Retain Repair Reinvest

Flemington Estate: Feasibility Study and Alternative Design Proposal

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OFFICE is a charitable not-for-profit design and research practice based in Melbourne, Australia. It is a group of architects, landscape architects, urban designers and researchers who assist community groups in advocating for better outcomes within the built environment.

Report prepared by OFFICE
6th October 2024

Acknowledgements

The project team would like to acknowledge the Traditional Owners of the land on which this research has been conducted. We pay our respects to Elders past, present and emerging. It always was, always will be, Aboriginal Land.

This project is a self-initiated research initiative, conducted independently and is not politically affiliated with any party. The project is underpinned by a commitment to ensure housing as a basic human right.

Thank you to everyone that donated to the production and delivery of this report. We would also like to thank the Flemington Estate and North Melbourne Estate public housing residents for their support and involvement.

OFFICE would like to thank the generosity and support of those involved and provided input into this proposal. Kelvin Mureithi (Makao Group), Nathan Grimes (Melbourne Quantity Surveyors), Quentin Suckling (Sheer Force Engineering), Con Nicolas (Nicolas Building Surveyors), Ben Hosking, Save Public Housing Collective, Priya Kunjan, David Kelly, Nicolas Guerra Rodrigues Tao, Libby Porter, Luciano Furfaro, Warwick Neilley, Ruby Yao, Issy Taylor, Christopher Kelly (Architecture Workshop)

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15/7/24

[redacted]

Flemington Victoria 3031

[redacted]

Dear Simon Newport and Minister Shing

I write to you urgently on behalf of the Flemington and North Melbourne community, particularly those of us from African countries who have found refuge in Australia. The prospect of being displaced from our homes is causing profound distress and threatens to unravel the very core of our community.

The impact of relocation extends far beyond housing. These high-rise buildings are not just structures; they are the heart of our lives where we have forged friendships, built support networks, and cultivated a sense of belonging. Moving us from this community will sever these vital connections, leaving families isolated and vulnerable, especially our elderly who already struggle with language barriers and rely heavily on local community support.

While we acknowledge the necessity for building repairs or renewal, the proposed alternative of community housing on Victoria Street is wholly inadequate. These units do not meet our needs—they are cramped, lack space for our families and cultural practices, and fail to provide essential privacy and amenities.

Many families have inspected community housing properties at Victoria Street. Large families will need to sell and purchase new furniture to fit the space. We have been told to place our kitchen tables on the balcony, downsize to a smaller fridge, and sell our vehicles. Who is going to pay for all of this?

Some smaller families have considered relocating to community housing on Victoria Street but cannot afford to replace existing furniture.

Public housing, with its distinct policies and affordability, is essential for us as it provides stability and security that community housing cannot guarantee.

Furthermore, the scarcity of public housing exacerbates our concerns. With limited availability, we fear being scattered across areas where we lack necessary support networks and essential services. Where does Homes Victoria plan to relocate us and will there be sufficient parking, especially for women who rely on safe transportation options?

The impact on our cultural identity cannot be overstated. Many of us have fled war-torn countries seeking safety in Australia, and maintaining ties with our families overseas through visits is crucial for our emotional well-being. If we are relocated to community housing, the risk

of losing Commonwealth rent assistance when visiting loved ones abroad would create an insurmountable barrier, further isolating us from our families and cultural heritage.

It is imperative that any relocation or demolition plans are immediately halted. The government must engage in meaningful consultation with our community to address these critical issues. We demand clarity on our rights—will we have the right to return to public housing? What will our rent be? These questions must be answered transparently and in writing to alleviate our anxieties.

The Flemington and North Melbourne communities have long supported each other, and any isolation or disconnection will lead to significant social issues impacting generations to come. Parents will lose vital support networks, and children will lose their school communities, which are safe havens for their growth and development.

We were initially assured that relocation would consider our needs and preferences, including moving with family and friends. However, recent interactions with relocation officers have contradicted these assurances, leaving us feeling coerced into accepting inadequate housing offers. The lack of consultation with our community during the planning of these community housing units has exacerbated this issue.

