieve will be reviewed in detail in conjunction with the geotechnical modelling. This design review will be completed within the following design phases.

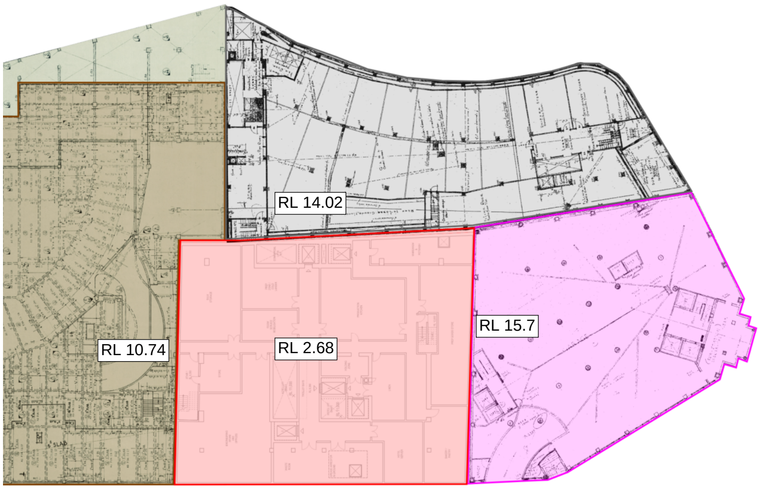


Figure 14: Existing and surrounding RLs

The proposed basement RL is 3.38m with a 3m deep shallow foundation below this level. The levels of the proposed basements overlaid upon the rock substrated levels are illstrated in Figure 15 below. The basement will likely be founded in 'Unit 3' rock which comprise Class I and II sandstone layers. It is anticipated that this layer will have sufficient capacity to meet bearing and serviceability requirements. However it is noted, there is a potential seam of shale in 'Unit 2' which may have inadequate capacity to support foundations which will be reviewed in the following design phases. This should be reviewed further depening on the final invert elevation of the foundations.

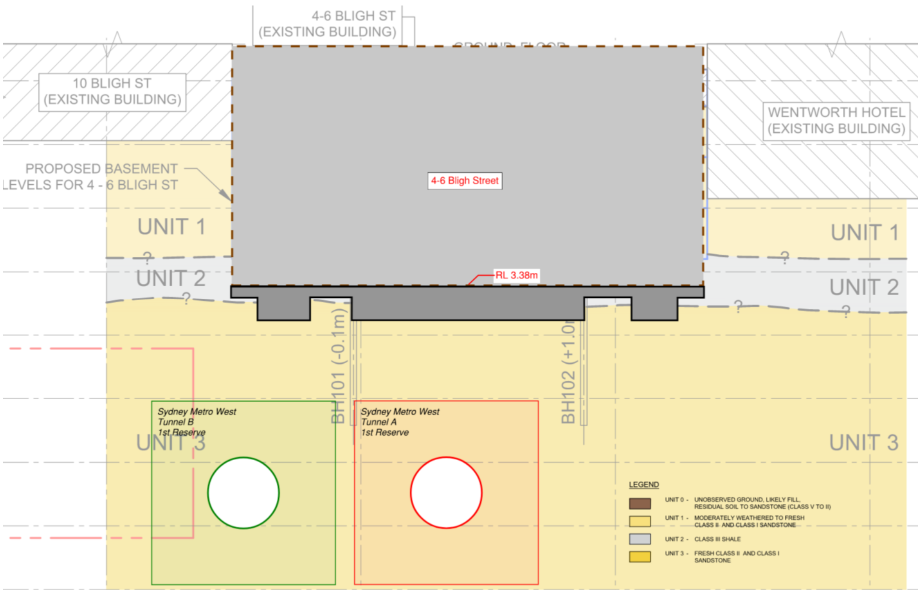


Figure 15: Basement overlay on rock level

2.2.3 Lateral Earth Pressures

The adjacent properties will impose loads onto the deeper basements of the 4-6 Bligh Street redevelopment. These loads have been estimated based on existing knowledge of these buildings and are summarised in Figure 16 below. These loads will need to be accounted for in the design of the basements in later phases.

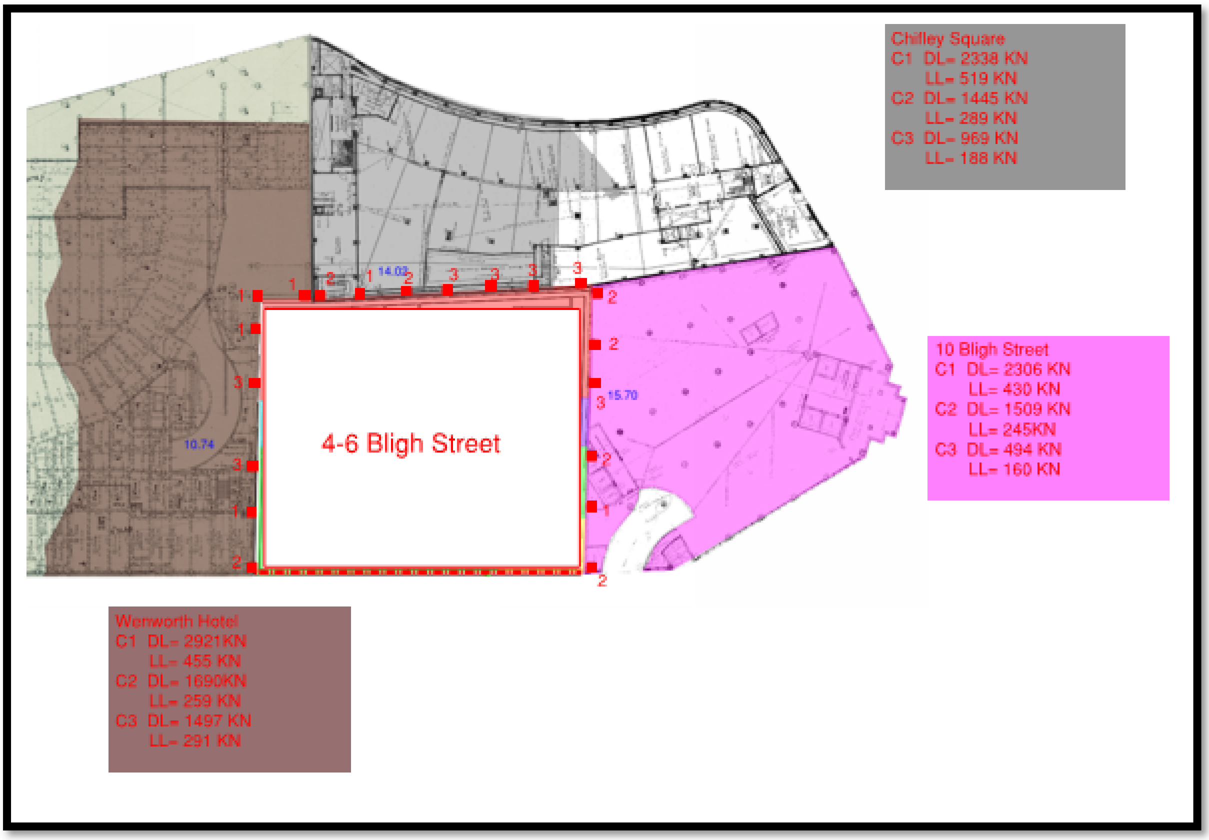


Figure 16: Adjacent building loads

2.3 Building Foundations Design Basis

Table 3 presents serviceability and limit state geotechnical design parameters that have been used for preliminary design of pad footings and bored piles into the different classes of sandstone. These will require further verification in later design phases.

Table 3: Foundation design parameters

Unit	Serviceability End Bearing Pressure (MPa)	Ultimate End Bearing Capacity (MPa)	Ultimate Shaft Adhesion (kPa)	Young's Modulus (MPa)
Unit 1 Sandstone Note A	8	80	2,000	1,500
Unit 2 Shale & Sandstone	3	25	600 [a]	600
Unit 3 Sandstone	8	80	2,000 [a]	1,500

3 Design Loading

3.1 Self-Weight

Self-Weight calculated using element dimensions and density from first principals.

3.2 Floor Loads

With reference to AS1170.1 the loading assumption for Live Load within all the levels are as follows:

- Hotel rooms = 2 Kpa
- General office = 3 Kpa
- Restaurant and Café = 2 Kpa
- Light Weight Carpark = 2.5Kpa

3.3 Super Imposed Dead Loads and Live Loads

Loads for equipment or plant rooms will be sought from the manufacturer and/or supplier.

3.4 Earthquake

Table 4: Seismic Design Parameters

Parameter	Comments	Value
Site Subsoil Class	**As per Coffey Report**	Assumed as Be (Rock) TBC
Annual probability of exceedance	AS1170.0 Table 3.3	1000 for IL3
Earthquake Design Category (EDC)		III
Probability Factory, kp		1.0
Hazard Factor, Z		0.08
Sp	Dependent on material and subsequent structural stability system	0.77
μ	As Above	1.0 or 2.0 depending on preferance

3.5 Wind

The development is located within the northern part of Sydney Central CBD precinct surrounded by numerous highrise buildings (No.1 O'Connell Street, No.1 Bligh Street, Governor Phillip, and Governor Macquarie Towers, Aurora Place, Chifley Tower, etc). Circular Quay and Sydney Cove are located approximately 500m north of the site. To the east are the parkland areas of the Royal Botanic Gardens and The Domain. To the south is the main central spine of the Sydney CBD precinct and Hyde Park. To the west are more Sydney CBD buildings in Barangaroo and Darling Harbour. The project site lies within Region "A2" in relation to AS1170.2 - 2011 design wind speeds. The regional 10-m height gust speeds for design (VR) are:

- 5 - year return period 32.1 m/sec
- 1000 - year return period 46.45 m/sec

Figure 17 illustrates the wind loading parameter assumptions based on S1170.2.

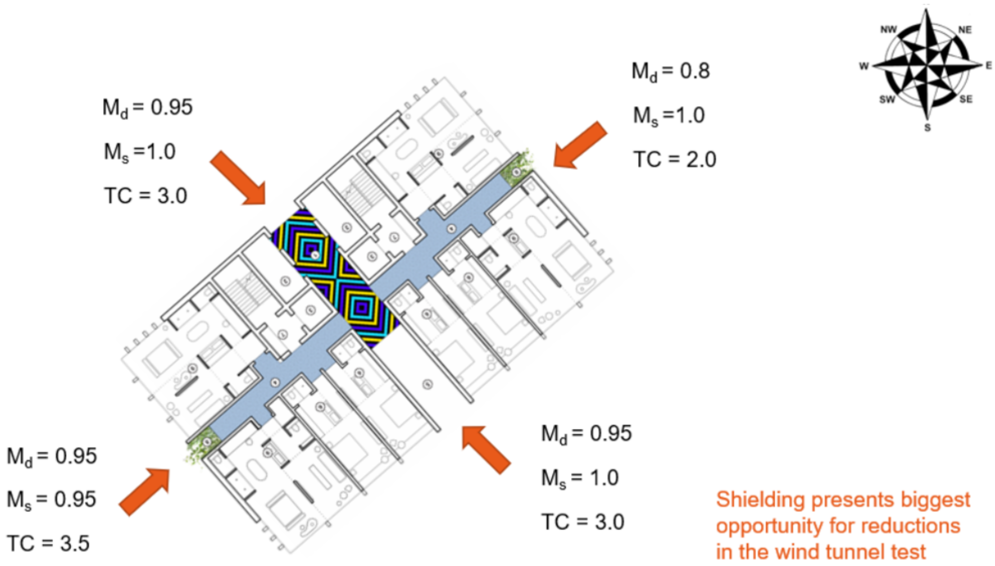


Figure 17: Wind loading parameter assumption

Wind load design parameters per code are shown in Table 5 below:

Table 5: Wind Design Parameters

Parameter	Comments	Value
Building Importance level	AS1170	III
Region	Inner Sydney (AS1170.2)	A2
V1000	AS1170.2 Section 3.2	46.45 m/sec
V5	AS1170.2 Section 3.2	32.1 m/sec
Md		1
Terrain Category	"Numerous closely spaced obstructions generally 3m to 10m"	Dependent on direction
Mz,cat		Varies
Ms	(AS1170.2)	1
Mt	(AS1170.2)	1

Code defined loads for buildings of this height are not accurate enough for detailed design and therefore wind tunnel studies are required.

SLR Consulting Australia Pty Ltd (SLR) was engaged to determine design structural wind responses via a Wind Tunnel Study for the proposed hotel development located at 4-6 Bligh Street, Sydney. Responses of interest include base bending moments, upper floor deflections and upper habitable floor accelerations as well as floor by floor equivalent static loads suitable for incorporation into the finite element model of the tower developed by the project structural engineers. The current assessment performed via detailed wind tunnel testing used the "Base Balance" technique for determining structural responses.

The code and wind tunnel defined base shears vary by approximately 20% and are shown below in Table 6. The wind directions are shown in Figure 18. Wind tunnel results have been adopted for the schematic design phase.

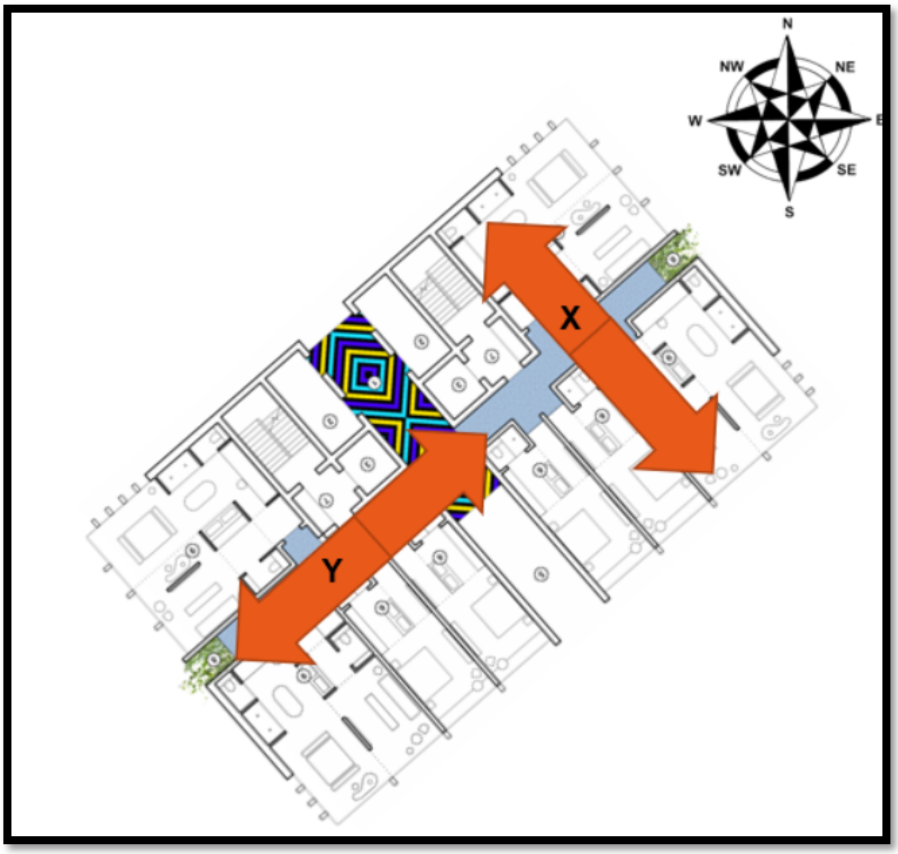


Figure 18: Wind directions

Table 6: Base shear comparison (code vs wind tunnel)

	X	Y
Code	12200	5800
Wind Tunnel	9800	5400

3.6 Structural Robustness

Robustness of structural design will be in accordance with AS1170.0 Section 6.

4 Design Standards and Criteria

4.1 Applicable Australia/New Zealand Standards

- AS/NZS 1170.0: 2002: Structural design actions – Part 0: General principles
- AS/NZS 1170.1:2002: Structural design actions – Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2:2021: Structural design actions – Part 2: Wind actions
- AS 1170.4:2018: Structural design actions – Part 4: Earthquake loads
- AS 2159:1995: Piling – Design and installation
- AS 2870:2011: Residential Slabs and Footings
- AS 3600:2018: Concrete structures
- AS 3610.1:2018 Formwork for concrete Specifications
- AS 3700:2011: Masonry structures
- AS 4100:1998: Steel structures
- AS 4678:2002: Earth-retaining structures
- AS 5100.6:2017: Bridge design Steel and composite Construction

4.2 Design Criteria

4.2.1 Building Classification and Importance Level

The primary classification for the buildings pursuant to the BCA is:

- Class 3 – Hotel
- Class 5 – Commercial
- Class 6 – Retails (shops, café)
- Class 7a – Carpark
- Class 7b – Storage
- Class 9b – Gathering Places

The building structure is to be designed to resist loads and load combinations as prescribed in Part B of the BCA and relevant Australian Standards. The importance level of the building is determined as importance level 3.

4.2.2 Design Life

The design life is the period assumed in design for which a structure or structural element is required to perform its intended purpose with minimal maintenance and without replacement or major repair. The design life for the development is 50 years.

4.2.3 Durability

Concrete exposure classification will dictate minimum cover requirement and concrete grade requirements for structural element types, as specified in AS3600.2018, such that durability of the structure is satisfied. This information is summarised in Table 7.

Table 7: Exposure classification and requirements of concrete elements

Description	Classification	Cover	Minimum f'c
Surface members in contact with ground c) Other members in non-aggressive soils	A2	AS3600.2018 Table 4.10.3.2	25 MPa
Surface members in Interior environments a) Fully enclosed within a building except for a brief period of weather exposure during construction (ii. Non-residential)	A2	AS3600.2018 Table 4.10.3.2	25 MPa
Surfaces of members in above-ground exterior environments in areas that are: b) Near-coastal (1 - 50km from coastline), any climatic zone	B1	AS3600.2018 Table 4.10.3.2	32 MPa

All exposed structural steel will be galvanised.

4.2.4 Fire

The level of fire resistance required for the building is determined based on its classification and the rise in stories. The minimum fire resistance level (FRL) required for the development are:

- Retail: 180 min FRL
- Office: 120 min FRL
- Basement Levels: 120 min FRL
- Hotel: 90 min

4.2.5 Deflection Limits

Deflections under serviceability loads are to be limited such that the impact on supported elements, line of sight, finishes (brittle and non-brittle) and perceptible movement are limited. Deflection limit summary is outlined in Table 8.

Table 8: Building serviceability limits

Type of Member	Deflection Considered	Span Deflection Limit	Cantilever deflection limit
All members (Unless otherwise noted)	Incremental Deflection	span/500 or 25mm whichever is less	cantilever/250 or 20mm whichever is less
	Total Vertical Deflection	span/250 or 25mm whichever is less	cantilever/125 or 20mm whichever is less
Members supporting masonry partitions	The deflection which occurs after the addition or attachment of the partitions	span/500 where provision is made to minimise the effect of movement, otherwise span/1000	cantilever/250 where provision is made to minimise the effect of movement, otherwise cantilever/500
Transfer Beams	Total Vertical Deflection	span/500 where provision is made to minimize the effect of deflection of the transfer member on the supported structure, otherwise span/1000 or 10mm whichever is less	cantilever/250 where provision is made to minimise the effect of movement, otherwise cantilever/500 or 5mm whichever is less

4.2.6 Tolerances

The design will consider concrete tolerance limitations as specified in AS3600-2018 and AS5100.5-2017 (structures supporting vehicular loading).

The design will consider steel tolerance and erection limitations specified in AS4100-1998, AS5100.6-2017 (for structures supporting vehicular loading) and AS5131-2017.

