Robert Bird Group

Adaptive Re-Use

45-53 Macleay St, Potts Point

Issue: A

29 September 2021

Prepared For: Time and Place Pty Ltd

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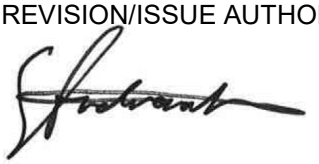

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Date: 29 September 2021

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1 Introduction

Robert Bird Group (RBG) have been appointed by Time and Place (Client) to prepare a report which summarises the potential adaptive re-use of the building at 45-53 Macleay St, Potts Point. This report has been prepared as part of, and to inform, the proposed development at the site.

The intent of this engagement is to summarise the suitability of the existing structures ability to be retained for the proposed future development.

2 Terms of Reference

RBG have been asked to review and comment on the building's suitability with reference to the following.

- Re-development of the building for future sale to new apartment owners.
- Current building condition
- Provide a future design of 50 years
- Current design standards and building practise
- Meet architectural requirements, to meet current codes and regulations

Existing structural drawings have not been provided to RBG, as well as not being available when searching on the City of Sydney Online archive.

RBG have been provided with the architectural adaptive re-use requirements which have been outlined by SJB architects (Document: Appendix A)

3 Existing Building

3.1 Site Location

The proposed development site includes the building which is currently occupied by an apartment building: 45-53 Macleay St, Potts point. The site is bounded by Macleay St, McDonald St, and Mc Donald lane. To the south of the site, it is bounded by 55 Macleay St.