In conclusion, Homes Victoria and the government must take responsibility for rectifying this situation. Immediate action is needed to develop a comprehensive housing strategy that respects our cultural practices, provides adequate space, and ensures affordable housing options that preserve community cohesion and opportunities to stay connected to loved ones.

Time is critical. Please act swiftly and responsibly to address our concerns before irreparable damage is done to our community.

Sincerely,

Name of renter	Contact	Community
[redacted]		

Executive Summary Retain, Repair, Reinvest

Render of the retrofitted Flemington Towers and new landscape. Image by OFFICE.

Retain, Repair, Reinvest (RRR) is a site-specific strategy developed by OFFICE for evaluating the refurbishment potential of existing public housing. At its core is the retention of public housing with the commitment to ensuring housing as a basic human right. The approach has three key objectives:

- Retain existing communities by not relocating residents,
- Repair existing buildings to reduce environmental impacts of construction,
- Reinvest savings to improve comfort and upgrade public housing.

This strategy was developed in response to the Department of Families, Fairness and Housing approach to renewing public housing, delivered through Homes Victoria. RRR was initially developed in response to the Public Housing Renewal Program, then the Ground Lease Model (part of the Big Housing Build), and is here being applied to the High-Rise Redevelopment Program. Across these three Homes Victoria programs, the Government's estate renewal process has followed a process of tenant eviction, demolition, and rebuild of community, affordable and market housing. This process begins from the rationale that refurbishment is not a viable option—despite no feasibility study for the renovation of the estates being available to the public.

Interior of a retrofitted home at 120 Racecourse Road, Flemington. Image by OFFICE.

The objective of Retain, Repair, Reinvest is to understand whether it is both technically and economically feasible to retain the existing public housing via refurbishment and where appropriate, to advocate for retrofit and infill to provide greater social and environmental benefit.

RRR identifies the uncaptured costs associated with the High-Rise Redevelopment Program approach at Flemington Estate and redirects these savings into the existing public housing stock and new infill. These costs include the relocation of existing tenants, disruption of communities and demolition of existing buildings.

This Retain, Repair, Reinvest report addresses all of the criteria presented by Homes Victoria that justify estate demolition—including energy efficiency, liveability standards, structural integrity of the towers and additional housing capacity through infill.

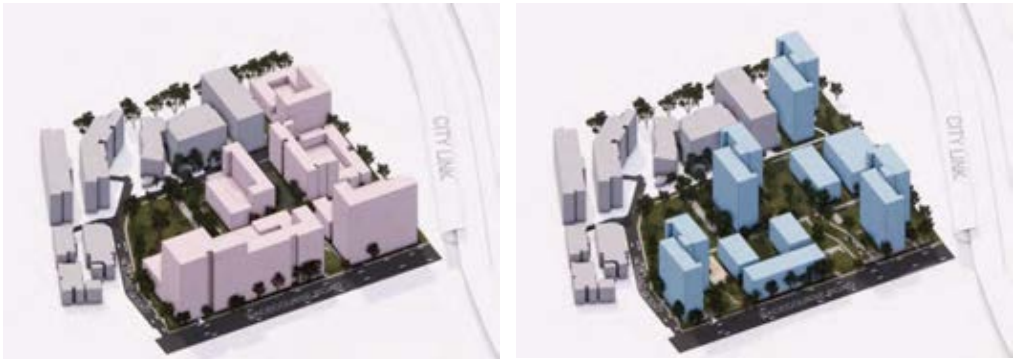

Figure 1: (Left) Homes Victoria's HRRP proposal for Flemington Estate, (Right) RRR proposal retaining the existing towers and infill to achieve the same number of dwellings as the HV plans. Image by OFFICE.