Tolerances and surface finishes of all formed (in-situ and precast) concrete elements will be in accordance with AS3610.1-2018 Formwork for concrete Specifications.

4.2.7 Units

Units are to be standard SI or derivatives thereof:

- Length: metre (m), millimetre (mm)
- Mass: kilogram (kg), tonne (t)
- Load, Force: kilonewton (kN)
- Pressure, Surcharge: kilopascals (kPa)
- Stress, Modulus: megapascals (MPa)

4.2.8 Material Properties

Basic material properties for the most commonly used materials are provided below, which should also be used as the basis for derived material properties as required in appropriate design standards.

4.2.8.1 Material Density

The following rationalised densities are to be adopted in the design:

- Concrete 2450 kg/m3 (24 kN/m3)
- Cementitious Structural Grout 2100 kg/m3 (21.0 kN/m3)
- Steel 7850 kg/m3 (77.0 kN/m3)
- Water 1000 kg/m3 (9.8 kN/m3)
- Backfill (minimum, to be confirmed against actual) 1800 kg/m3 (17.6 kN/m3)

4.2.8.2 Minimum Material Strength

The following concrete grades are indicative only and will be further refined as the design progressive through the Design Development stage:

- Concrete (f'c) – main structural elements 65 MPa
- Concrete (f'c) – exposed concrete elements 65 MPa
- Concrete (f'c) – interior/secondary elements 40 MPa
- Concrete (f'c) – transfer elements 65 MPa
- Concrete (f'c) – Footings 32 MPa
- Concrete (f'c) – blinding concrete 15 MPa
- Reinforcement (fsy) – deformed to AS/NZS 4671 (500N) 500 MPa
- Prestressing (fp) – 12.7mm, 7 wire super strand to AS/NZS 4672 1840 MPa
- Prestressing (fp) – 15.2mm, 7 wire super strand to AS/NZS 4672 1750 MPa
- Structural Steel (fy) – to AS/NZS 1163, 1594, 3678 or 3679 ≤ 450 MPa

5 Description of Structural Form

5.1 Foundations

As noted wtihin the *'Sydney Metro Underground Corridor Protection Technical Guidelines'* document, construction of basements/foundations within the 1st reserve surrounding metro tunnels is not permitted. Based on this and the image below, piling would only be feasible in areas not beneath the red, green or purple zones. This limits piling to the northwest portion of the site and restricts piling under the elements with the heaviest loads.

Due to the site constraints from the Sydney Metro west and City & Southwest tunnels, a shallow foundation system has been adopted for the tower structura to maximise the area of load distribution on the supporting rock strata. Refer to Figure 19 below which illustrates the primary vertical elements of the tower (in red) overlaid on the Sydney Metro West (Tunnel A and B) and City & Southwest (Tunnel C) tunnels (inner two lines) and 1st reserves (outer two lines).

Refer to Figure 20 and Figure 21 below for sections through Tunnels A/B and Tunnel C respectively. Based on this information, the initial decision to adopt a shallow pad solution for the building as the preferred soluition is validated.

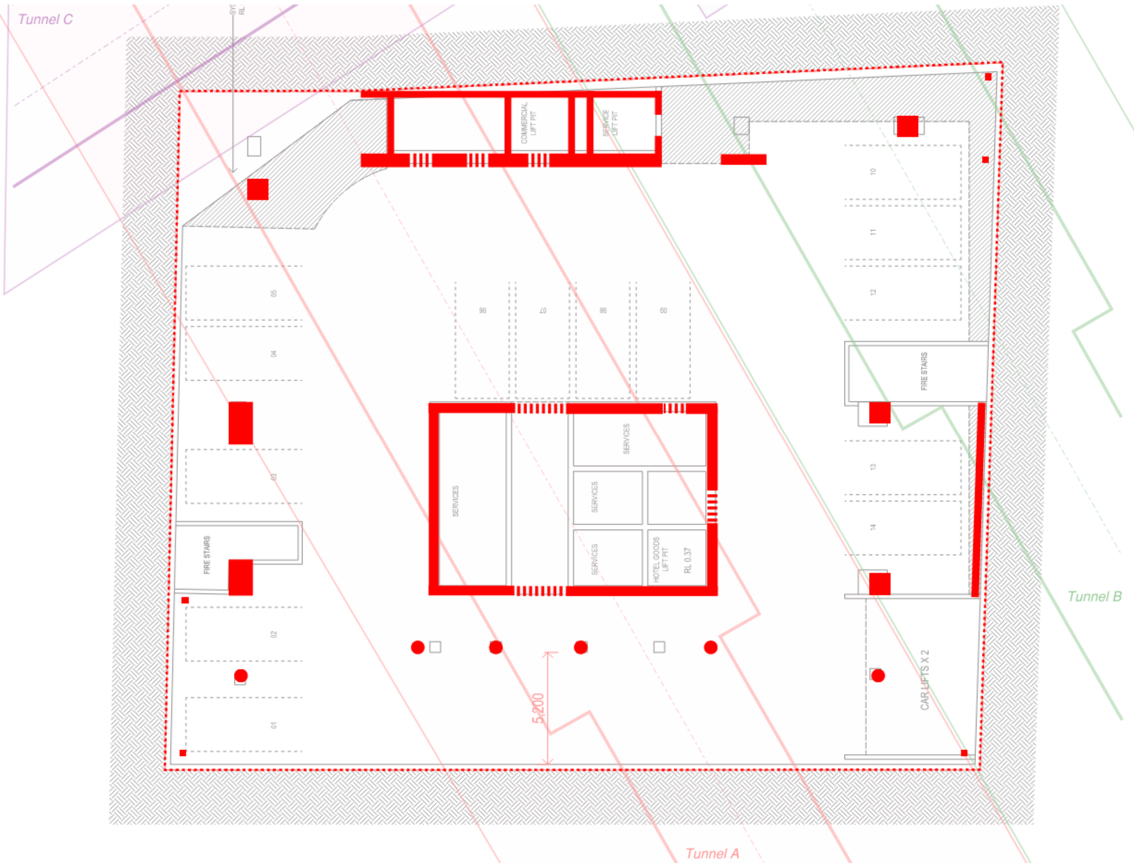


Figure 19: Tower veritcal elements overlaid on Metro West (Tunnels A and B) and City & Southwest (Tunnel C) tunnels (inner line) and 1st reserve (outer lines)

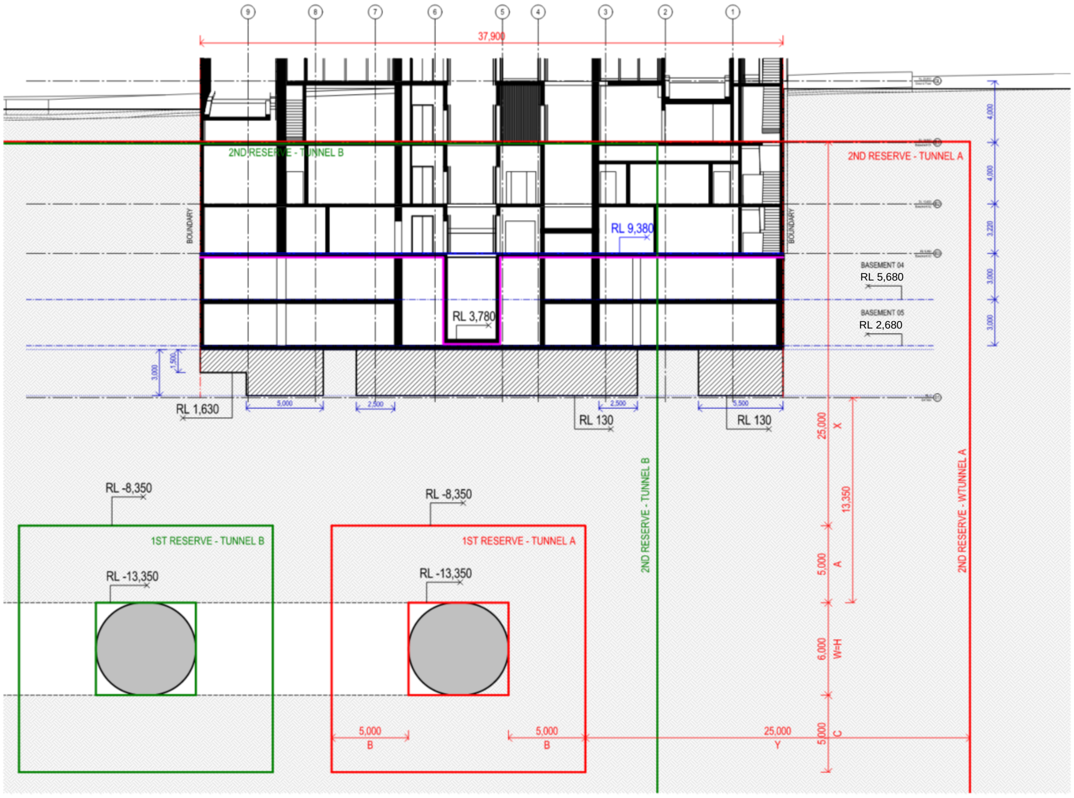


Figure 20: Section through Sydney Metro West tunnels

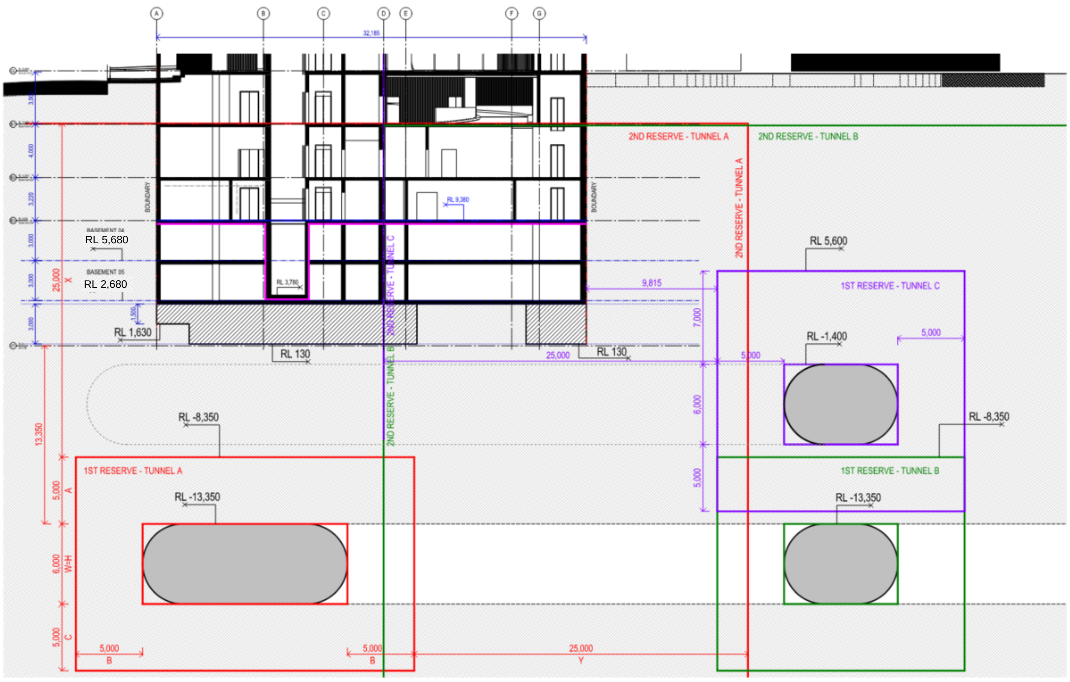


Figure 21: Section through Sydney Metro City & Southwest tunnel

Preliminary analysis has been carried out and the foundation pad elements supporting cores and columns have been sized with the aim of limiting stresses imposed on the strata below. The general criteria used for this initial analysis of the foundation was to limit the maximum compressive stresses to 2.5MPa. These stresses will disperse into the rock strata below and be reduced further at the depths of the tunnels. The stresses and deflections experienced around the tunnels have been assessed by Coffey via multiple 2D sectional analyses. These analyses predict stresses imposed on the tunnels as well as deflections experienced. Initial results are summarised in Section 2.2.

Refer to Figure 22 for a plan view of the shallow foundation solution proposed for the development at the end of the schematic design phase. Pad foundations are positioned below each of the major vertical elements. These pads extend up to 2m out from the face of the core walls/columns. To ensure sufficient distribution of forces and behavior of the pads with these offset distances, pad depths of up to 3m have been proposed and incorporated into the geotechnical analysis.

Figure 22: Proposed shallow foundation layout at B4

The pad foundations will resist lateral loading through sliding friction along the base of the structure. Based on preliminary geotechnical figures and the self-weight of the tower, the frictional resistance at the base of each pad have sufficient capacity when compared to the base shear from wind and seismic loads.

In addition, the preliminary analysis shows that the pads can be sufficiently sized to prevent any tension uplift in the corners under wind and seismic load conditions. Therefore, tension piles or ground anchors are not currently anticipated.

5.2 Excavation and associated basement/retaining structures

The proposed basement at 4-6 Bligh St will utilise the existing basement extent but will be supplemented with an additional 3 levels thus resulting in sub-level basement levels when compared to the current as-built layout.

It is anticipated that the existing building has shoring walls within the basement levels which are utilised to retain the adjacent sites substrata and foundation elements. A review of the available existing structural drawings for the building also illustrate perimeter columns built intergrally with these walls.

There is value in retaining these shoring walls, and modifying or adding to them as required. This could create savings in terms of time and cost, plus reduce risk in the process. The existing basement walls may be able to be used as temporary shoring (with additional propping). Underpinning of the existing adjacent structures requires further review but is noted as a key element to be discussed in the subsequent phase. Further geotechnical work will clarify whether temporary propping walls can be used or whether a more extensive soldier pile system is required to limit the impacts to the adjacent heritage buildings.

The basement floor systems (within the depth of the existing shoring walls) will be required to prop these existing shoring walls and as such a reinforced concrete floorplate solution has been selected as the long-term movements (restraints) are more predictable. The floorplates are setout to be supported on new vertical columns and would not rely on vertically loading existing perimeter walls. A typical layout of the basement levels is illustrated in Figure 23.

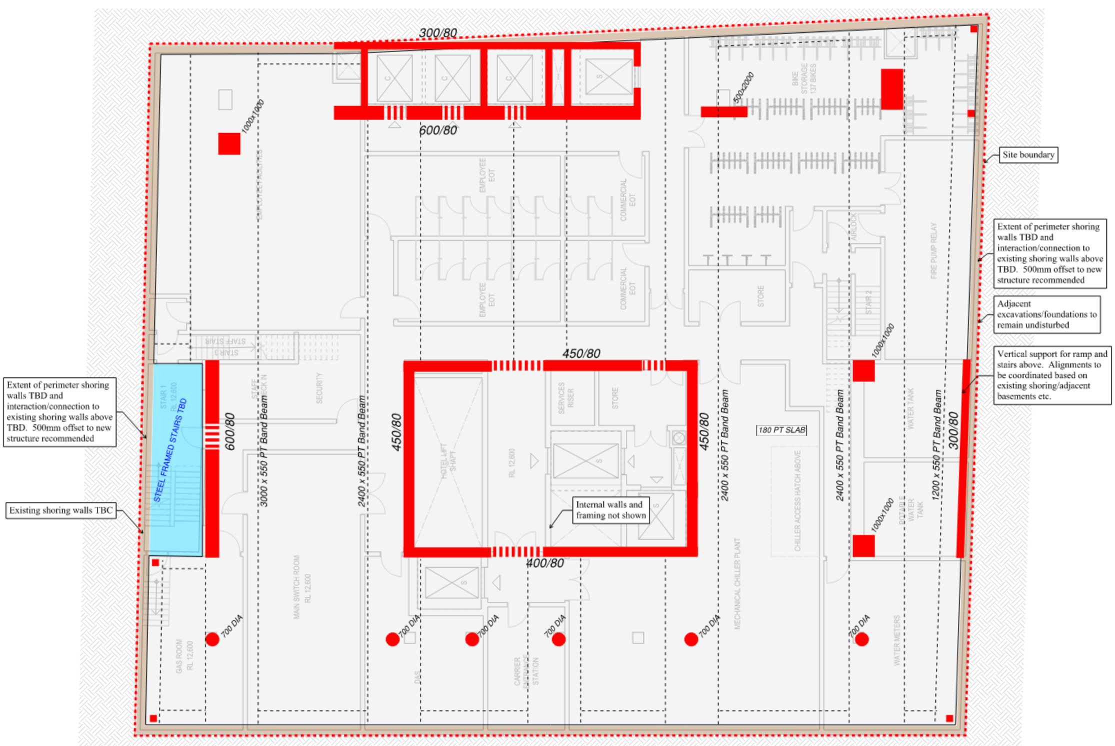


Figure 23: Typical basement floor system

A schematic section through the existing site and the proposed excavations is illustrated in Figure 24. There is a 300mm existing perimeter wall adjacent to the site boundary, with 450/800 deep perimeter columns built integrally. It is anticipated that the proposed excavation will be limited to be within the 300mm wall to allow the existing structure to be used in the construction of the proposed basement levels. Based on this, it is advisable that the set-out of the proposed basement should consider an offset of 500mm at a minimum from the site boundary.

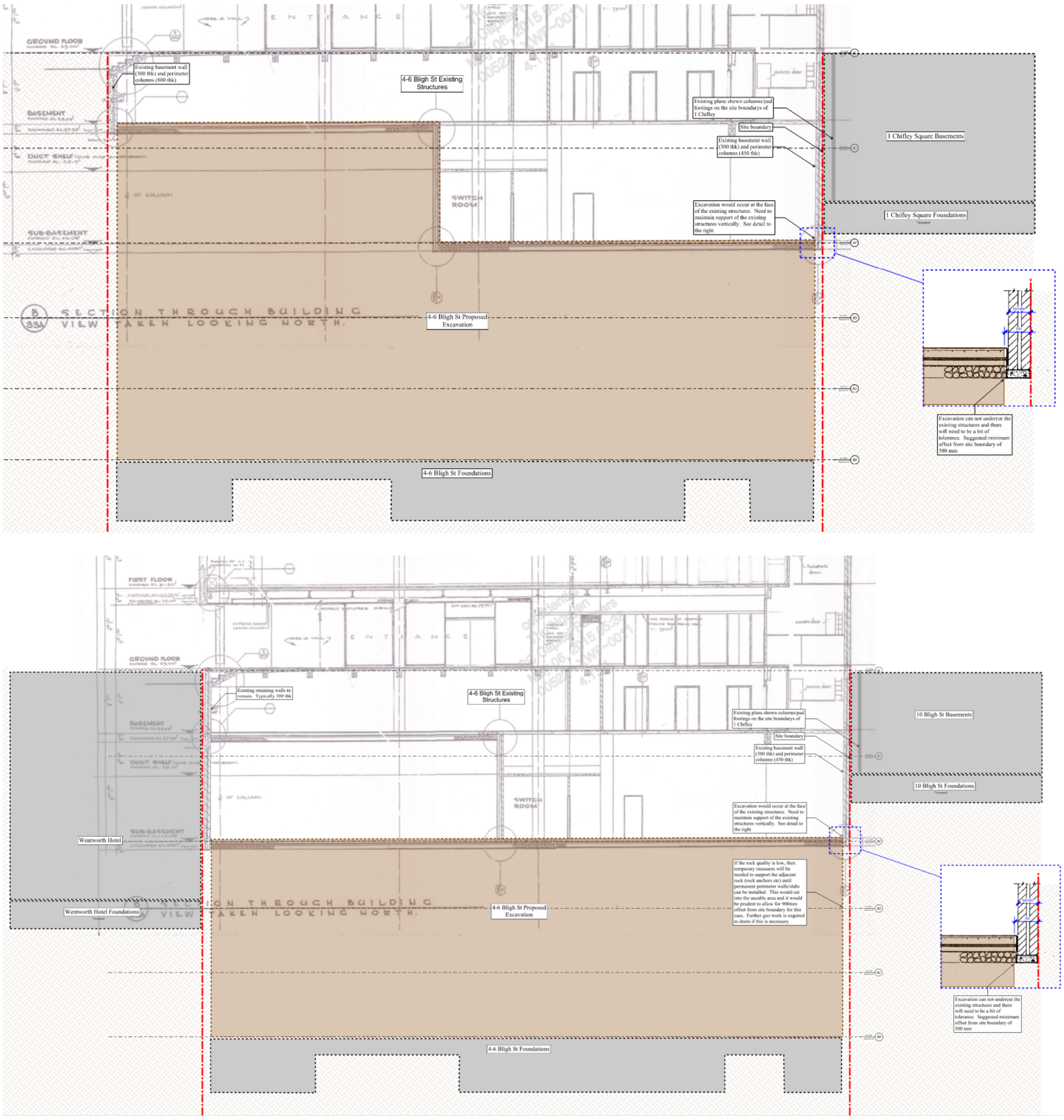


Figure 24: Existing structures/proposed excavations (top – North / bottom – East)

5.3 Typical Floor Systems

5.3.1 Construction Method options

Four floor framing options were considered and reviewed during the schematic design stage. Theses options included:

- Option 1 : Composite Steel
- Option 2 : Slim Floor
- Option 3 : PT Flat Plate
- Option 4 : RC Flat Slab

An option assessment was undertaken to investiatte the positive and negative aspects of each option as they related to material quantity for the overall development, construction complexity and impact on schedule etc. Based on the results of this comparison (summarised below in Table 9) Option 3 PT Flat plates were chosen as the preferred option.