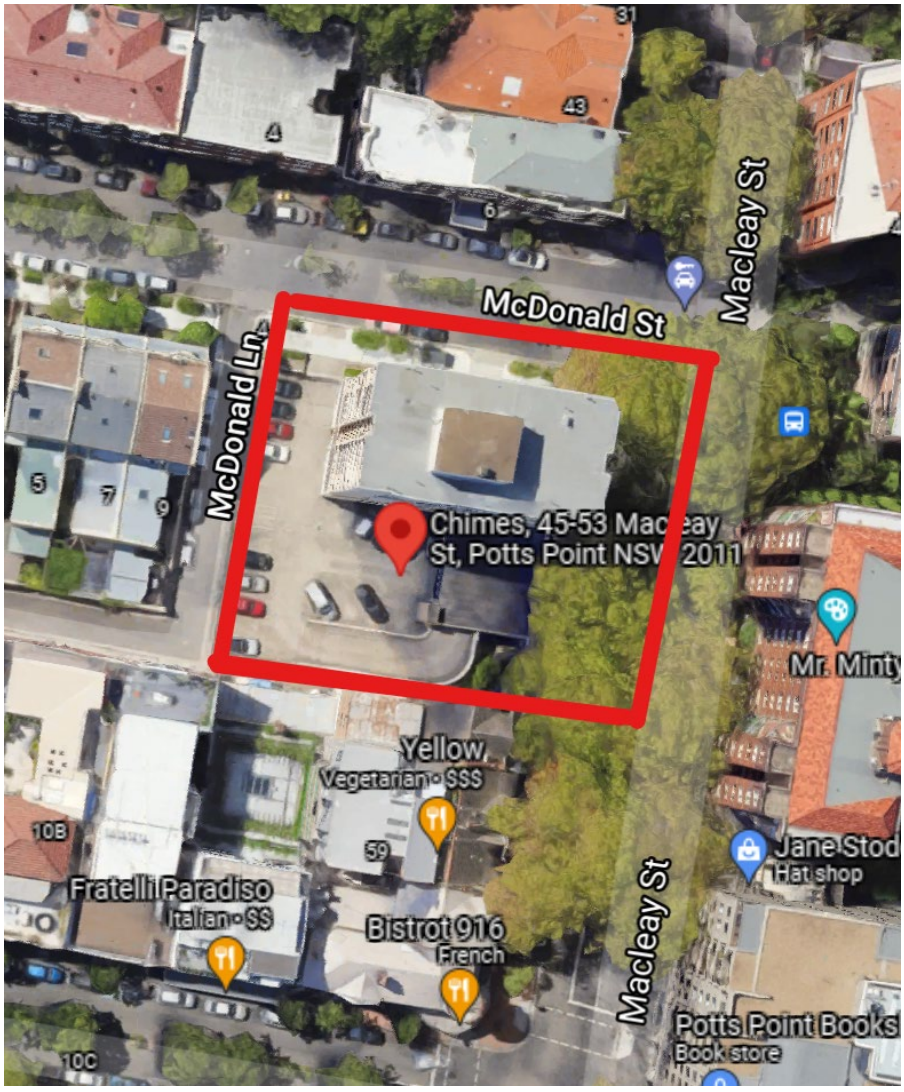


Figure 1 - Location Plan

3.2 Existing Building

The existing building consists of Ground to Level 11, plus a flat roof level. Records show that the building was constructed in 1964. RBG was not able to enter the premises due to the current COVID-19 situation, but it appears to be a building consistent with apartment buildings of this age built in the locality.

We understand the building to be a reinforced concrete framed building, with what appears to be a non-load bearing façade in most locations. Most of the building appears to be supported by concrete columns, with some isolated reinforced concrete walls.

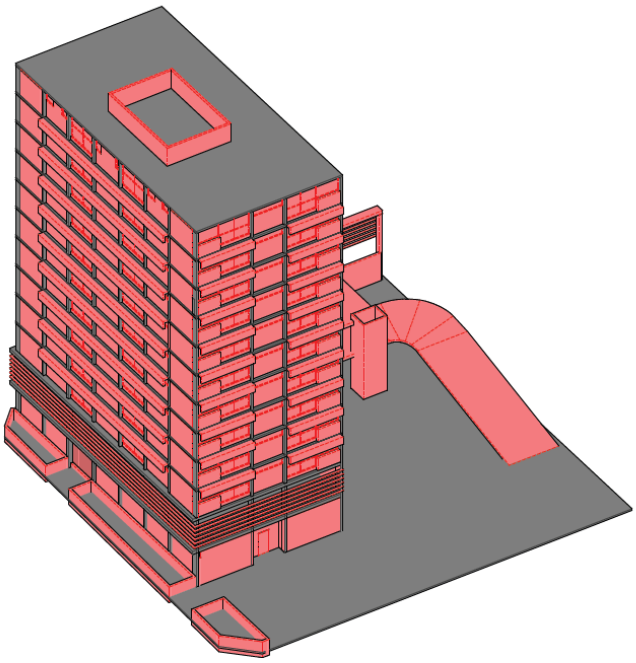
4 Adaptive Re-use Considerations

RBG have considered adaptive re-use of the building regarding the structural suitability and additional requirement which may need to be carried out. In the section, the following has been considered as part of this analysis explicitly in relation to structural engineering works.

4.1 Architectural Requirements

4.1.1 Façade Removal

RBG understand that an estimated 65% of the façade would be required to be removed.



Extensive demolition required

Existing facade to be removed to accommodate new openings and bring external skin up to code meeting current regulations including waterproofing, thermal & ESD requirements (BASIX) as well as cladding standards.

Figure 2

A significant amount of the façade volume is non-load bearing precast, namely the brick elements. This removal is relatively straight forward. However, it is the removal of the wall elements which appear to be load bearing, as well as the integral façade feature, which will likely result in removal of primary structural which will not be able to be accommodated without significant additional structure being added. Furthermore, this isolated demolition risks local damage to the primary which will be required for structural integrity of the building.