Background

This report presents an alternative strategy for the renewal and expansion of public housing in Victoria. Currently, large-scale estate renewal is delivered by Homes Victoria under both the Big Housing Build (previously the Public Housing Renewal Program [PHRP]), and the recently announced High-Rise Redevelopment Program (HRRP). Both the BHB and PHRP approach to estate upgrades is through the relocation of existing tenants to other public or community housing (or private market rentals), the demolition of existing buildings, and development of new social, affordable and private dwellings.

The 2023 announcement of the HRRP and identification of the initial tranche of five sites for tower demolition did not include details of the public-private-partnership financing and development model. As such, this report focused on the possibility of retaining the existing communities and buildings by accurately determining the viability of refurbishment - but does not examine the requisite financing and delivery mechanisms, beyond an assumption of the land remaining publicly owned. This document demonstrates the value of a refurbishment and infill approach by comparing the delivery of the HRRP development for Flemington Estate with an RRR strategy.

RRR: Flemington questions the rationale for demolition, quantifies the uncaptured costs and value-loss of the real estate-led model, and calculates the savings that can be achieved through renovation and infill. These costs and disbenefits of the HRRP model include:

- The direct financial costs of relocating residents during the demolition and rebuild period
- The social and health impact of relocating residents

This document demonstrates the value of a refurbishment and infill approach by comparing the delivery of the HRRP development with an RRR strategy.

Key Findings

This study demonstrates how a Retain, Repair, Reinvest strategy can address all of the objectives of the HRRP, and deliver improved living conditions for lower direct financial investment from the government.

As outlined in Table 1, the RRR feasibility study has found that a refurbishment of the existing public housing, combined with infill of new social housing dwellings can be delivered for $519,386,582 ($400,000 per unit), while retaining the existing community on site and avoiding the social impact and economic costs of relocation. A demolition and rebuild approach would cost $882,994,835 ($680,000 per unit).

This saves the government $227.7 million in direct relocation costs, and approximately $5 million in associated health and well-being costs as well as reduced construction costs. The RRR proposal also provides a 55% reduction of global warming potential compared with the HRRP approach.

The RRR study proposes that it is possible for the $364 million of financial savings to be reinvested back into the refurbishment of the existing public housing and development of new social housing. The HRRP does not provide financial, social or environmental benefit, and improved outcomes could be delivered for significantly less government and private investment.

Figure 2: Cost comparisons between the RRR and the HRRP proposals.