Table 9: Floor Framing comparison study

Option	Detail	Primary Structure	Secondary Strucrure	No Columns	Back Propping	Screen Support	Effect On Core
1	Composite Steel						
2	Slim Floor						
3	PT Flat Plate						
4	RC Flat Plate						

Legend
GOOD
OK
FAIR
POOR

5.3.2 Typical Hotel Floor System

Traditional hotel construction techniques have been proposed for the hotel levels of the proposed tower. This has resulted in a post-tensioned flat plate solution. The slab is supported from strategically positioned blade columns (within party walls) and by the RC core and outrigger walls. A 230mm thick PT flat plate has been nominated based on the proposed spans and to allow for 30mm setdowns in wet areas of the floorplate. Select ares of the floor will require thickening to 250mm to account for increased spans.

Refer to Figure 25 below for a plan view of the proposed typical hotel floorplate.

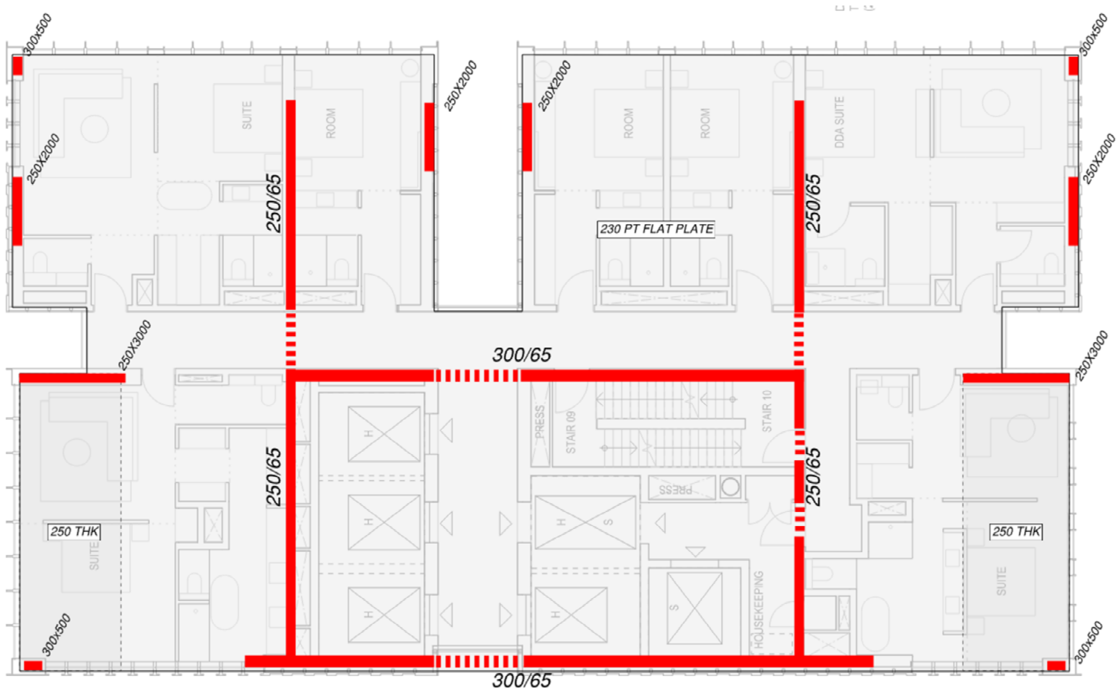


Figure 25: Typical Hotel floor system

5.3.3 Typical Commercial Floor System

Traditional commercial construction techniques have been proposed for the commercial levels of the proposed tower. This has resulted in a one way post-tensioned slab supported on PT band beams of varying depths. The band beam positions and spans vary and are driven by the need to align the hotel column layouts above with the commercial layouts below. A 180mm thick PT slab has typically been nominated based on the proposed spans with band beam depths ranging from 450 to 550mm. Band beams are supported by either RC columns and/or RC walls.

At this early stage, the services reticulation is unknown. Based on the floor-floor height services should have adequate reticulation space below the bands. If needed, notches can be introduced close to cores/columns to allow extra room for ducts to pass through.

Refer to Figure 26 below for a plan view of the proposed typical hotel floorplate.

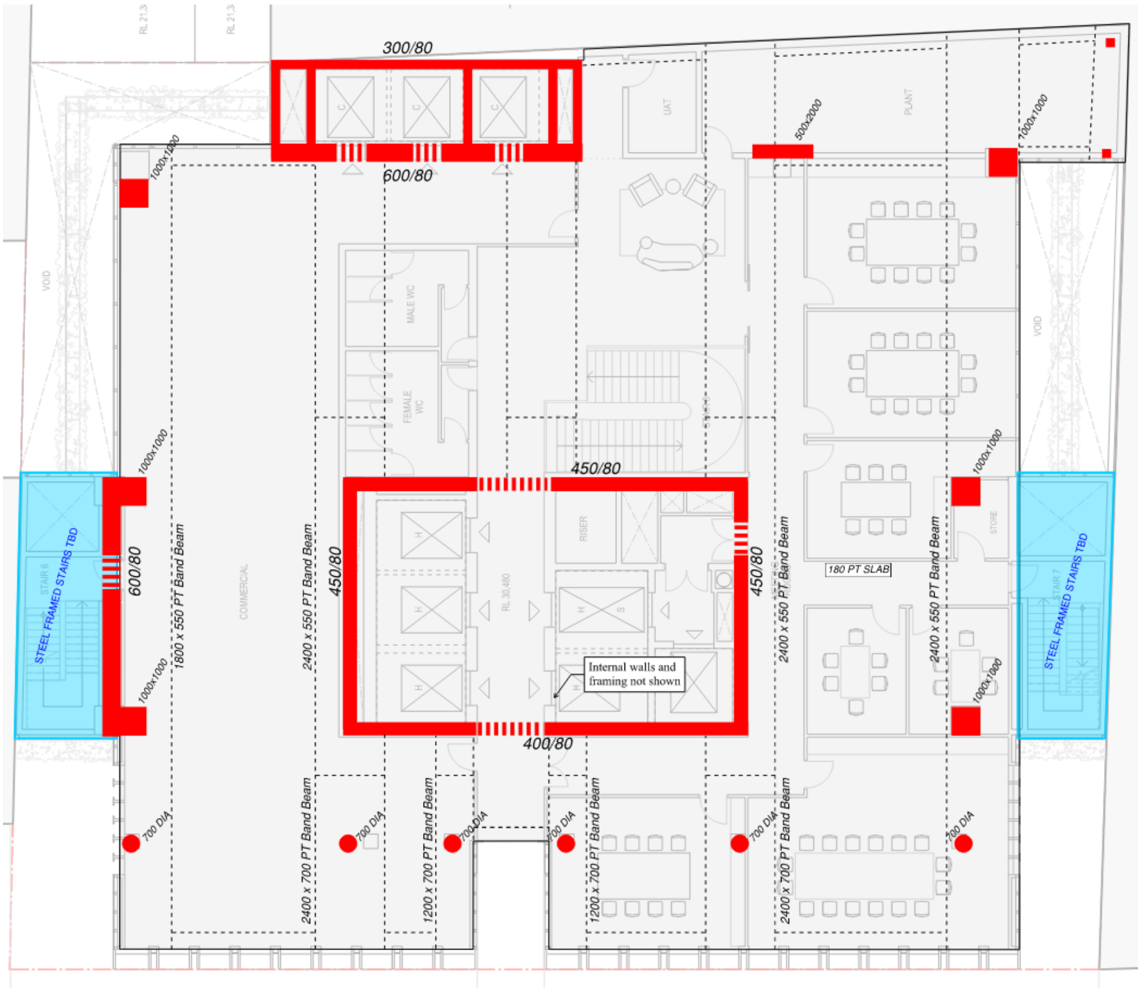


Figure 26: Typical Commerical floor system

5.4 Tower Lateral Systems

The proposed lateral system for the tower is a reinforced concrete core enclosing the stairs, risers and lifts. Header beams located over openings couple the walls together. The main core is supplemented by blade walls which extend up to the roof as well as outriggers between L12-L14 which spread the lateral loads out to perimeter walls/columns to the north, south and east.

Outriggers occupy L11 to L13 and spread load to the north, south and eastern sides of the development. Due to the setback in the tower at the hotel level, the blade walls (above L13) do not align for a transition to the eastern core. A 3m deep transfer slab has been proposed between L11 and L12 to transfer the blade walls out to the eastern core. This element might introduce a high degree of complexity/cost to the construction schedule and will be reviewed in subsequent phases against alternatives. The extents of these various elements are shown in the following images.

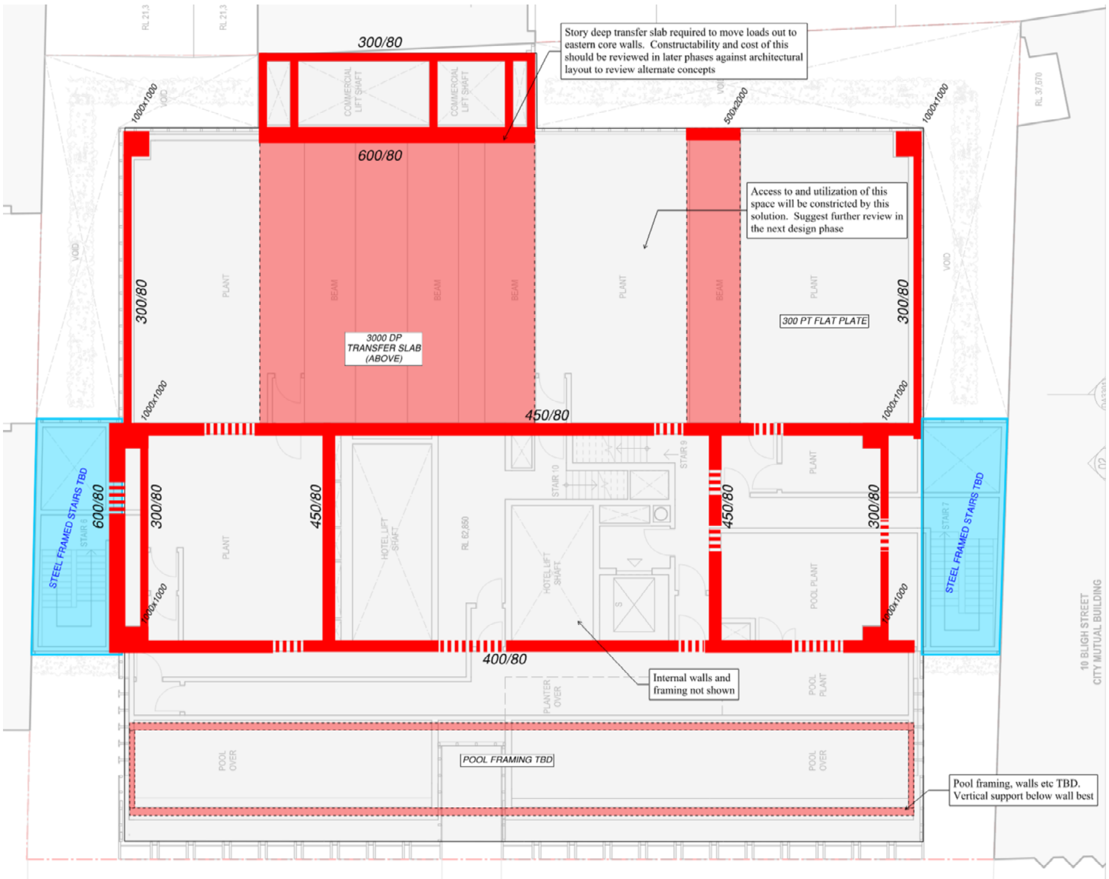


Figure 27: Outrigger and 3m deep transfer slab (L11)

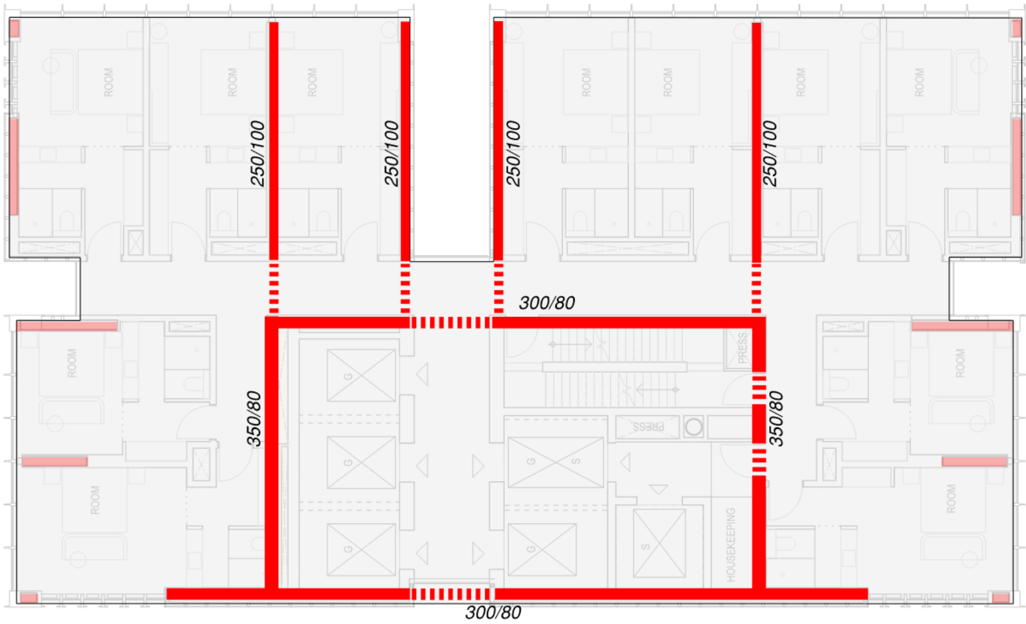


Figure 28: Tower lateral system L15 to L32

Figure 29: Tower lateral system L32 to roof

ETABs models have been developed to assess the preliminary performance of the tower. Refer to Figure 30 for images of the ETABS model used for analysis to date.

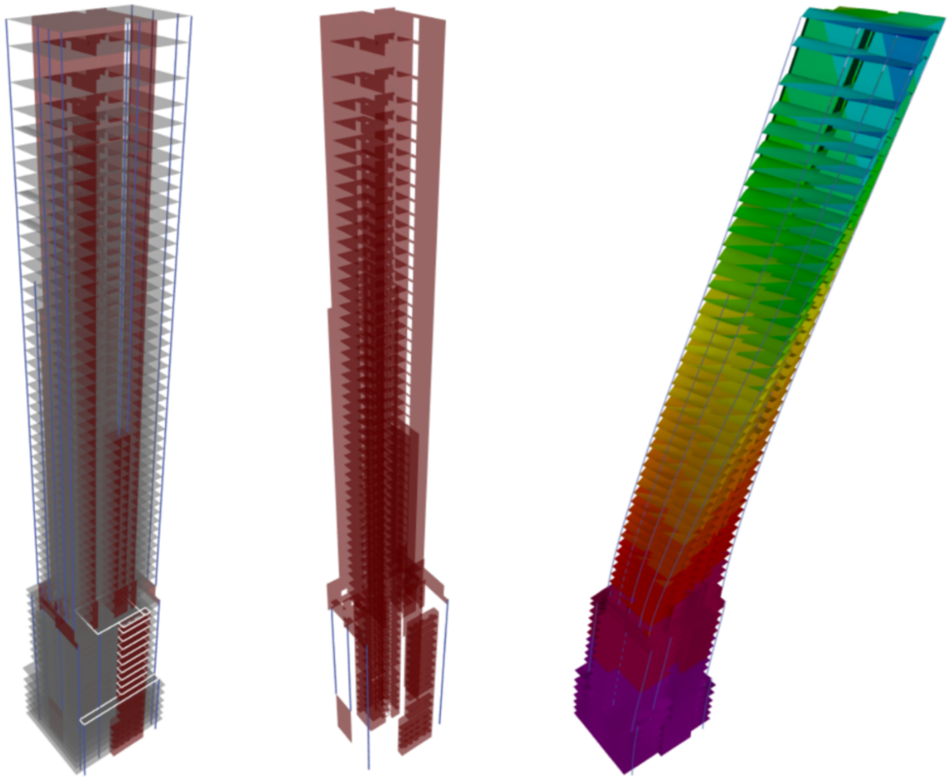


Figure 30: 4-6 Bligh St ETABs (left) - lateral System (middle) - Analysis results (right)

Due to the building height and slenderness, wind loads are more onerous than the seismic loads. In particular, human comfort will be an important design parameter and will dictate the required stiffness of the towers lateral system. The preliminary wind tunnel studies have highlighted accelerations in the upper levels of the tower as a critical design parameter and the stiffness of the entire system will require tuning in later design phases to mitigate any ill effects. The aim is to develop a structural system which has adequate stiffness to remove the need for any supplementary damping systems.