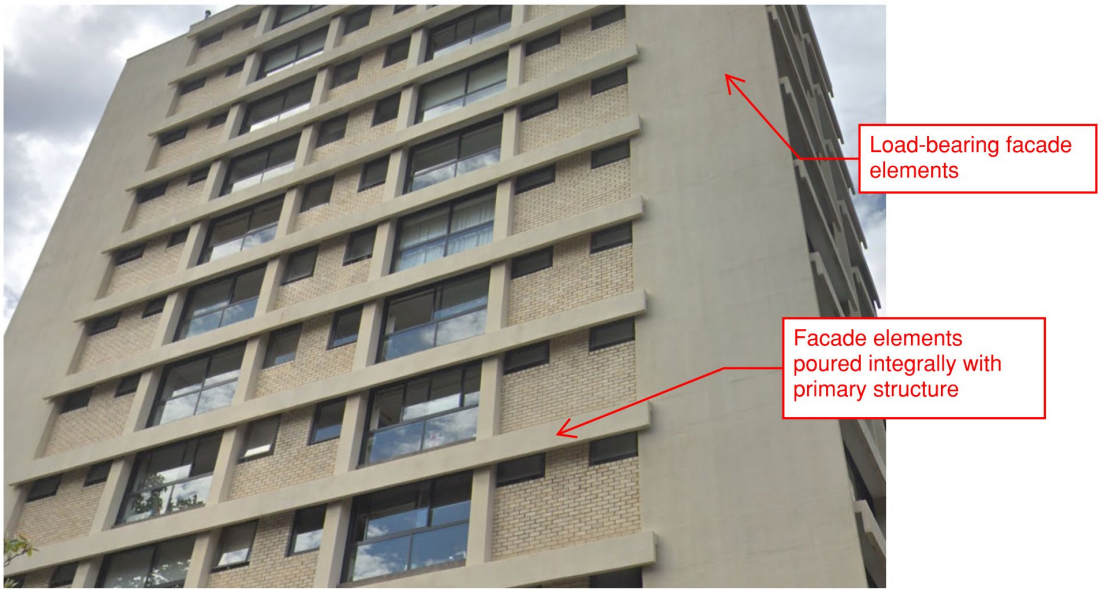
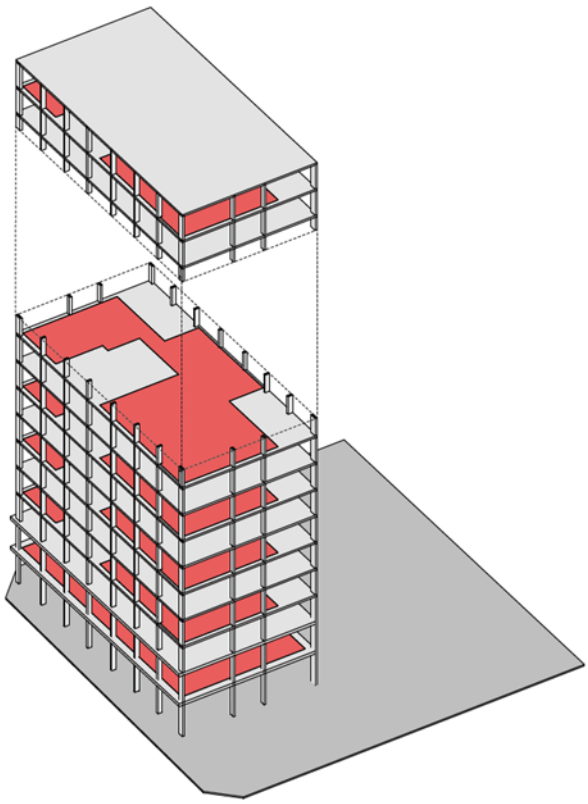


Figure 3

4.1.2 Slab Removal to provide ADG requirements

To meet ADG compliance in the living areas of the apartments, the below slab removal would need to occur at every second level. This is shown in Figure 4 below.



Slab removal to provide ADG compliance in living areas

Figure 4

Review of these requirements results in extensive floor slab removal whereby triggers the following affects to the existing structure;

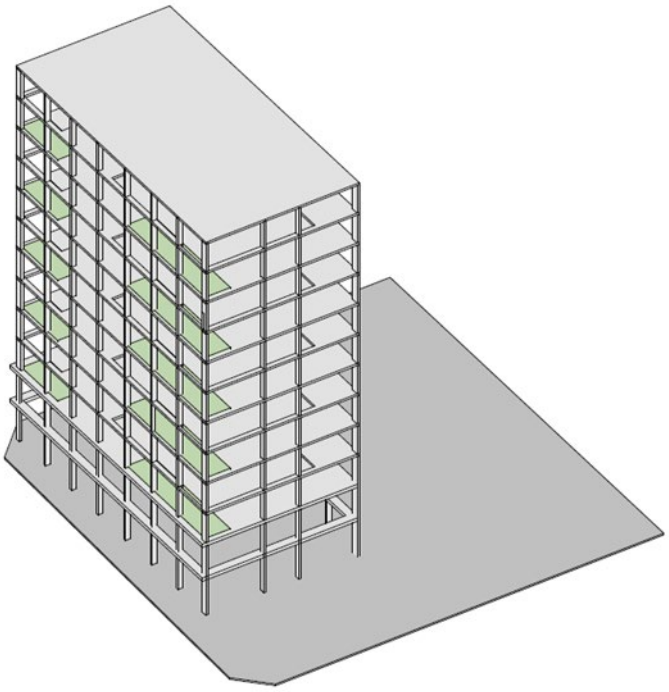
- **Double Height Vertical Elements –** Slab removal in these zones results in the attached vertical elements now being 'double height'. This is a condition which the existing structure is not designed or detailed. Most of these elements (likely all) will not have the structural capacity to accommodate this condition.