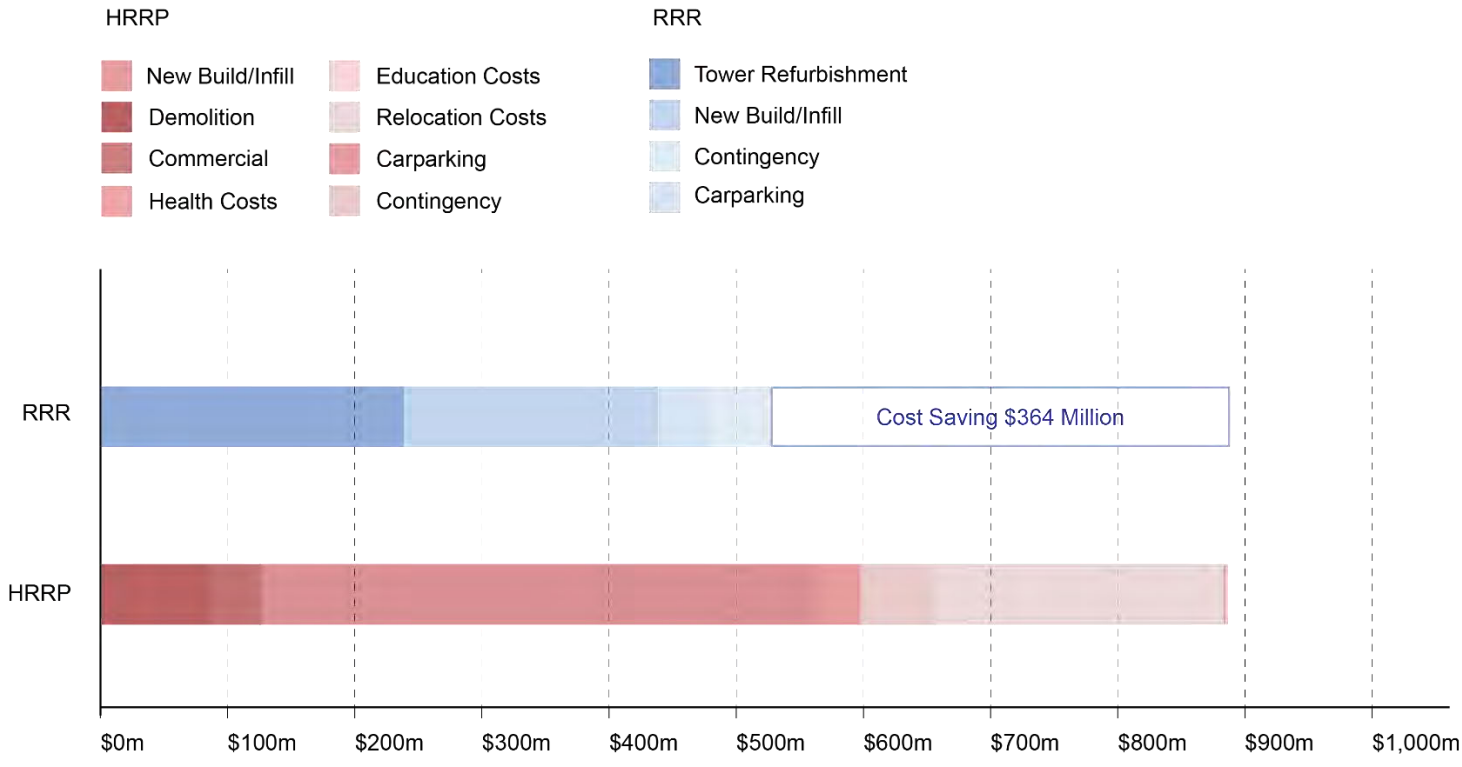

Table 1: Comparison of key costs of the HRRP and RRR proposals for the Flemington Estate

	HRRP Flemington Estate	RRR: Flemington Proposal
RETAIN		
External Relocation costs	The total relocation costs of existing tenants within the HRRP project is estimated to be $227.7 million	Relocation costs for RRR are minimal due to the staging of works. We anticipate there might be a small budget to cover a removalist fee from relocating remaining residents within the Estate during the new build and refurbishment. The RRR strategy saves $227.7 million in State Government financing.
Health and wellbeing cost	The cost to health and wellbeing is estimated at $2,088,000 for relocated residents.	By retaining community, there are no health and wellbeing impacts through relocation. The RRR strategy has no health and wellbeing cost.
Education costs	The cost of interruption to education during this period is estimated as $2,492,724 for relocated residents.	By retaining the existing community, there are no educational impacts through relocation. The RRR strategy has no educational impact cost.
REPAIR		
Demolition and construction costs	The construction costs of the HRRP development will be approximately $650,670,482 ($501k per unit)	Flemington Estate can be refurbished with new infill housing achieving the HV environmental and apartments standards without displacing communities or demolishing buildings for $519,386,582. ($400k per unit) The RRR refurbishment and infill cost is therefore $131,283,900 less than the HRRP. A saving of $101,000 per unit

HV Objectives (Lifts, Energy Efficiency, Accessibility)	Addressed through demolition, relocation and rebuild.	Addressed through refurbishment and infill. The RRR refurbishment strategy can meet all HV objectives, for a lower financial investment.
Global Warming Potential Embodied Energy Comparison	The global warming potential embodied energy to demolish and replace with build the new housing is calculated at 264, 3936 tonnes CO eq 168,155,294 MJ NVC.	The global warming potential embodied energy of the refurbishment proposal and infill proposal is.145,852 tonnes CO eq. The RRR model has a global warming potential embodied energy saving of 55%.
Increase Housing Numbers	HV will increase the number of dwellings on Flemington Estate to 1297 new community, affordable and market dwellings.	RRR will retain the 720 public housing units and introduce infill to match 1297 dwellings on site.
REINVEST		
Overall cost savings	The full costs for demolition, relocation, construction and health/educational impacts of the new community housing under the HRRP is calculated at $882,994,835	The RRR strategy would see the Flemington Estate refurbished and housing infill without displacing communities or demolishing buildings for $519,386,582. Refurbishing and infill at the Flemington Estate is financially viable, and savings could be invested into other public housing maintenance and building. **The overall cost savings to government by retrofitting rather than demolishing would be $363,608,253.**