The dynamic properties as well as the first 3 mode shapes for the tower are shown below in Table 10 and Figure 31:

Table 10: Modal Properties

Mode	Period (sec)	Frequency (hz)	Direction
1	5.06	0.20	X Translation
2	4.61	0.22	Y Translation
3	2.06	0.49	Torsion

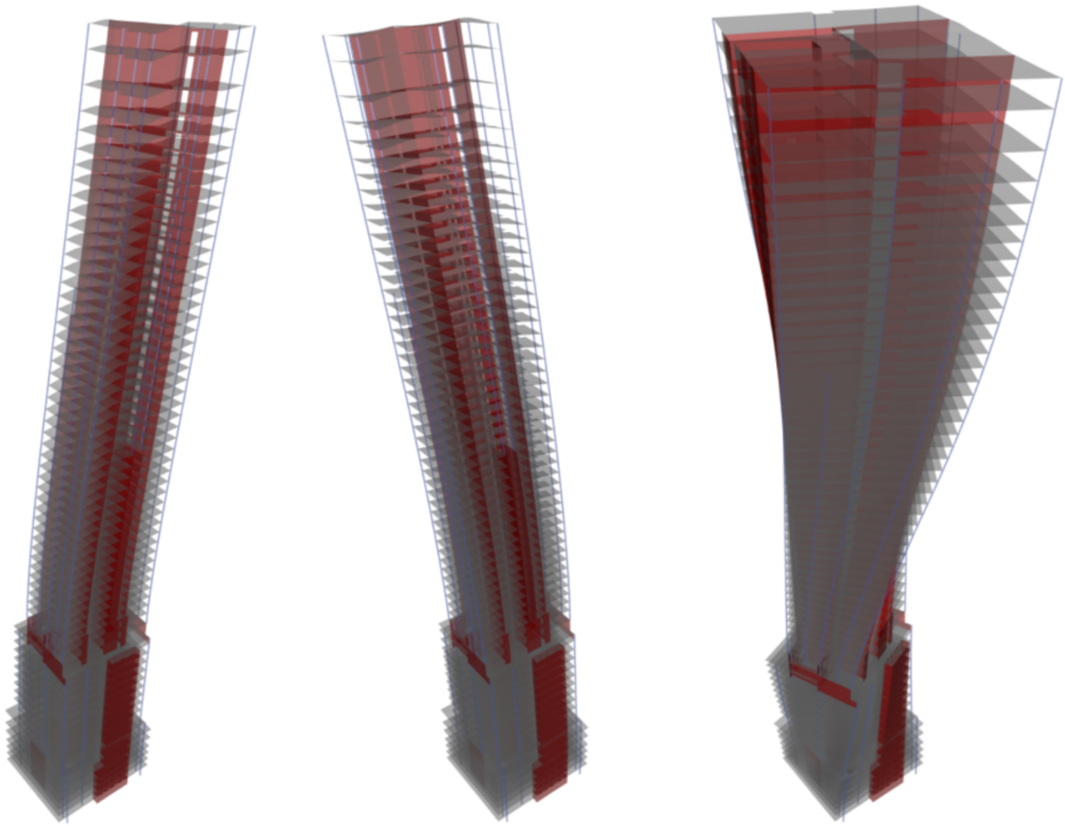


Figure 31: 4-6 Bligh St SLS Mode Shapes

6 Next Steps

The proposed development at 4-6 Bligh Street has been established through to a schematic level of structural design as described in the report above. The architectural drawings have been marked up to indicate the structural framing as it currently stands. These are included in Appendix B.

In the next phase of the design, the structural framing and coordination will be progressed along with more detailed coordination with the other disciplines. Specific areas requiring further thought include but are not limited to:

- Basement structural coordination and strategies for interfacing with the existing basement perimeter retention systems
- Tower lateral system sensitivity and optimization in relation to human comfort performance criteria
- Review of alternatives to the 3m deep transfer slab as they relate to the planned architectural layouts with discussions related to the constructability and construction staging of this part of the outrigger and its delayed connection to the rest of the building
- Coordination of pool support and column locations along the entrance to the development on Bligh Street
- Riser coordination and core layouts to ensure proper service distribution and access through core wall penetrations
- Continued coordination and resolution with Sydney Metro in regards to tunnel impacts

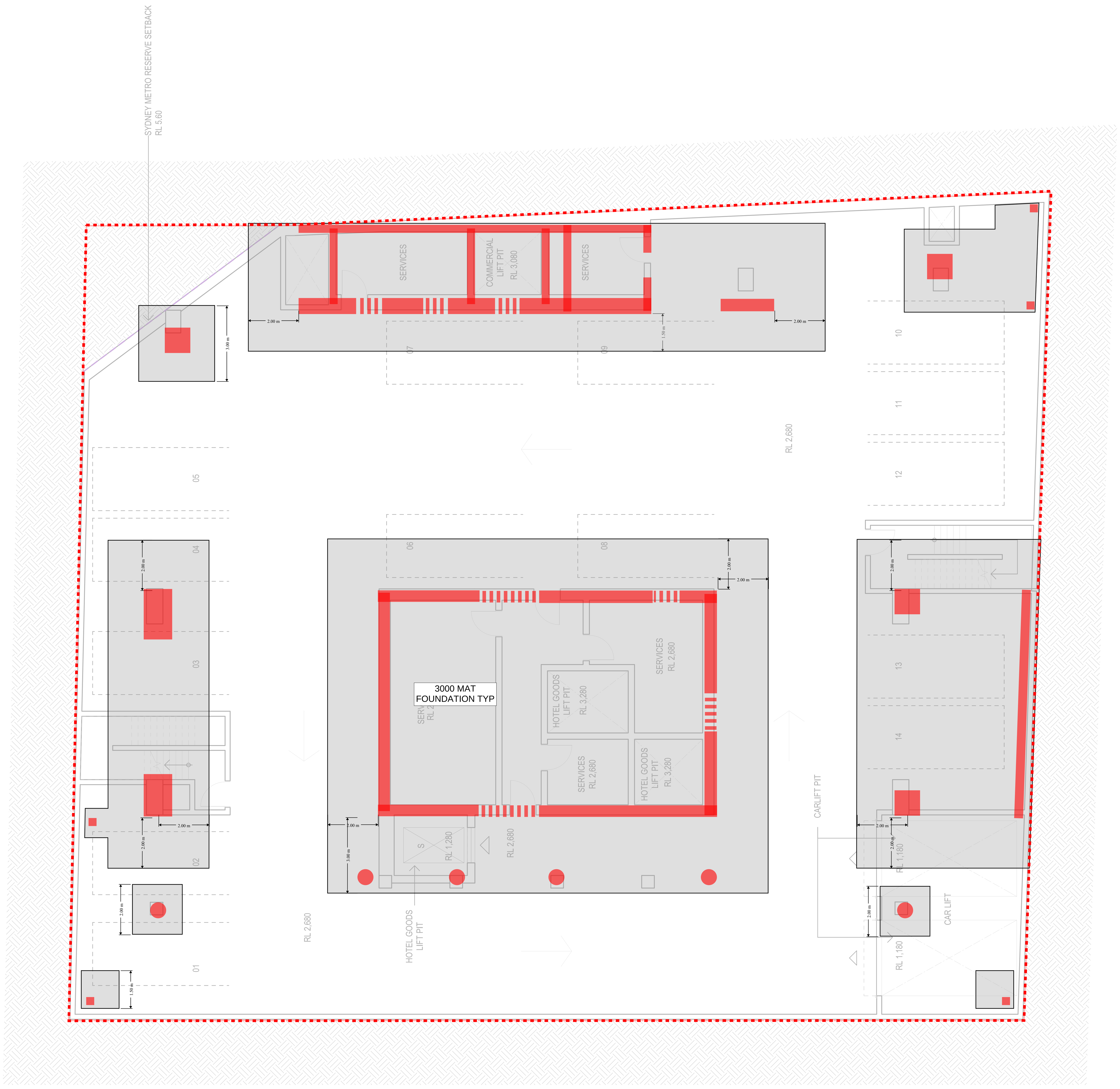
A. Appendix A

A.1 References

- *4-6 Bligh Street, Sydney NSW, Geotechnical Investigation Report, Coffey, November 2018*
- *4-6 Bligh Street, Sydney NSW, Potential impact of the proposed development on Sydney Metro assets, Coffey, December 2018*
- *Structural Load Wind Tunnel Study, SLR, Ref: 610.18713-R02, June 2019*

B. Appendix B

B.1 Mott MacDonald Schematic Structural Drawings



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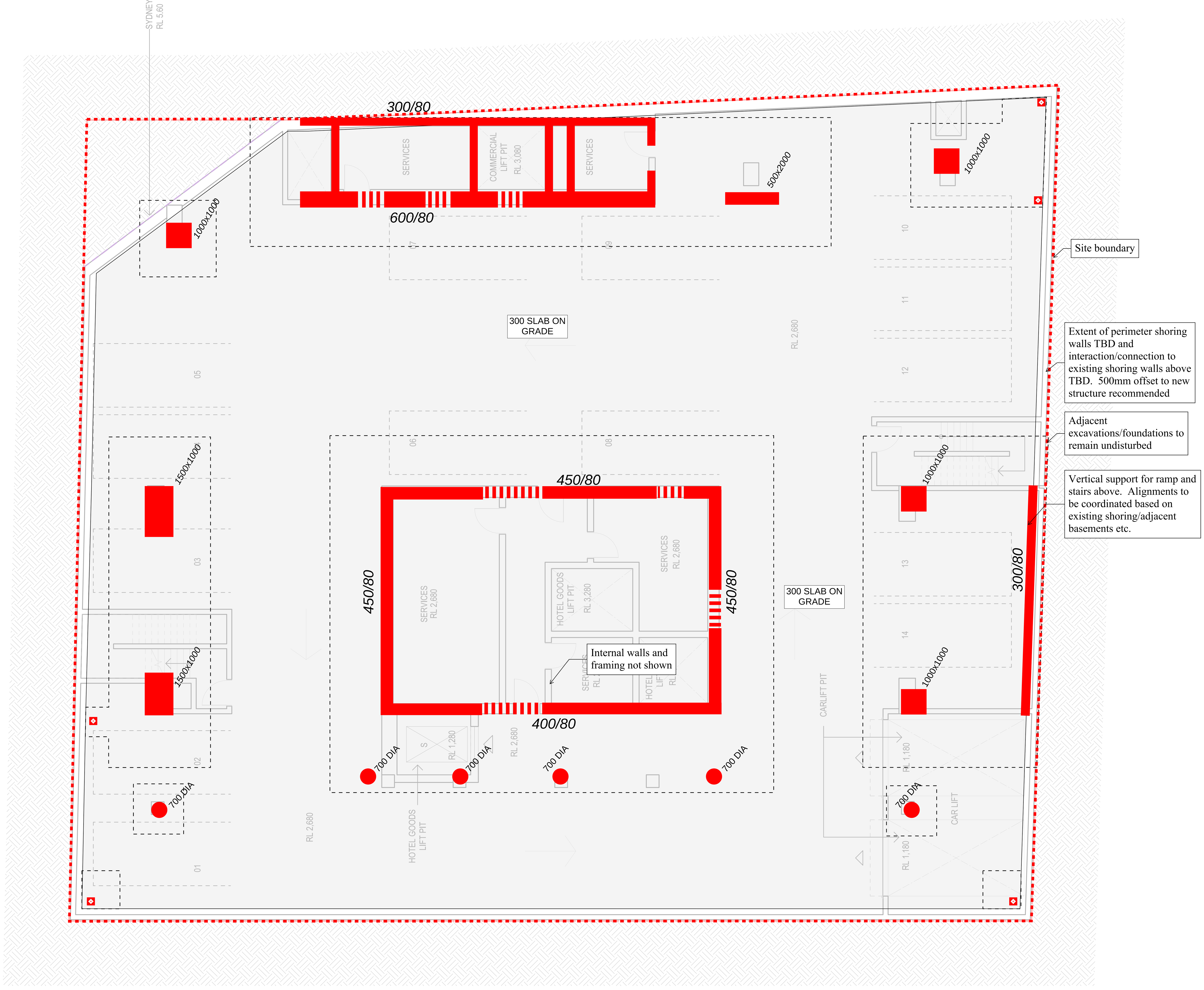
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL FOUNDATIONS	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK001	Status	Rev: B	



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4-6 BLIGH STREET		Scale	
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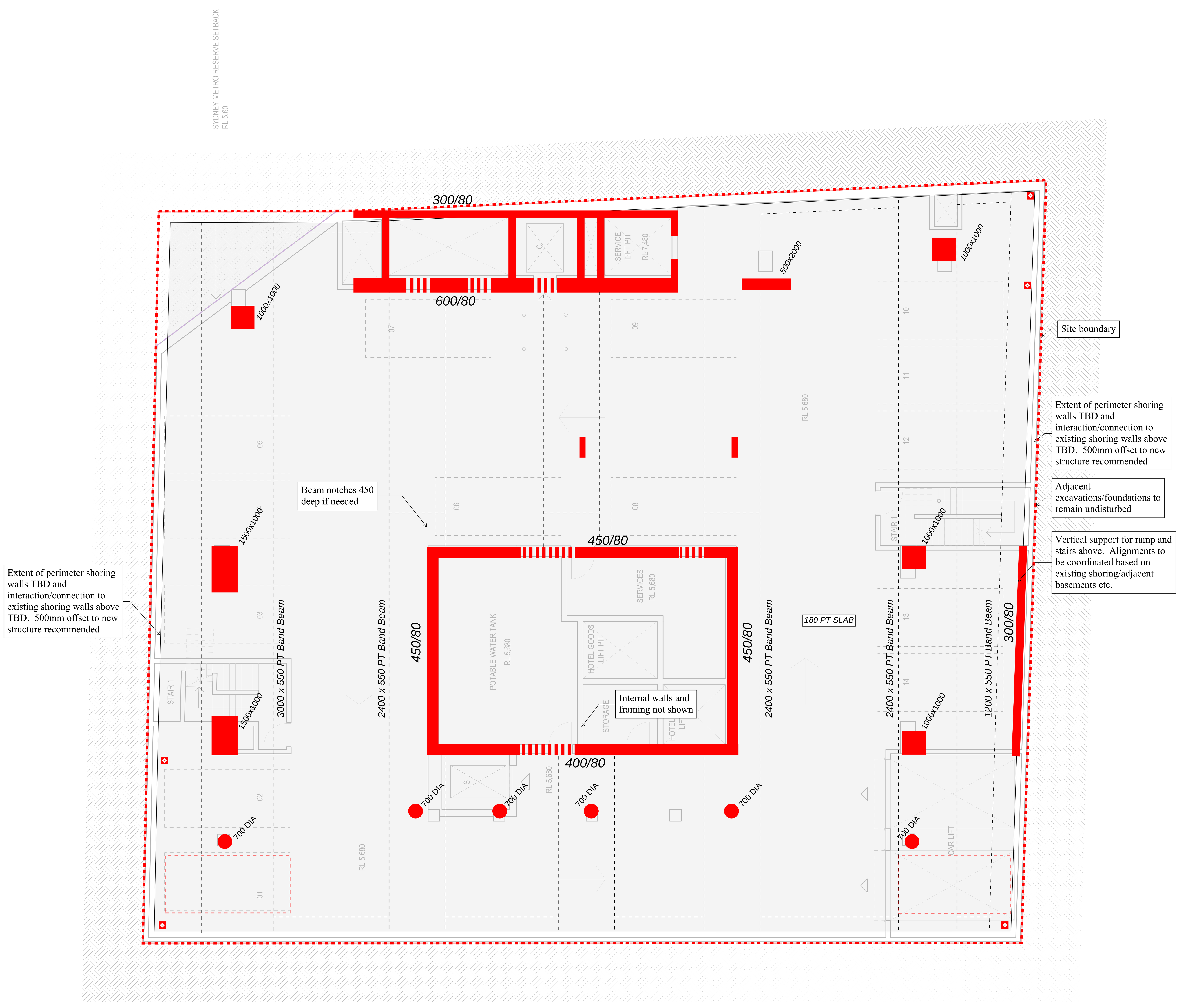
LEVEL B5		Date	07/12/2022
Sketch Number	MMD-SK002	Status	Rev B



NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

9) CONTRACTOR/QS TO MAKE RELEVANT CONTINGENCY ALLOWANCES TO ACCOUNT FOR THE ABOVE AS WELL AS TO REFLECT THE STAGE OF THE STURCTURAL DESIGN (PRE-CONCEPT FINALISATION)

10) THESE DRAWINGS ARE NOT INTENDED TO PROVIDE A FINAL PROJECT BUDGET, BUT ARE INTENDED TO PROVIDE A GUIDE TO TRACK COST DIFFERENTIALS THROUGH THE DEVELOPMENT OF THE STRUCTURAL CONCEPT AND MAY BE USED FOR COMPARATIVE PURPOSES AGAINST PREVIOUS COST PLAN ITERATIONS AND STRUCTURAL CONCEPT SKETCHES

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Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL B4		Date	07/12/2022
Sketch Number MMD-SK003		Status	Rev B

NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

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Sketch Title: LEVEL B3	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK004	Status	Rev: B	

NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

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Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL B2	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK005	Status	Rev: B	

NOTES:

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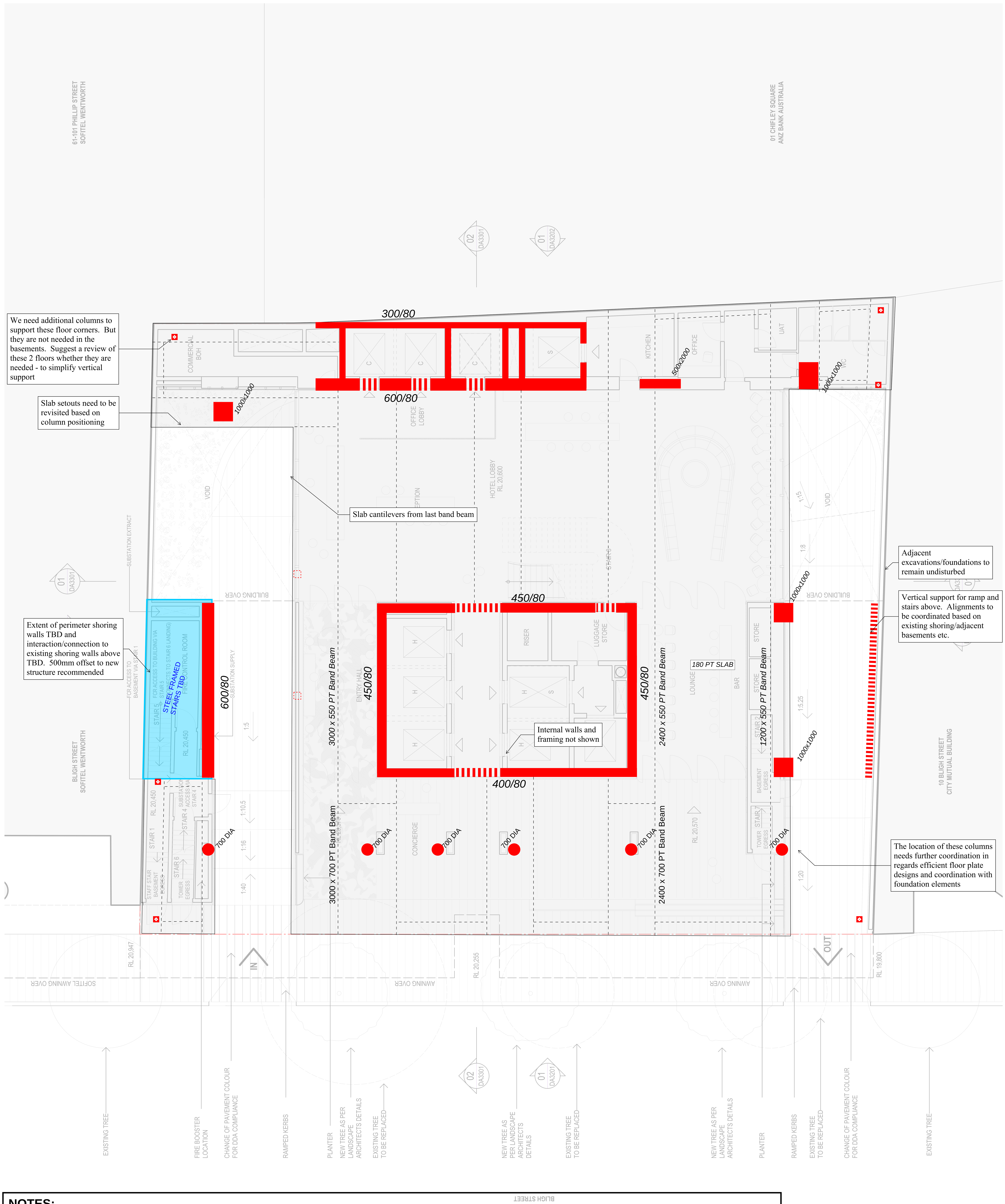
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL B1		Date	07/12/2022
Sketch Number MMD-SK006		Status	Rev B