  This is especially critical for the walls, which are assumed to be providing the lateral resisting elements for this building. New walls would need to be constructed throughout the full building height, and this is likely to result in more demolition and removal of floor slabs. This condition would result in nearly all of slab on every second level to be removed.

- **Removal of Floor diaphragm –** The floor diaphragm is what is used to transfer the lateral loads from the relevant level into the lateral resisting frame of the building. Significant removal of this diaphragm on every second levels means that the lateral load will be induced into elements at higher loads which was not considered by the original design.

  Very significant local strengthening works would be required to accommodate this upgrade to structure. However, it is likely that additional lateral resisting elements would be required to be introduced throughout the building footprint.

- **Balcony requirements -** to accommodate balconies into the apartments layouts there is two potential options.



Balconies

Figure 5

Removal of the existing structure in those locations can occur, but this would require local demolition and extensive temporary works. When considering the extent of demolition that would be required by the other ADG requirements, much of the floor plate disappears and the issues of double height elements is further compounded.

To achieve a set down in the balconies, a topping slab of 50mm could be applied across the entire remaining floor plates i.e. non-set down locations. This would result in additional loading to the structure of approximately 1.25kPa. Typically, apartments are designed for a total finishes allowance of 1.0 – 1.5kpa, thus including the topping would exceed the expected design allowance for this building. Additionally, this would increase the seismic mass of the building at the floor locations, which the existing structure is not designed for.

4.2 Design Life of Building

The project brief (as per typical requirements) requires a 50-year design life to be met by the proposed development. The re-use of the existing structure would need to meet these criteria. Given that the current building was constructed in 1964 (57 years ago), the current building has exceeded original design life requirement.

Buildings of this age are showing similar signs in terms of structural adequacy and it is evident they are beyond their intended design life. This is further compounded by the following characteristics of this building and location.

- Quality of construction materials, namely concrete placement and material is much poorer when compared to today's standards as required to meet 50-year design life.

- Reduced concrete cover which is the largest factor in reviewing a buildings ability to meet its durability requirement. The concrete cover in this building is highly likely to be insufficient to meet 50 year design life in this location (proximately to the coast), let alone exceed it by another 50 + years. This is further explained in section 4.3 of this report.

- Construction detailing – many of the details evident on the façade of this building are typical of similar age buildings in Sydney. The detailing of the façade / primary structure interface means that some locations trap water and thus increase the rate of corrosion.

The above points are supported by evidence of the condition of the structure from outside the building. Some examples are shown below.

