CONSULTANTS

Unit 10, Level 1
1 Maitland Place
NORWEST NSW 2153

BAULKHAM HILLS NSW 1755

T 02 9634 6311
F 02 9438 5398

ENGINEERS

MANAGERS

INFRASTRUCTURE
PLANNERS

DEVELOPMENT
CONSULTANTS

22 Melwood Ave, Forestville

Structural Design Report

Prepared for: Forestville RSL

Document no: NA241102

Issue no: Rev B

Disclaimer

This Report has been prepared in accordance with the scope of services described in the agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements, and results based on instructions from, and in consultation with, the Client. Except as otherwise stated, ACOR Consultants Pty Ltd has not attempted to verify the accuracy or completeness of any information provided by the Client. If the information is subsequently determined to be false, inaccurate, or incomplete then it is possible that changes may be required to the Report. Changes in circumstances or facts, the passage of time, manifestation of latent conditions or impacts of future events may also impact on the accuracy, completeness or currency of the information or material set out in this Report. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd accepts no responsibility for its use by any third parties without the specific authorisation of ACOR Consultants Pty Ltd. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this Report, to the extent permitted by law.

REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
A	05/09/24	Issue For Information	OB	AW
B	18/09/24	Final Issue	OB	AW

Review Panel	
Division/Office	**Name**

Table of Contents

1 Introduction

ACOR Consultants has been engaged by Forestville RSL to conduct a structural preliminary study for the proposed new development at 22 Melwood Ave, Forestville. This report presents the scope and findings of our preliminary analysis.

The proposed development includes the development comprising of

Stage 1: Construction of a new RSL club and seniors living apartments at the southern end of the site where the existing Bowling Greens are located. Its include three levels above ground with the RSL club at ground floor and the seniors living apartment occupying the upper two levels. There will also be as basement for parking and general storage that comprises three split levels.

Stage 2: The demolition of the existing Club and associated carparking area in the northern part of the site, followed by the construction of 3 x 3 level seniors living apartment buildings over single level basement.

2 Scope

The intention of this report is to provide an overview of the loadings and load paths for the buildings and provide a preliminary analysis and sizing of the structural elements such as the reinforced concrete columns and post-tensioned concrete floor structures.

3 Proposed Development

Refer to architectural plans of the proposed works, prepared by Quattro Architecture.

The proposed construction works include the following scope of works:

- Shoring walls to accommodate basement excavations as required.
- Post-tensioned slab/band system to be adopted for the floor structure.
- Concrete columns and walls support the suspended slab.

4 Structural Analysis Methodology

A preliminary structural assessment of the buildings has been carried out to determine the size of the structural elements. The assessment is based on the architectural drawings, as well as the relevant Australian Standards.

The loads for the structure have been adopted in accordance with AS1170 and are as follows:

Superimposed Dead Load (SDL)

General	Car parking
1.5 kPa	1 kPa

Live Load (LL)

Senior Living Units	Car parking	Club areas
2 kPa 2 kPa (Balconies)	2.5 kPa	5 kPa

We have carried out our assessment and review of the existing building in accordance with generally accepted engineering practise and principles, as well as the following Australian Standards:

- AS1170.0- Structural Design Actions: General Principals
- AS1170.1- Structural Design Actions: Imposed Loadings
- AS1170.2- Structural Design Actions: Wind Actions
- AS1170.4- Structural Design Actions: Earthquake
- AS3600- Concrete Structures
- AS3700- Masonry Structures
- AS4100- Steel Structures

4.1 Prelminary Assessment of structural elements

4.1.1 Reinforced Concrete Columns

Load takedowns for the structure were completed and used to determine preliminary sizes for the reinforced concrete columns in accordance with AS3600-2018.

4.1.2 Slabs

Analysis of the post-tensioned concrete slabs was carried out using the commercial concrete design software package RAPT, for the purposes of preliminary sizing.

4.1.3 Transfer Floor

Analysis of the post-tensioned transfer concrete floor was carried out using the commercial concrete design software package RAPT, for the purposes of preliminary sizing.

4.1.4 Walls

Load takedowns of the structure were completed and used to determine preliminary sizes for the reinforced concrete walls in accordance with AS3600-2018.

4.1.5 Foundations

Foundation design is to be completed at the detailed design stage. In our opinion and experience with similar structures in the local area, there are no unusual design considerations that need to be taken into account with respect to the foundations, that would not be present with similar structures.

4.1.6 Shoring

Prelminary shoring design was carried out based on geotechinical report, and our experience on similar projects.

4.1.7 Lateral Load Analysis

An analysis of the lateral loads, including earthquake and wind, is to be completed at the detailed design stage. In our opinion and experience with similar structures in the local area, there are no unusual design considerations that need to be taken into account with respect to the lateral loading, that would not be present with similar structures.

5 Results

5.1 Member sizing

All member sizes have been summarised and coordinated with the architecture. Floor to floor height have been reviewed to ensure there is sufficient space to allow transfer slab.