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7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

9) CONTRACTOR/QS TO MAKE RELEVANT CONTINGENCY ALLOWANCES TO ACCOUNT FOR THE ABOVE AS WELL AS TO REFLECT THE STAGE OF THE STURCTURAL DESIGN (PRE-CONCEPT FINALISATION)

10) THESE DRAWINGS ARE NOT INTENDED TO PROVIDE A FINAL PROJECT BUDGET, BUT ARE INTENDED TO PROVIDE A GUIDE TO TRACK COST DIFFERENTIALS THROUGH THE DEVELOPMENT OF THE STRUCTURAL CONCEPT AND MAY BE USED FOR COMPARATIVE PURPOSES AGAINST PREVIOUS COST PLAN ITERATIONS AND STRUCTURAL CONCEPT SKETCHES

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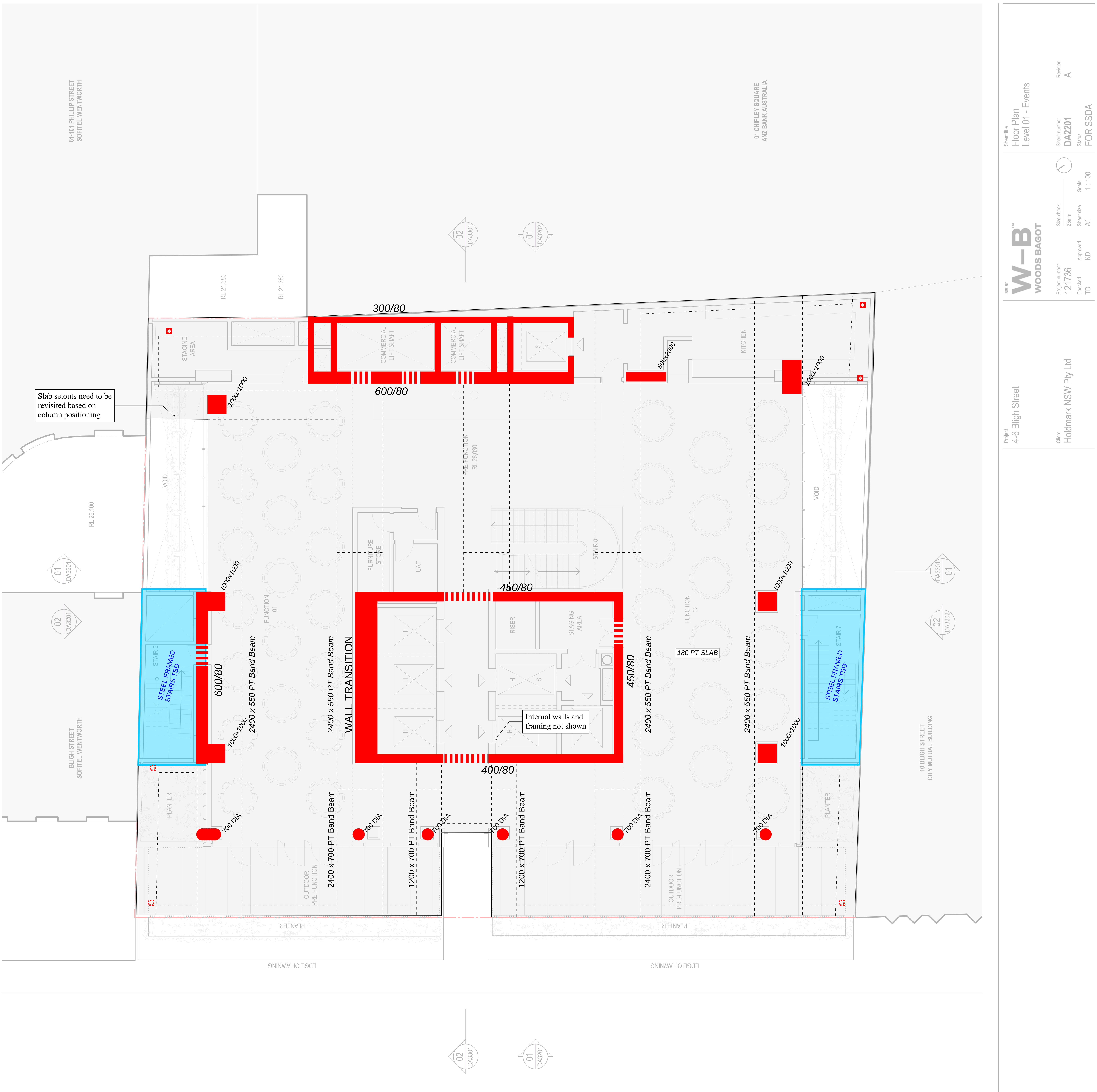
Project		Project No	409096	
4-6 BLIGH STREET		Scale		
Sketch Title		Drawn	Checked	Approved
LEVEL G		J.O.	J.O.	G.D.
		Date	07/12/2022	
Sketch Number		Status	Rev	
MMD-SK007			B	



NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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Project: 4-6 BLIGH STREET	Project No	409096		
	Scale			
Sketch Title: LEVEL 01	Drawn J.O.	Checked J.O.	Approved G.D.	
	Date	07/12/2022		
Sketch Number: MMD-SK008	Status	Rev B		

NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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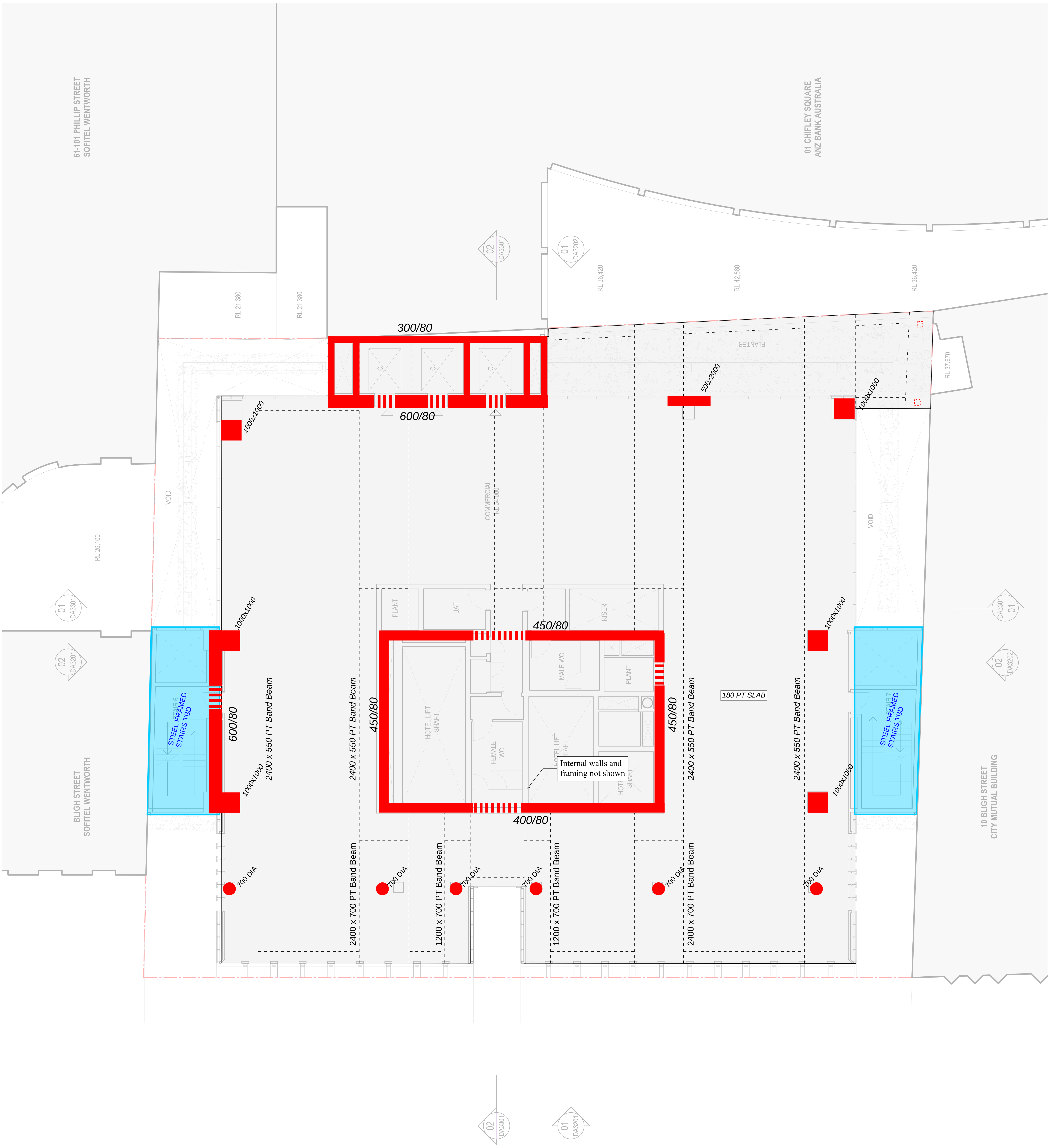
Project: 4-6 BLIGH STREET	Project No	409096		
	Scale			
Sketch Title: LEVEL 02	Drawn J.O.	Checked J.O.	Approved G.D.	
	Date	07/12/2022		
Sketch Number: MMD-SK009	Status	Rev B		



NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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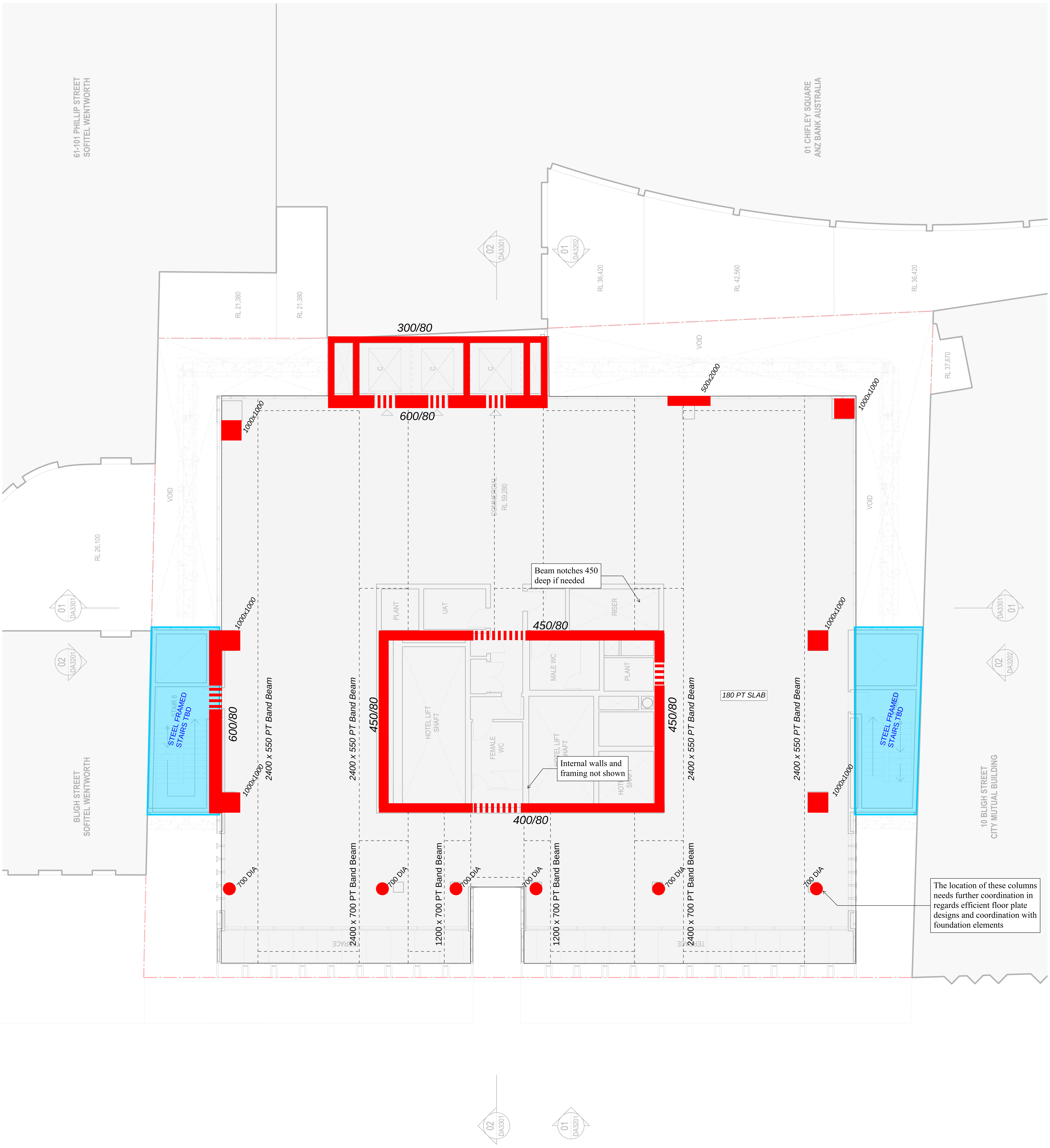
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 03	Drawn J.O.	Checked J.O.	Approved G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK010	Status	Rev B	



Floor Plan
Level 10 - Commercial
Sheet number DA2210
Revision A
Status FOR SSDA
Scale 1:100
Sheet size A1
WOODS BAGOT
Project number 121736
Project 4-6 Bligh Street
Client Holdmark NSW Pty Ltd

LEGEND
[H] Hotel Guests / Public Use
[S] Service Lift
[C] Commercial Lift

NOTES:

1) 180mm THK PT SLAB WITH 550 DEEP PT BAND BEAMS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

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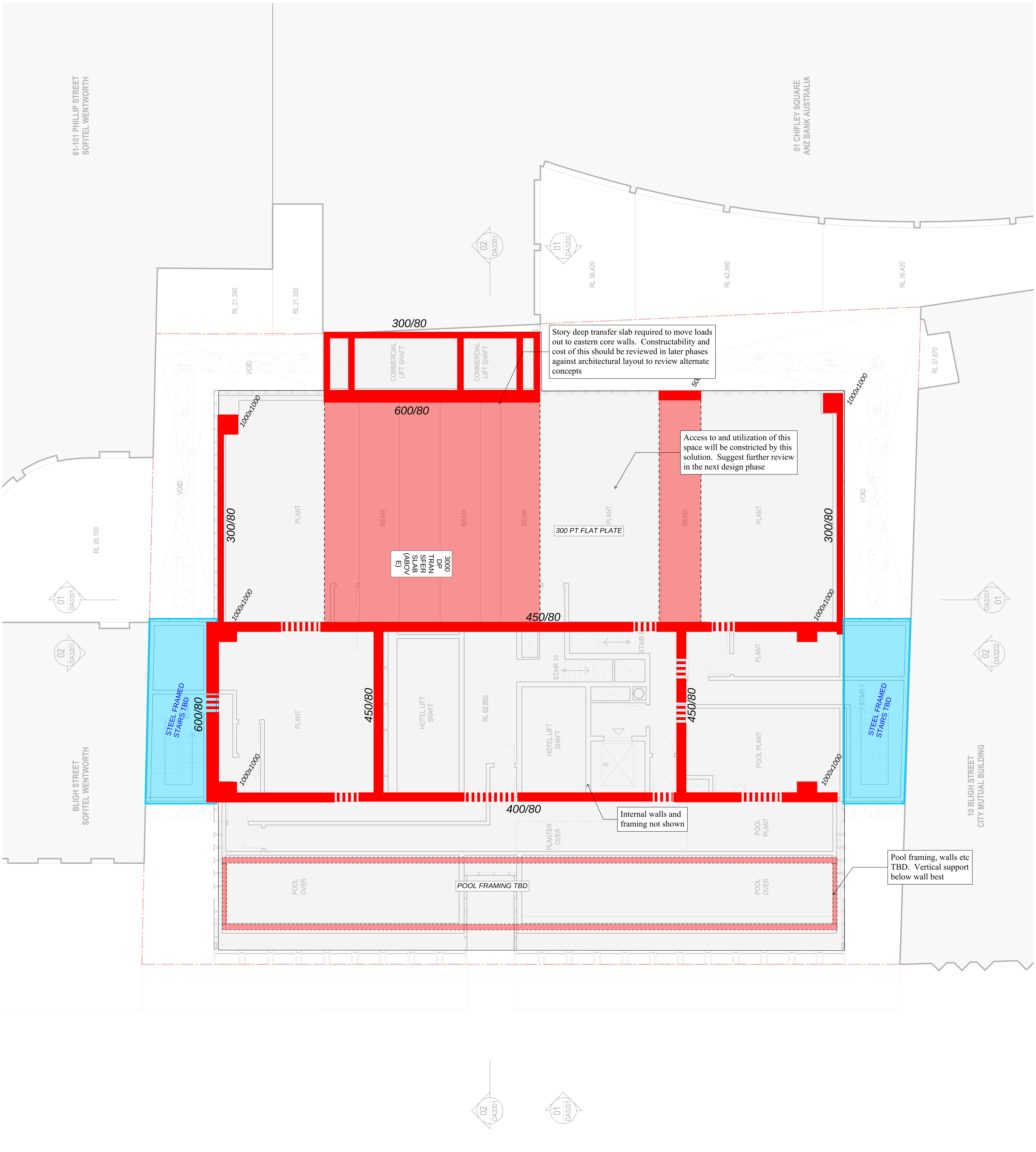
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 10	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK011	Status	Rev: B	



Sheet title: Floor Plan Level 11 - Plant
Sheet number: DA2211
Revision: A
Status: FOR SSDA
Scale: 1:100
Project: 4-6 Bligh Street
Client: Holdmark NSW Pty Ltd
W-B WOODS BAGOT
Project number: 121736

NOTES:

1) 300mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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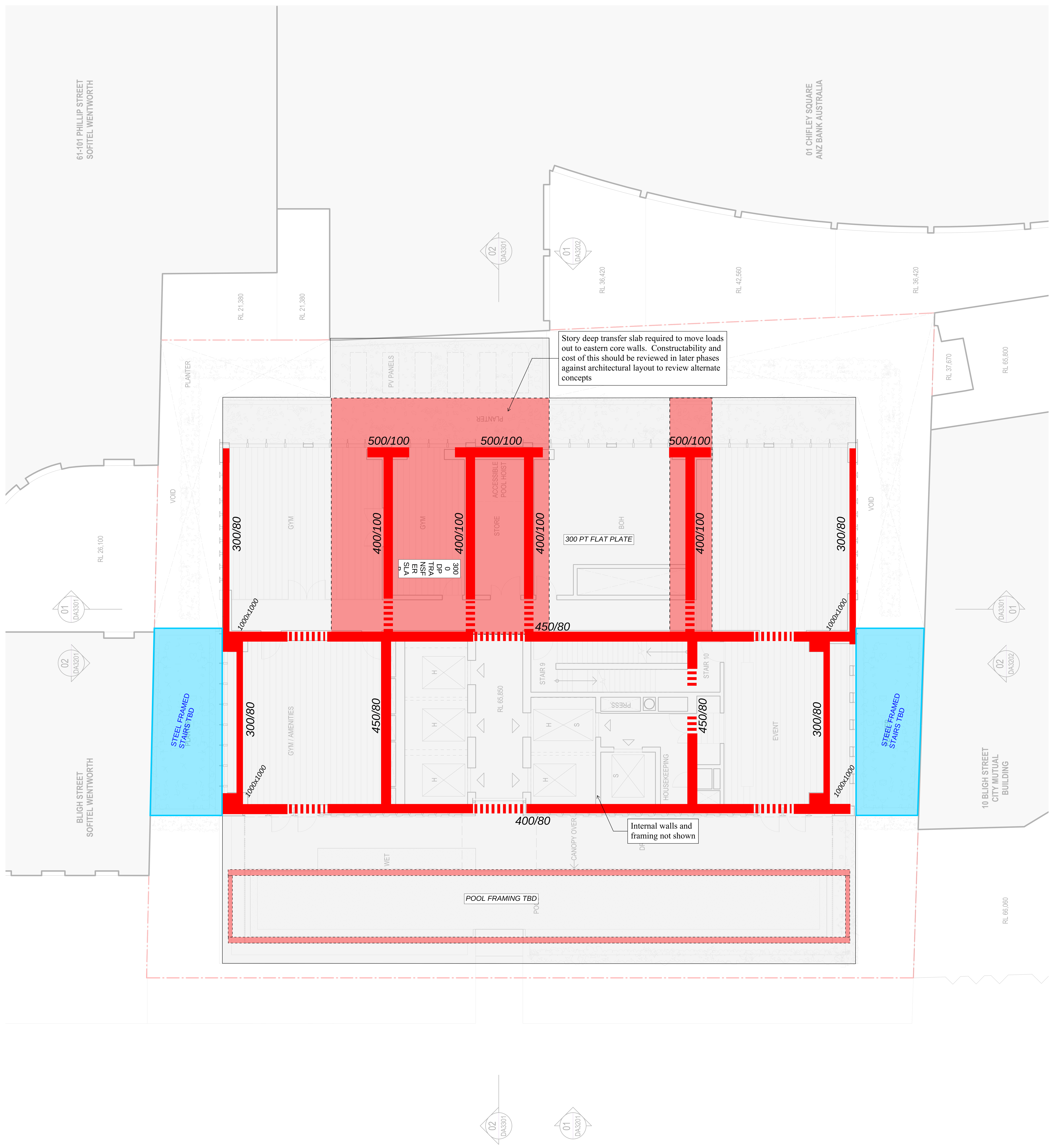
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 11	Drawn J.O.	Checked J.O.	Approved G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK012	Status	Rev B	



Floor Plan Level 12 - Wellness
Sheet number DA2212
Revision A
Status FOR SSDA
W–B WOODS BAGOT
Project number 121736
Scale 1 : 100
Project 4-6 Bligh Street
Client Holdmark NSW Pty Ltd

NOTES:

1) 300mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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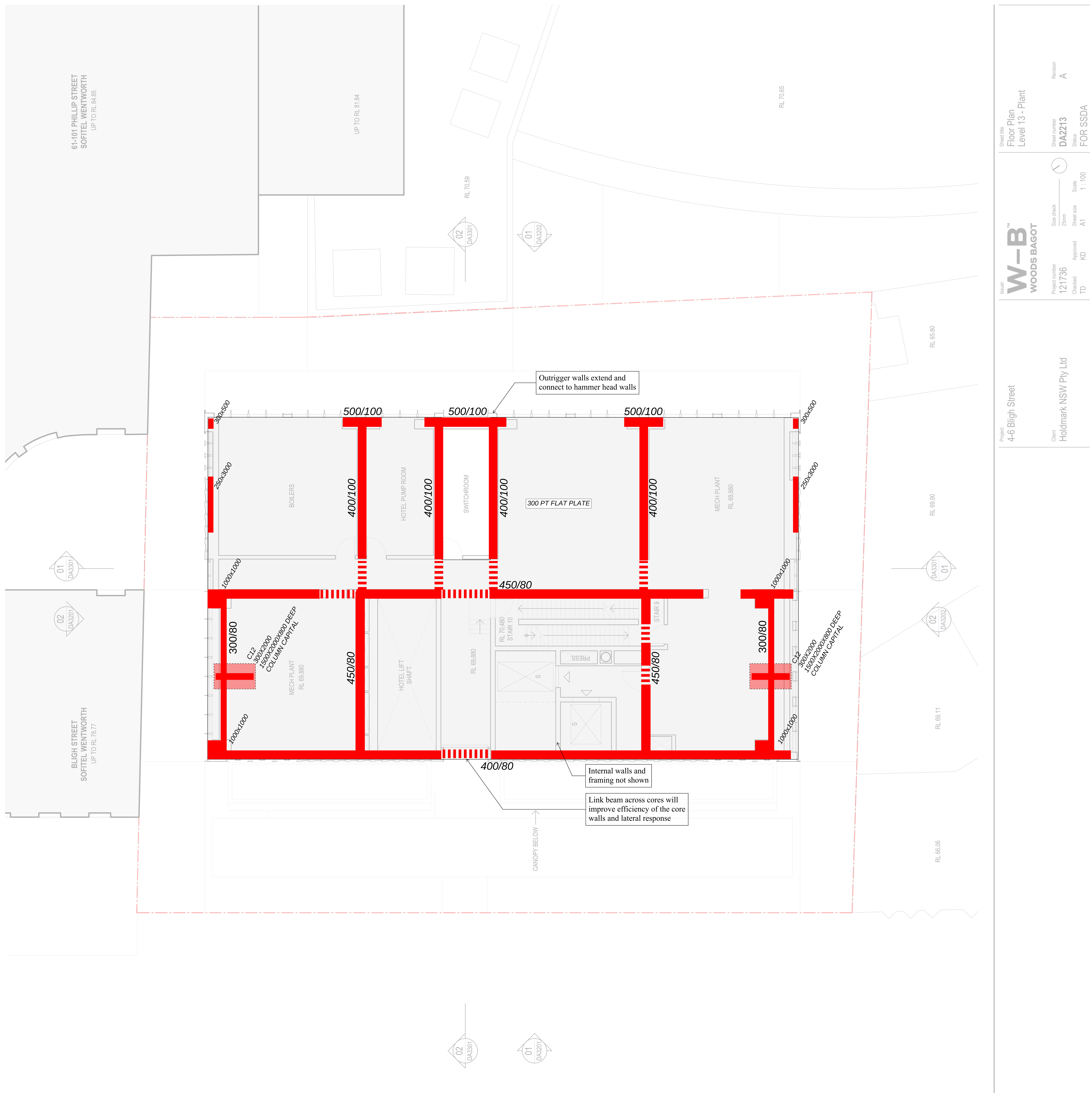
Project: 4-6 BLIGH STREET	Project No	409096		
	Scale			
Sketch Title: LEVEL 12	Drawn J.O.	Checked J.O.	Approved G.D.	
	Date	07/12/2022		
Sketch Number: MMD-SK013	Status	Rev B		



NOTES:

1) 300mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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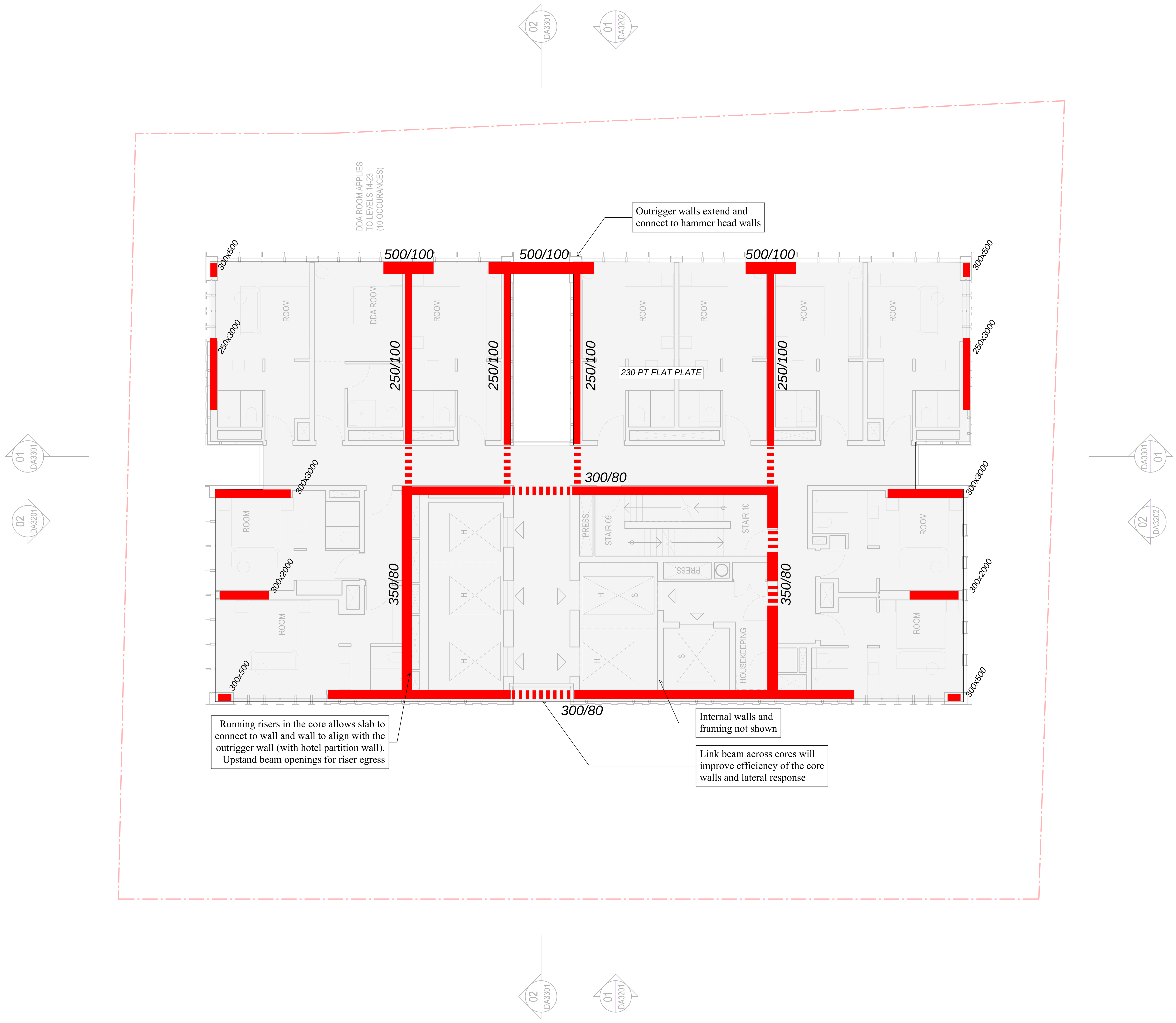
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 13	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK014	Status	Rev: B	



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

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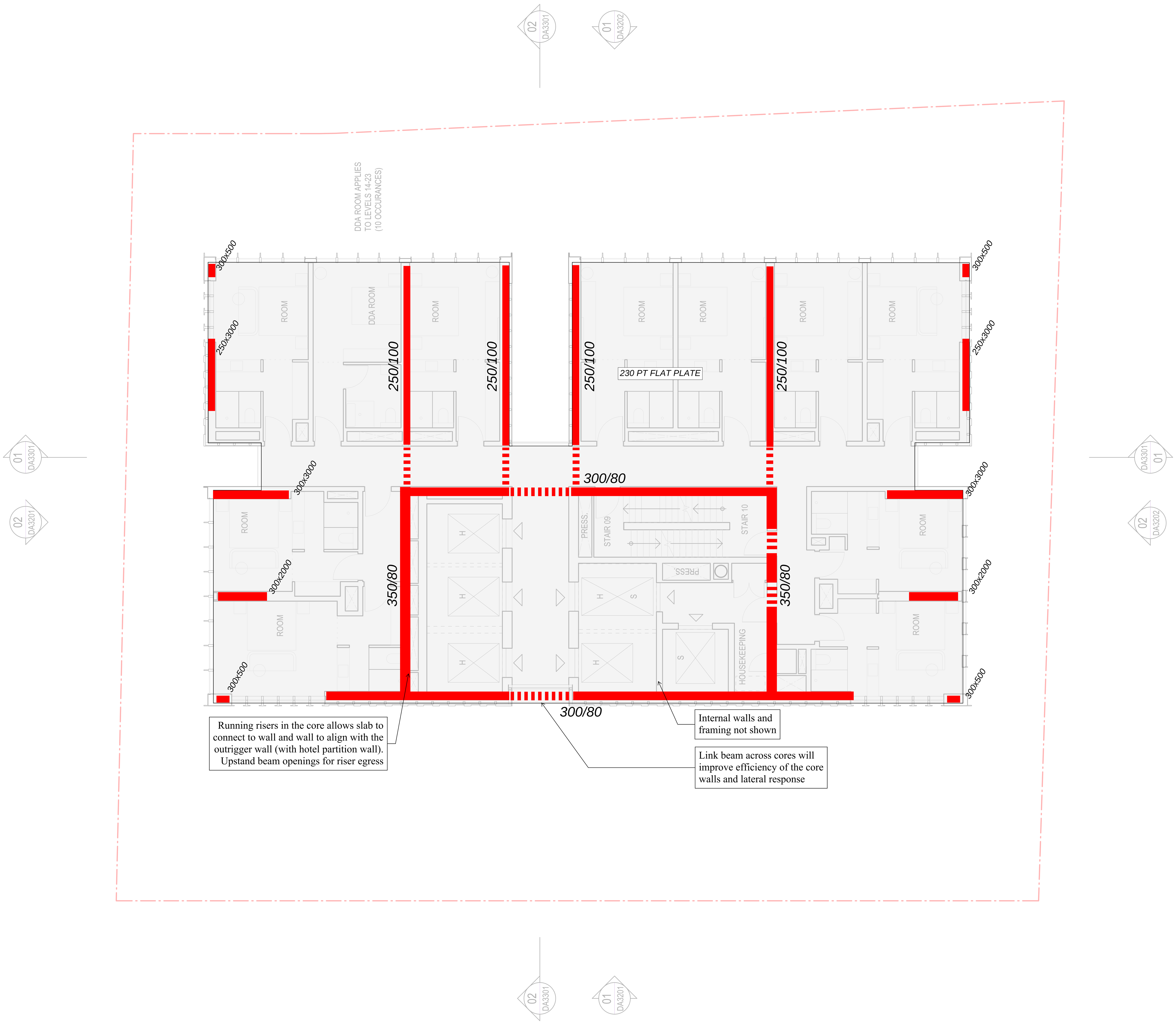
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title		Drawn / Checked / Approved	J.O. / J.O. / G.D.
LEVEL 14		Date	07/12/2022
Sketch Number		Status	Rev
MMD-SK015			B



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

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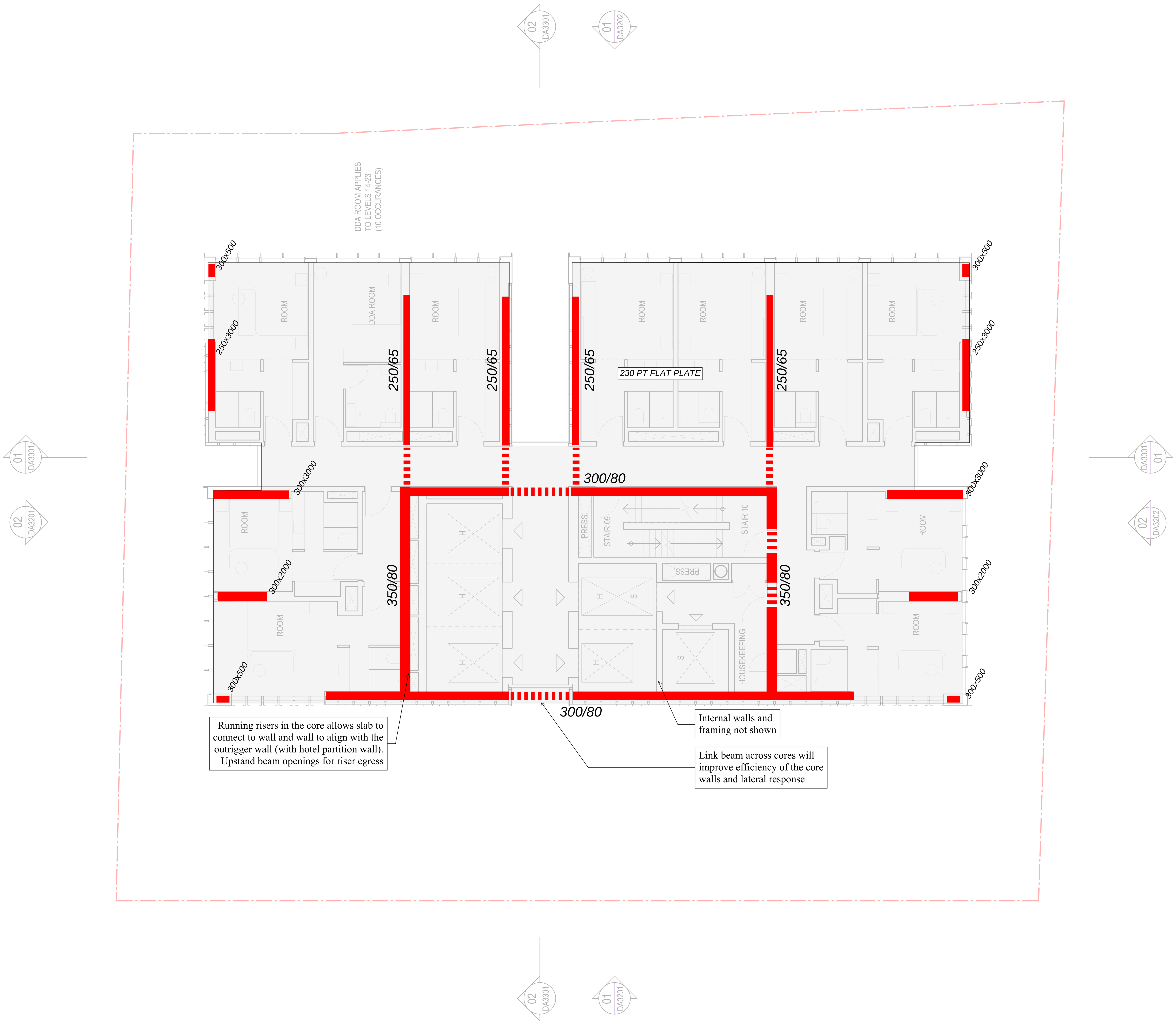
Project: 4-6 BLIGH STREET	Project No: 409096		
	Scale		
Sketch Title: LEVEL 15	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date: 07/12/2022		
Sketch Number: MMD-SK016	Status	Rev: B	