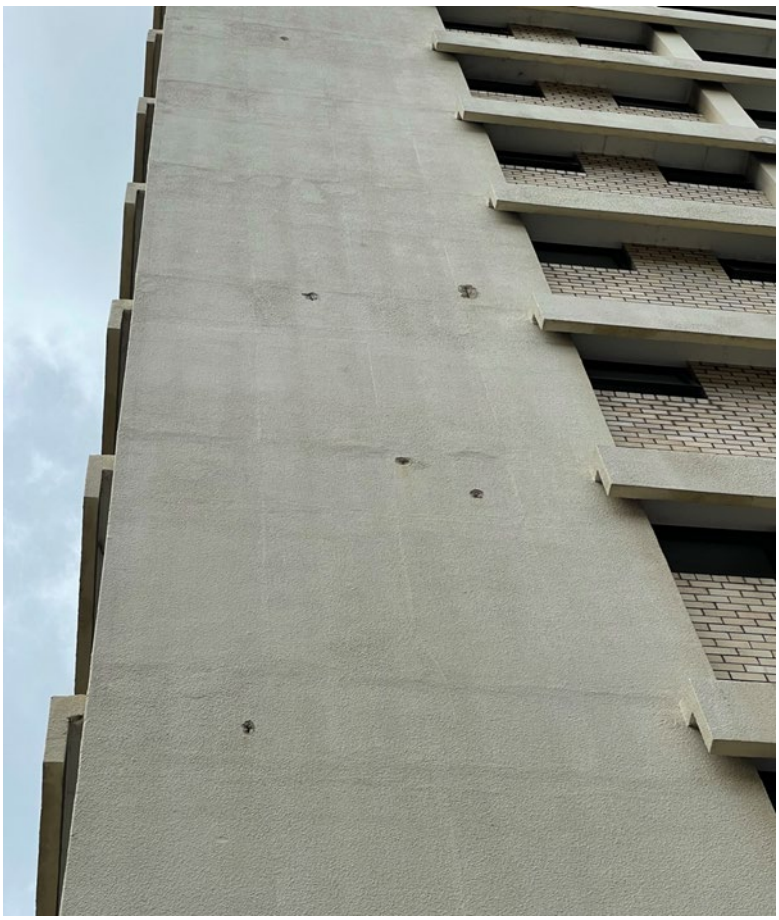


Figure 6 - Spalling of concrete on wall elevation due to corrosion and ‘concrete cancer’. Likely to be caused by reinforcement with insufficient cover and building exceeding its design life. Poses a very significant safety risk due to concrete pieces falling without notice to ground.

Figure 7 - Spalling concrete at façade / primary structure interface. Primary structure is supporting brick façade. Poses a very significant safety risk due to concrete pieces falling without notice to ground.

Figure 8 - Elevation shot showing extent of building damage. In this location all but one floor has been affected by concrete cancer (or evidence of it).

Figure 9 - Additional locations of spalling of external concrete façade elements. Poses a very significant safety risk due to concrete pieces falling without notice to ground

Figure 10 - Elevation of façade showing previous repair of concrete elements. If this building was to remain, it would require constant repair and maintenance of the external building fabric. This maintenance would not stop safety concern, but rather be required for the building to remain serviceable. This repair would require concrete and steel removal and reinstatement. These works would likely require scaffolding to be erected around the perimeter for long periods and cause significant disruption to the residents and public.

It must be noted that these repairs may assist to ensure the building is serviceable, but it is likely that this could be carried out for 15-20 years (as an expected maximum), before the building would not be able to remain.

In summary, the design life requirements of the development would not be able to be met if the adaptive re-use of the structure is considered. The existing building has exceeded its current design life, and this may be able to be extended to remain serviceable – but this is limited. Furthermore, extending the building service life would need to be considered with respect to the suitability of such works to be carried out constantly on a habitable building as well as the risk to public safety.

4.3 Current Australian Standard Requirements

For certification of the building to be met in a proposed adaptive re-use, the building must be deemed to comply with the current Australian Standards. This is required due to the re-use requiring significant modification to its existing structure. Such compliance is required by building certifiers in NSW.

RBG have carried out an assessment of existing standard in relation to the current building and highlighted some initial issues with respect to building compliance to current Australian standards. This list is not exhaustive, but rather intended to highlight some initial non-compliance items.

- Earthquake Loadings (AS1170) – Due to this building being constructed in 1964, it did not need to meet any Earthquake load requirements which were introduced in the 1990's. This building will not be able to withstand current earthquake loads.

- Durability Requirements (AS3600) – the current building will not meet the durability requirement as per AS3600. For this location a building required the following;

Due to the site being approximately 200m from the coastline and saltwater, its exposure classification in the Australian Standard is: B2 (refer excerpts from AS3600 below).