5.1.1 Shoring

Based on the geotechnical report, the excavation will be mostly through fill and extremely low strength sandstone bedrock which will vary in strength. Such material will be readily excavated but will require shoring to be installed as noted in the geotechnical report. Refer to geotechnical report for further details of levels and depths of fill and rock.

The shoring consists of 600mm diameter soldier piles at regular spacings, to be determined in the detailed design to resist the lateral pressures of the soil and effectively restrain it. Temporary ground anchors or internal compression struts will be required to facilitate the excavation of the basement and should be maintained until the later loads can be transferred into the structural floor systems. Deflection of the shoring system should be taken into account in the detailed design stage, to ensure that ground movement will not adversely impact any nearby assets.

5.2 Fire Resistance Periods (FRP)

5.2.1 Insulation Period

Fire resistance insulating periods for walls and slabs shall be in accordance with the requirements of tables 5.5.1 and 5.7.1 of AS3600-2018, which has been summarised below:

Table 1 - Insulation periods for walls and slabs

FRP for insulation min	Effective thickness of slab or wall mm
30	60
60	80
90	100
120	120
180	150
240	175

Hence, a minimum slab and wall thickness of 120mm and 150mm is required to meet the 120 and 180 minute FRP insulation requirements respectively.

In accordance with Clause 5.3.1 of AS3600-2018, the satisfaction of fire resistance period for integrity is implied, if the FRP for insulation and structural adequacy are met.

5.2.2 Reinforced Concrete Columns

The structural adequacy periods for the reinforced concrete columns shall be assessed at the detailed design stage in accordance with Clause 5.6 of AS3600-2018, given the dependence on load actions and column fixities. Where required, structural adequacy periods for columns can be increased with the addition of insulating materials in accordance with Clause 5.8 of AS3600-2018.

5.2.3 Slabs

The preliminary sizing of the post-tensioned concrete slabs was carried out with consideration to the axis distance requirements listed Section 5.5 of AS3600-2018. Specifically, an axis distance of 40mm/55mm for simply supported slabs and 20mm/30mm for continuous slabs has been adopted for reinforcement, to achieve a 120 minute/180 minute FRP for structural adequacy. Where required, insulating materials in accordance with Clause 5.8 of AS3600-2018 can be adopted to reduce the axis distance requirements.

TABLE 5.5.2(A)

**FIRE RESISTANCE PERIODS (FRPs)
FOR STRUCTURAL ADEQUACY
FOR FLAT SLABS INCLUDING FLAT PLATES**

FRP for structural adequacy (min)	Minimum dimensions (mm)	
	Slab thickness	Axis distance (a_s)
30	150	10
60	180	15
90	200	25
120	200	35
180	200	45
240	200	50

Figure 1 - FRP Minimum Slab Thickness

In accordance with Clause 5.5.2 of AS3600-2018, the minimum slab of 200 mm is required to meet the 120 and 180 minute RFP structural adequacy requirement.

Refer to Section 5.2.6 for additional notes for prestressing tendons.

5.2.4 Transfer Floor

The preliminary sizing of the post-tensioned concrete transfer floor slab was carried out with consideration to the axis distance requirements listed Section 5.4 of AS3600-2018. Specifically, an axis distance of 50mm/60mm for simply supported beams and 30mm/40mm for continuous beams (all beam widths greater than 600mm) has been adopted for reinforcement, to achieve a 120 minute/180 minute FRP for structural adequacy. Where required, insulating materials in accordance with Clause 5.8 of AS3600-2018 can be adopted to reduce the axis distance requirements.

Refer to Section 5.2.6 for additional notes for prestressing tendons.

5.2.5 Walls

The structural adequacy periods for the reinforced concrete walls shall be assessed at the detailed design stage in accordance with Clause 5.6 of AS3600-2018, given the dependence on load actions. Where required, structural adequacy periods for walls can be increased with the addition of insulating materials in accordance with Clause 5.8 of AS3600-2018.

5.2.6 Prestressing Tendons

Consideration was given to Clause 5.3.3 of AS3600-2018 when designing post-tensioned members. Specifically, the axis distances noted for reinforcement above, were increased by 15mm when considering the post-tension strands.

6 Conclusion

An initial structural analysis has been carried out to determine the preliminary structural member sizing, providing confidence in the architectural layout and confirming constructability from a structural perspective. The member sizing has been coordinated with the architect. All member sizing and details is subject to detailed design.

In carrying out the preliminary assessment and preparing this report, we have exercised the same degree of skill, care and diligence normally exercised by consulting engineers in similar circumstances.

We trust that the structural adequacy assessment report is satisfactory, however if you have any questions or require additional advice, please do not hesitate to contact the undersigned.

Yours faithfully

ACOR Consultants Pty Ltd

Dr Andy Wang
Structural Team Leader | Principal Engineer