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

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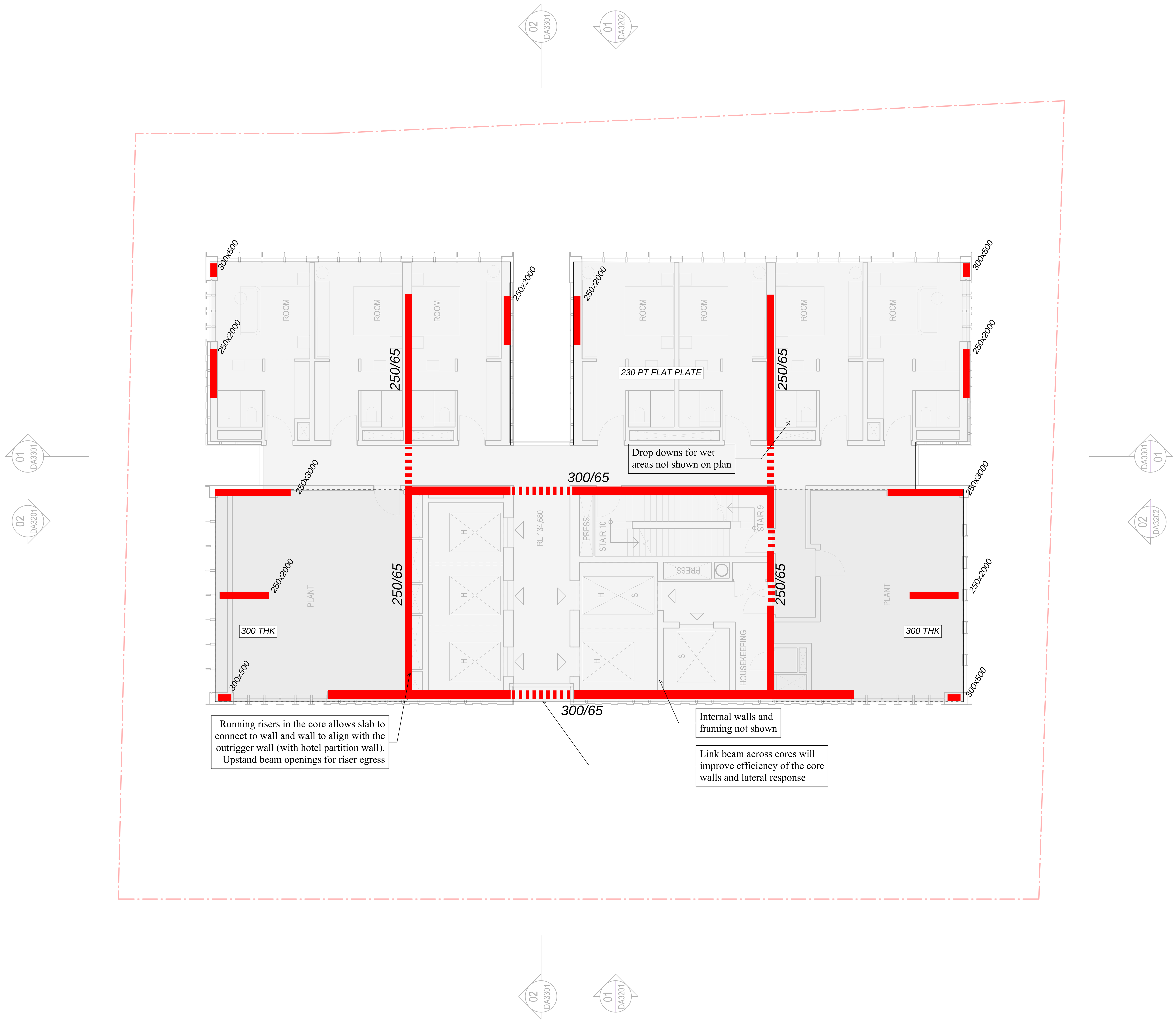
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 16-32	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK017	Status	Rev: B	

Sheet title: Floor Plan Level 16- - Rooms
Revision: A
Sheet number: DA2214
Status: FOR SSDA
Scale: 1 : 100
Issuer: WOODS BAGOT
Project number: 121736
Checked: TD
Approved: KD
Sheet size: A1
Project: 4-6 Bligh Street
Client: Holdmark NSW Pty Ltd

LEGEND
[H] Hotel Guests / Public Use
[S] Service Lift
[C] Commercial Lift



Floor Plan Level 33 - Plant/Rooms

DA2233

FOR SSDA

WOODS BAGOT

121736

1 : 100

4-6 Bligh Street

Holdmark NSW Pty Ltd

NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

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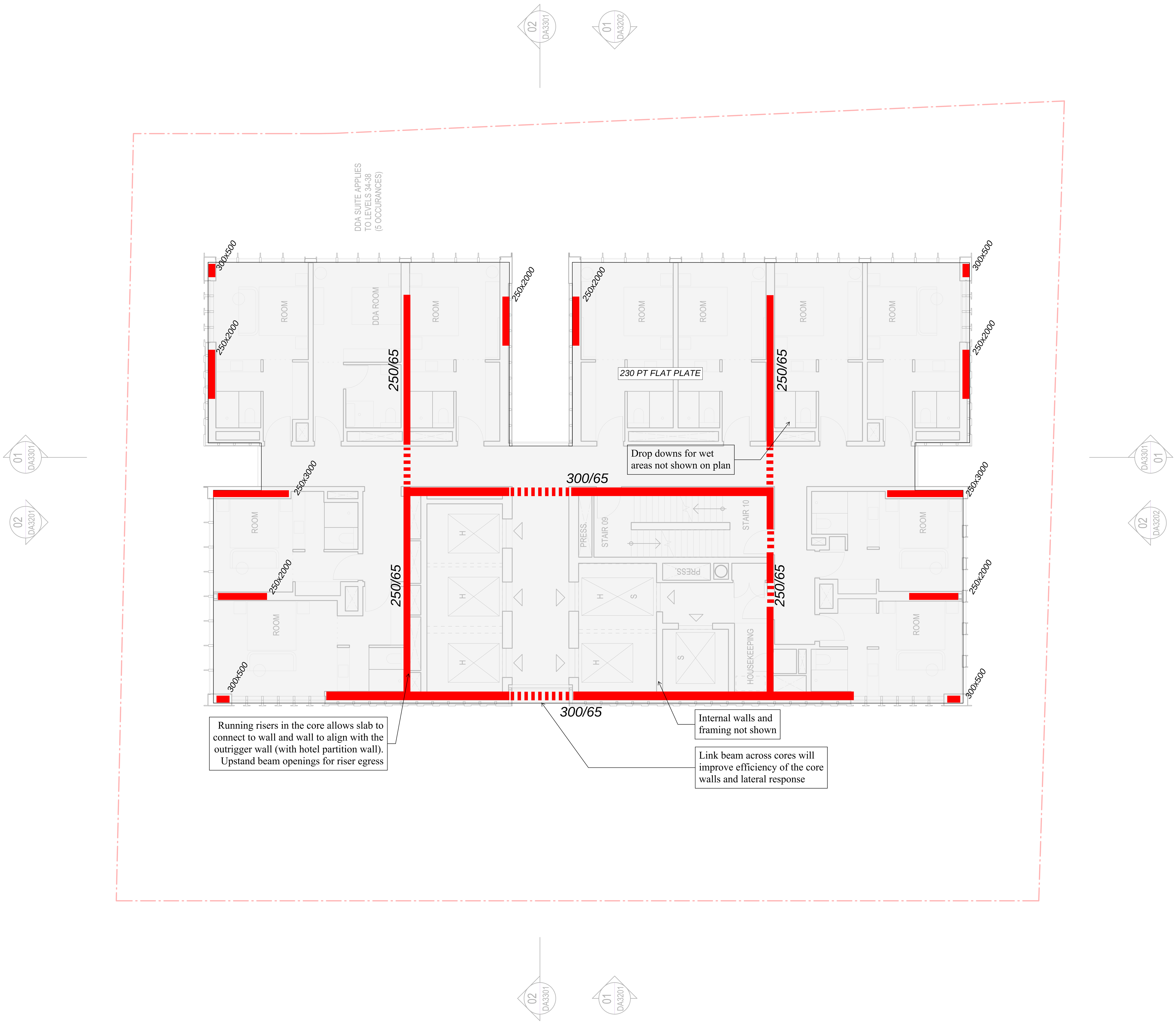
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL 33		Date	07/12/2022
Sketch Number MMD-SK018		Status	Rev B



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

9) CONTRACTOR/QS TO MAKE RELEVANT CONTINGENCY ALLOWANCES TO ACCOUNT FOR THE ABOVE AS WELL AS TO REFLECT THE STAGE OF THE STURCTURAL DESIGN (PRE-CONCEPT FINALISATION)

10) THESE DRAWINGS ARE NOT INTENDED TO PROVIDE A FINAL PROJECT BUDGET, BUT ARE INTENDED TO PROVIDE A GUIDE TO TRACK COST DIFFERENTIALS THROUGH THE DEVELOPMENT OF THE STRUCTURAL CONCEPT AND MAY BE USED FOR COMPARATIVE PURPOSES AGAINST PREVIOUS COST PLAN ITERATIONS AND STRUCTURAL CONCEPT SKETCHES

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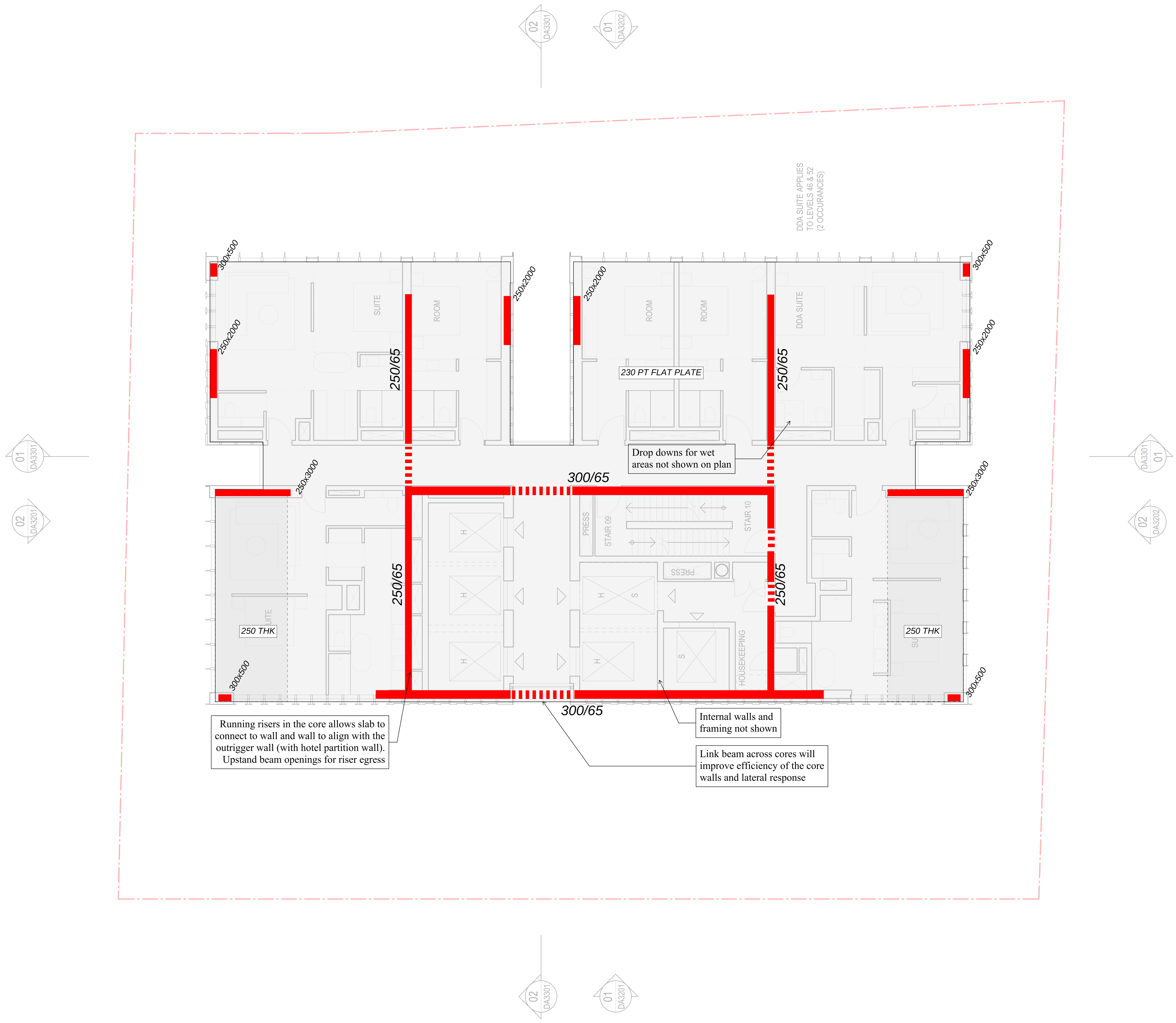
Project: 4-6 BLIGH STREET	Project No: 409096		
	Scale		
Sketch Title: LEVEL 34-35	Drawn: J.O.	Checked: J.O.	Approved: G.D.
	Date: 07/12/2022		
Sketch Number: MMD-SK019	Status	Rev: B	

Sheet title: Floor Plan Level 34-45 - Rooms
Revision: A
Sheet number: DA2234
Status: FOR SSDA
Scale: 1:100
Sheet size: A1
WOODS BAGOT
Project number: 121736
Approved: KD
Checked: TD
Project: 4-6 Bligh Street
Client: Holdmark NSW Pty Ltd

LEGEND
[H] Hotel Guests / Public Use
[S] Service Lift
[C] Commercial Lift



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

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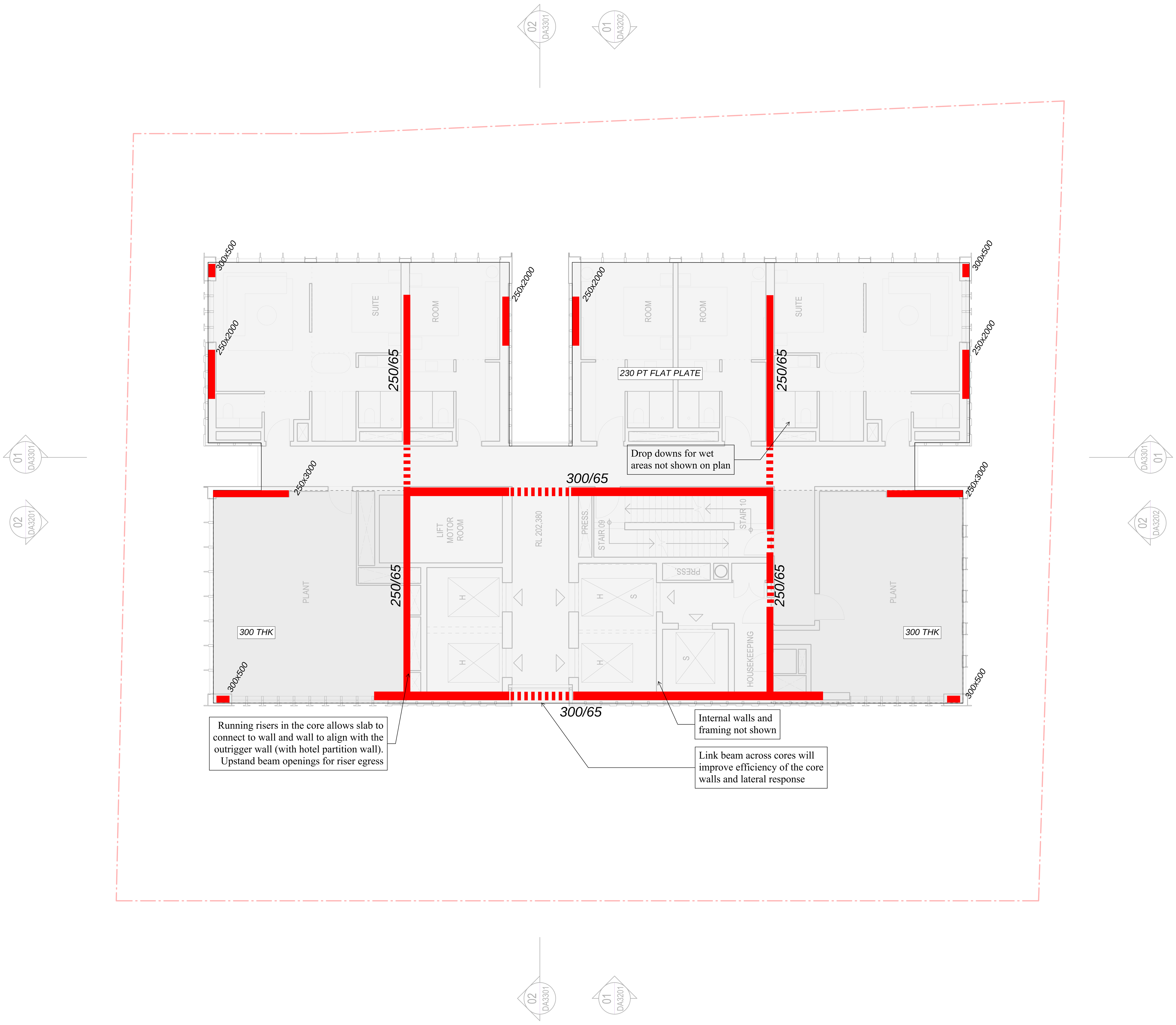
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title		Drawn J.O.	Checked J.O. / Approved G.D.
LEVEL 46-53		Date	07/12/2022
Sketch Number	MMD-SK020	Status	Rev B



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

9) CONTRACTOR/QS TO MAKE RELEVANT CONTINGENCY ALLOWANCES TO ACCOUNT FOR THE ABOVE AS WELL AS TO REFLECT THE STAGE OF THE STURCTURAL DESIGN (PRE-CONCEPT FINALISATION)

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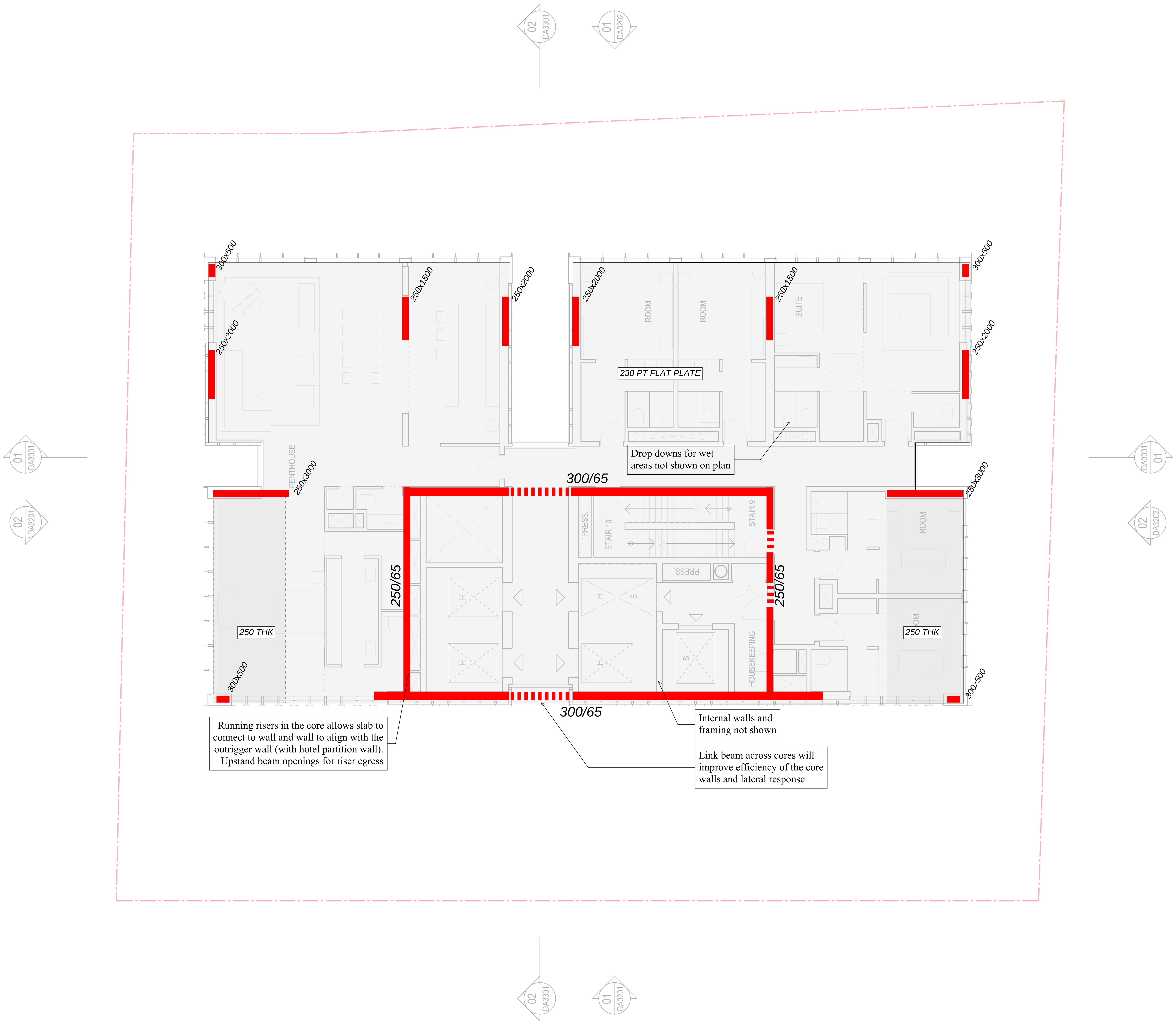
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title		Drawn J.O.	Checked J.O. / Approved G.D.
LEVEL 54		Date	07/12/2022
Sketch Number MMD-SK021		Status	Rev B