TABLE 4.3
EXPOSURE CLASSIFICATIONS

	Surface and exposure environment	Exposure classification reinforced or prestressed concrete members (see Note 1)
1	Surface of members in contact with the ground:	
	(a) Members protected by a damp-proof membrane.	A1
	(b) Residential footings in non-aggressive soils.	A1
	(c) Other members in non-aggressive soils.	A2
	(d) Members in aggressive soils:	
	(i) Sulfate bearing (magnesium content <1g/L).	See Table 4.8.1
	(ii) Sulfate bearing (magnesium content ≥1g/L) (see Note 2).	U
	(iii) Other.	U
	(e) Salt rich soils and soils in areas affected by salinity.	See Table 4.8.2
2	Surfaces of members in interior environments:	
	(a) Fully enclosed within a building except for a brief period of weather exposure during construction:	
	(i) Residential.	A1
	(ii) Non-residential.	A2
	(b) In industrial buildings, the member being subject to repeated wetting and drying.	B1
3	Surfaces of members in above-ground exterior environments in areas that are:	
	(a) Inland (>50 km from coastline) environment being:	
	(i) Non-industrial and arid climatic zone (see Note 3).	A1
	(ii) Non-industrial and temperate climatic zone.	A2
	(iii) Non-industrial and tropical climatic zone.	B1
	(iv) Industrial (see Note 4) and any climatic zone.	B1
	(b) Near-coastal (1 km to 50 km from coastline), any climatic zone.	B1
	(c) Coastal (see Note 5) and any climatic zone.	B2

NOTES:

1 In this context, reinforced concrete includes any concrete containing metals that rely on the concrete for protection against environmental degradation. Plain concrete members containing metallic embedments should be treated as reinforced members when considering durability.

2 Severity of sulfate attack depends on the type of sulfate. For example, magnesium sulfate is more aggressive than sodium sulfate. The use of sulfate-resisting cement and concrete would be adequate for sodium sulfate conditions. For the magnesium sulfate conditions, specific consideration should be given to the cement and concrete that are likely to resist this type of sulfate. For magnesium sulfate soil conditions in which the concentration of magnesium is more than 1000 ppm, special consideration shall be given to the cement and concrete and other protective measures that will be required to resist this type of sulfate attack.

3 The climatic zones referred to are those given in Figure 4.3, which is based on the Bureau of Meteorology map, *Major seasonal rainfall zones of Australia*, Commonwealth of Australia, 2005.

4 Industrial refers to areas that are within 3 km of industries that discharge atmospheric pollutants.

5 For the purpose of this table, the coastal zone includes locations within 1 km of the shoreline of large expanses of saltwater. Where there are strong prevailing winds or vigorous surf, the distance should be increased beyond 1 km and higher levels of protection should be considered.

This exposure classification means that significant cover and minimum concrete strength is required to meet the durability requirements for 50-year design life. RBG have not carried out destructive testing on this building, but in our extensive experience no building of this age meets this requirement. Thus, compliance to the current Australian standard is not able to be achieved. Nor is there opportunity to ensure compliance can be achieved for an additional 50-year design life. Evidence of this is apparent when reviewing the building condition currently.

- Detailing Requirements for Earthquake (AS3600) – the current Australian Standard has very prescriptive requirements for the detailing of reinforcing. The reinforcing in this building does not meet these requirements and thus will not meet the current code. An entire new lateral resisting element system would need to be installed into the building.

- Fire Design (AS3600) – This building will not meet the fire design requirements of the current standards.

4.4 Design and Building Practitioners Act

On 1st July 2021, the new Design Building and Practitioners Act was introduced in NSW. This act was introduced to protect owners of Class 2 buildings, which this proposed development is considered. The changes were introduced by the NSW government to:

> "*to restore consumer confidence and make sure that apartments being built are trustworthy. We're making these changes to ensure that buildings are safe and secure, that the industry is more customer-focused, and that better data is captured throughout the building lifecycle" (Fair Trading Website)*

Due to this act, all design and certifiers are required to illustrate suitable training and experience to sign off on Class 2 residential buildings.

The act is relevant to this development as it is proposed that new owners will purchase these properties and to ensure that a suitable standard of design and construction is adopted. This includes, but not limited to structural works, which is relevant to this report and RBG's engagement.

RBG and its registered Design Practitioners must adhere to the regulations and therefore the relevant NCC, Australian Standard and industry best practice requirements. Further all designs must now be submitted to through the portal on the Fair Trading Website for approval prior to a Construction Certificate being issued to the developer.

In our opinion, the adaptive re-use for this structure will not meet much of the legislative requirements of a new build and the intent of the act. It is likely that the design will not pass the approval process in many respects. The implications are that the development may not be able to proceed under the act.

RBG fully supports the intent of the act and its requirements. In our opinion we do not think that the adaptive re-use of the building is an acceptable pathway to meet the intent of the act as outlined by the legislation.

5 Conclusion

Based on the RBG investigation and analysis, we are of the opinion that this building is not suitable for adaptive re-use on the project. To summarise the main reasons for this are as follows;

- The current building structure is past the intended design life of 50 years, furthermore, will not be able to satisfactorily meet code and serviceability requirements for an additional 50 years.
- To adopt the architectural requirements to meet ADG compliance, the primary structure will not be able to support the loading conditions which would result from such works.
- In its current form, the building does not meet, nor can be modified to achieve the criteria as per the Australian standards requirements.
- Due to the changes in legislation and introduction the 'Design, Building and Practitioners Act', class 2 buildings are subject to additional requirements and approvals. This act was intended to protect the consumer. The adaptive re-use of this building would not meet the Acts requirements and meet the intent of the act as outlined in the legislation.

APPENDICES

Appendix A SJB – Adaptive Re use requirements

Appendix B Existing Building Photos

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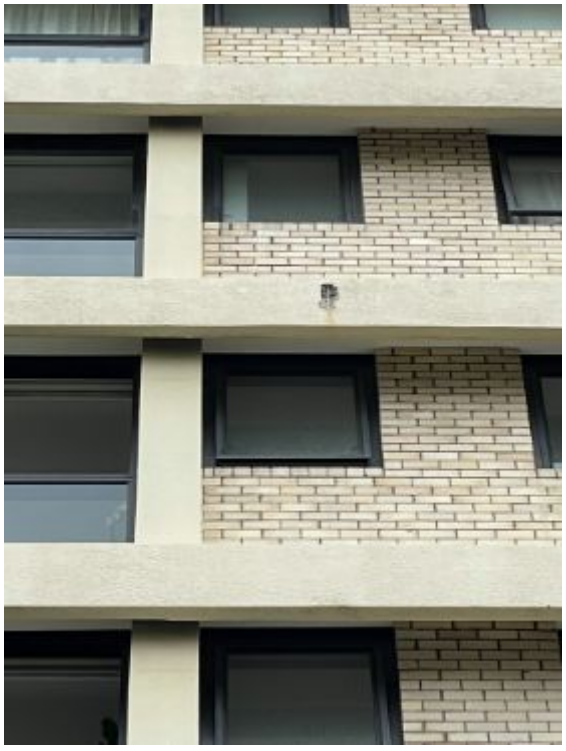
Appendix B Existing Building Photos

001 Existing Building Photos - Dated 26/09/2020



002 Existing Building Photos - Dated 26/09/2021

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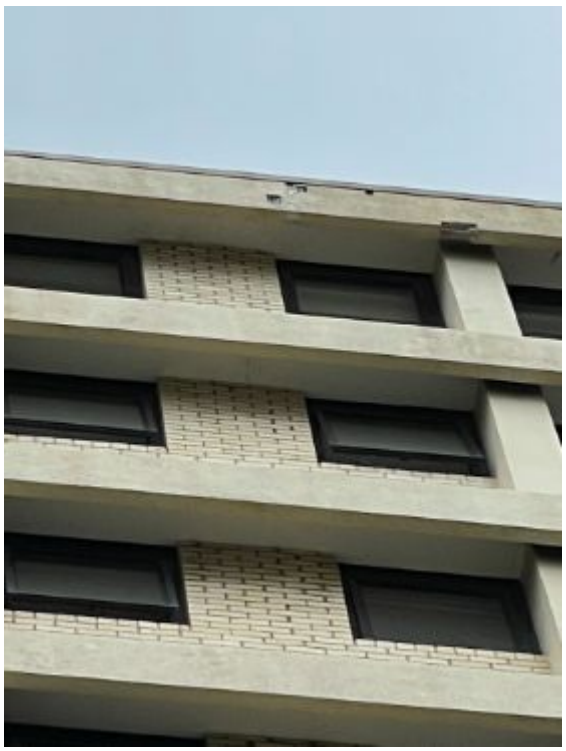

005 Existing Building Photos - Dated 26/09/2021

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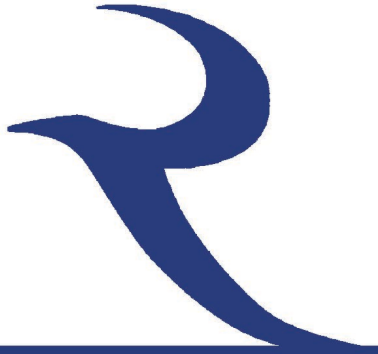

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