NOTES:

1) 230mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

9) CONTRACTOR/QS TO MAKE RELEVANT CONTINGENCY ALLOWANCES TO ACCOUNT FOR THE ABOVE AS WELL AS TO REFLECT THE STAGE OF THE STURCTURAL DESIGN (PRE-CONCEPT FINALISATION)

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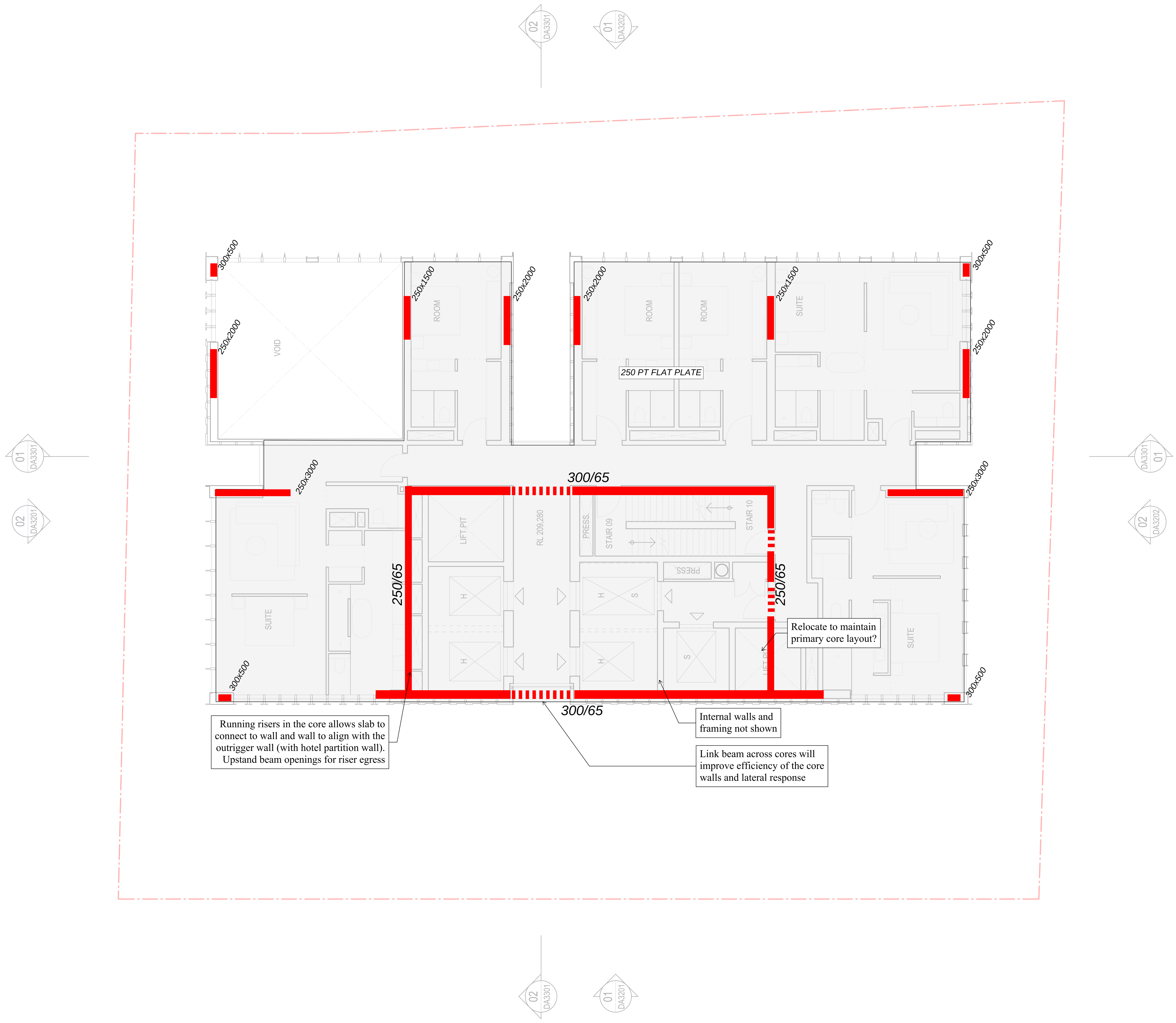
Project: 4-6 BLIGH STREET	Project No	409096	
	Scale		
Sketch Title: LEVEL 55	Drawn J.O.	Checked J.O.	Approved G.D.
	Date	07/12/2022	
Sketch Number: MMD-SK022	Status	Rev B	



NOTES:

1) 250mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

5) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND SERVICES DESIGN, THIS MAY INFLUENCE STRUCTURAL SIZING.

6) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO RECEIPT OF FINAL WIND TUNNEL TEST RESULTS

7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

8) ALL WALL AND COLUMN SIZES TBC FOLLOWING DETAILED CONSTRUCTION STAGED ANALYSIS AND DIFFERENTIAL AXIAL SHORTENING STUDY

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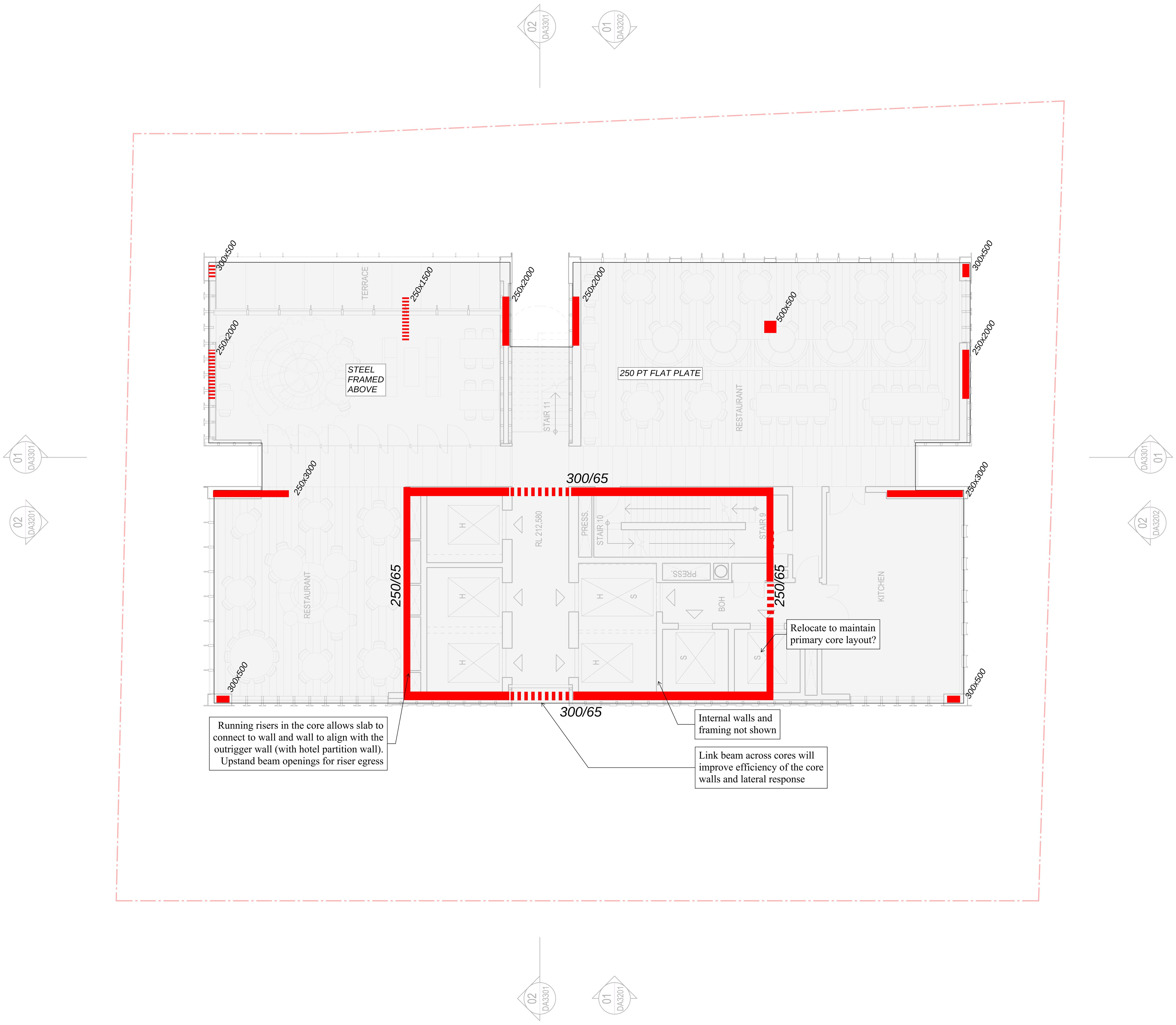
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL 56		Date	07/12/2022
Sketch Number		Status	Rev B
MMD-SK023			



Sheet title: Floor Plan Level 57 - Restaurant
Revision: A
Sheet number: DA2257
Status: FOR SSDA
Scale: 1 : 100
Sheet size: A1
WOODS BAGOT
Project number: 121736
Checked: TD
Approved: KD
Project: 4-6 Bligh Street
Client: Holdmark NSW Pty Ltd

LEGEND
[H] Hotel Guests / Public Use
[S] Service Lift
[C] Commercial Lift

NOTES:

1) 250mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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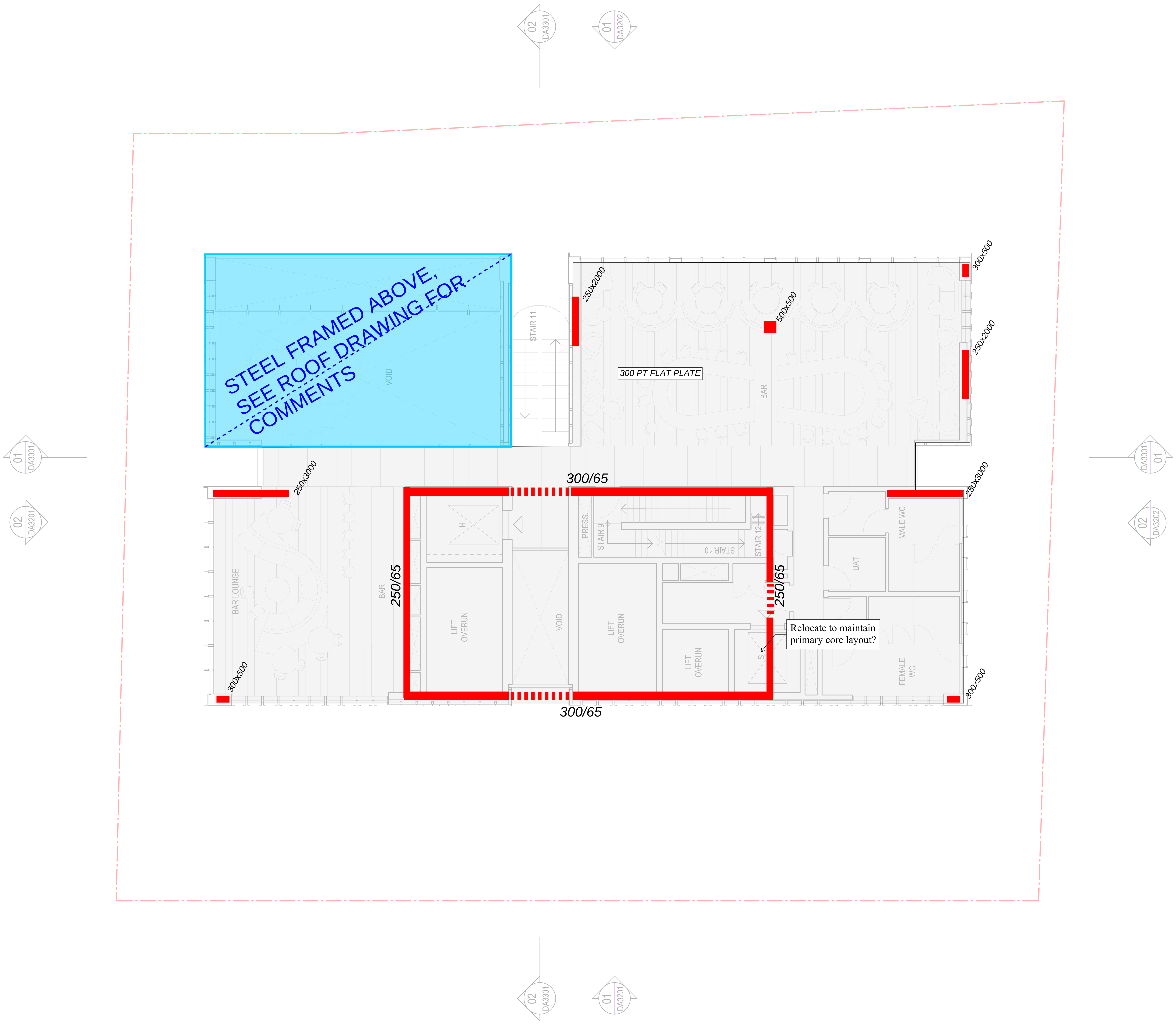
Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL 57		Date	07/12/2022
Sketch Number MMD-SK024		Status	Rev B



NOTES:

1) 300mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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7) FINAL STABILITY ELEMENT SIZING (CORE AND SHEAR WALLS) SUBJECT TO COMPLETION OF DETAILED SOIL/STRUCTURE INTERACTION STUDY

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Sheet title: Floor Plan Level 58 - Bar
Revision: A
Sheet number: DA2258
Status: FOR SSDA
Scale: 1:100
Sheet size: A1
WOODS BAGOT
Project number: 121736
Checked: TD
Approved: KD
Project: 4-6 Bligh Street
Client: Holdmark NSW Pty Ltd

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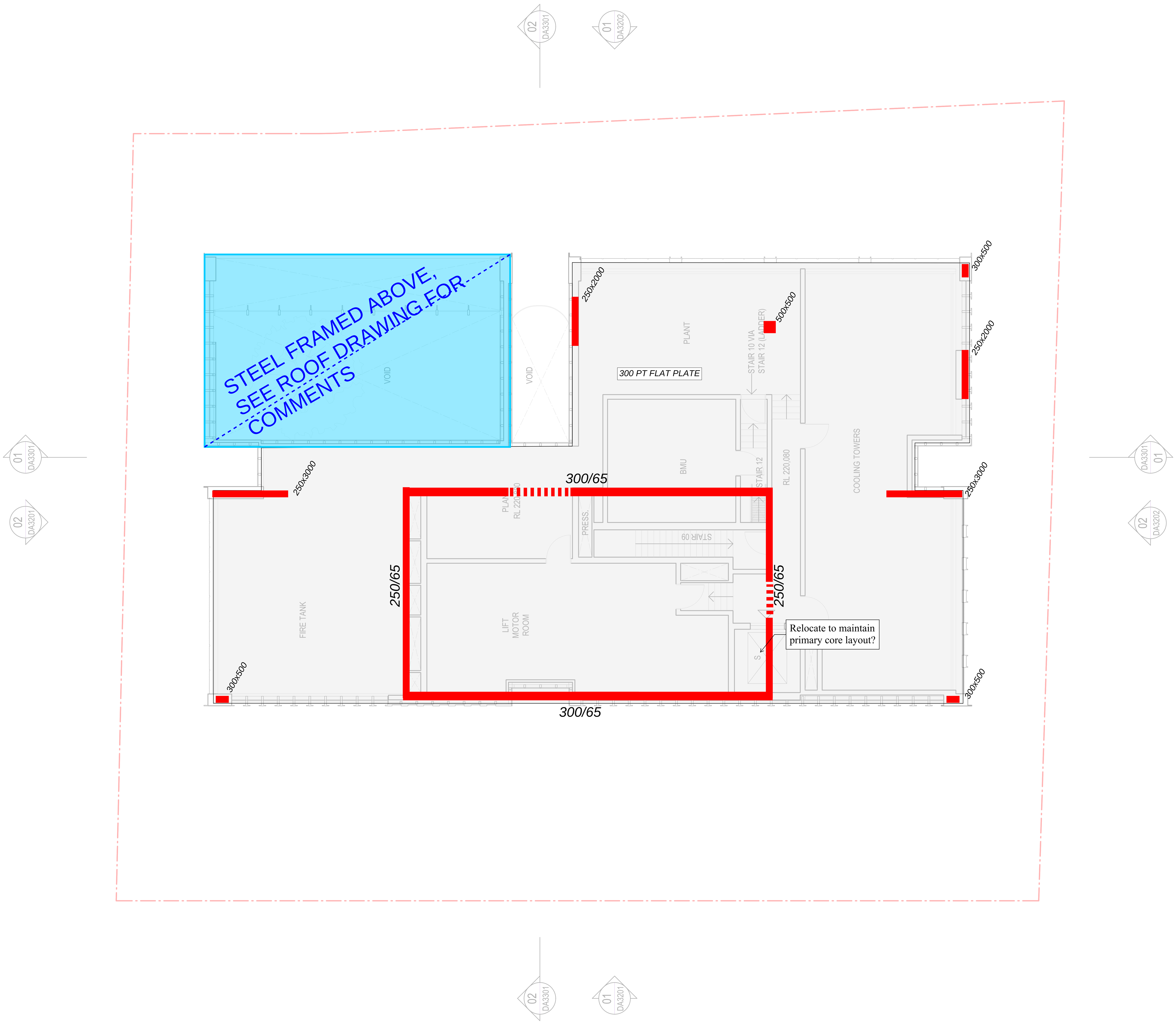
Project		Project No	409096	
4-6 BLIGH STREET		Scale		
Sketch Title		Drawn	Checked	Approved
LEVEL 58		J.O.	J.O.	G.D.
		Date	07/12/2022	
Sketch Number		Status	Rev	
MMD-SK025			B	



Floor Plan Level 59 - Plant
Revision A
Sheet number DA2259
Status FOR SSDA
Scale 1:100
Sheet size A1
W–B WOODS BAGOT
Project number 121736
Checked TD
Approved KD
Project 4-6 Bligh Street
Client Holdmark NSW Pty Ltd

NOTES:

1) 300mm THK PT SLAB WITH 30mm SET DOWNS IN WET AREAS

2) ALLOW STUD RAILS TO ONE THIRD OF COLUMNS TYPICALLY

3) ALL INTERNAL CORE WALLS 250mm

4) ONGOING COORDINATION REQUIRED BETWEEN STRUCTURE AND ARCHITECTURE, THIS MAY INFLUENCE STRUCTURAL SIZING

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Project		Project No	409096
4-6 BLIGH STREET		Scale	
Sketch Title	Drawn J.O.	Checked J.O.	Approved G.D.
LEVEL 59		Date	07/12/2022
Sketch Number MMD-SK026		Status	Rev B

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