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Acronyms and Definitions

BHB	Big Housing Build
CRA	Commonwealth Rent Assistance
HRRP	High-Rise Redevelopment Project (also referred to in the State Budget Papers as the Public Housing Revitalisation Program)
HV	Homes Victoria
GLM	Ground Lease Model
GLM2	Ground Lease Model Project 2
PHRP	Public Housing Renewal Program
RRR	Retain, Repair, Reinvest
the Estate	Flemington Estate
VAGO	Victoria Auditors General Office

The existing 20 storey tower at 120 Racecourse Road is one of four high-rises earmarked for demolition at Flemington Estate. Photo by Ben Hosking.

1. Introduction

1.1 Overview

This report presents an alternative to the Victorian Government's strategy for the renewal of public housing, by questioning the assumed necessity of demolishing the high-rise towers at Flemington Estate. The report quantifies the uncaptured costs and value-loss of the demolition approach, under the Homes Victoria program.

This report assesses whether a Retain Repair Reinvest (RRR) refurbishment strategy can achieve the same objectives as the High-Rise Redevelopment Project (HRRP), without the relocation of existing communities and demolition of housing stock while providing greater economic, environmental and social value.

The Flemington Estate case study is specific to the conditions and particularities of the housing's construction, design, site condition and community values. However, the RRR approach employed here can be used as a model for establishing the feasibility of all 44 towers slated for demolition as part of the High-Rise Refurbishment Project.

While the RRR approach does not include financial modelling for subsidising the renewal of public and social housing, the report findings highlight huge potential cost savings to government, as well as a viability of retrofitting the Flemington towers.

1.2 Previous RRR Studies

RRR Flemington is the third iteration of Retain, Repair, Reinvest (RRR), a feasibility study which assesses the refurbishment potential of ageing public housing estates in Victoria.

ASCOT VALE

In May 2022, OFFICE applied the RRR strategy to a public housing estate in Ascot Vale which has been identified as a site for renewal by Homes Victoria. The Estate, designed in the 1940s by modernist architect Best Overend, consists of 47 three storey walk-ups and is estimated to be at 80% occupancy. Working closely with residents and the Save Ascot Vale Estate community group OFFICE identified an empty block of flats, at 42 Ascot Street, to conduct the RRR study on, by comparing the outcomes to part of the Estate that had already been demolished and redeveloped as part of the Public Housing Renewal Program (PHRP). The RRR study established that refurbishment could achieve the PHRP program objectives of accessibility, liveability and energy requirements without requiring the relocation of existing communities. The design proposal incorporated a new lift, an allocation of Specialist Disability Apartments (SDA), heating and cooling upgrades (7.4 NatHERS and 38% energy use reduction), and a redesign of the communal rooftop. A direct construction cost saving of $281,838 per dwelling was identified through the RRR refurbishment proposal, compared with the PHRP demolition and rebuild. Refurbishment works at the case study site of 42 Ascot Street were recently completed by Homes Victoria who confirmed that the block will be retained as public housing. Construction began two months after the release of the RRR: Ascot Vale feasibility study, having been vacant for over two years. These works recognise the potential of refurbishment as an alternative renewal strategy and hopefully one that will be adopted in other ageing public housing estates.

Photo of the refurbishment works in process at Ascot Vale, and the rendered proposal produce as part of RRR: Ascot Vale. Photo by Ben Hosking (left). Image by OFFICE (right).

Barak Beacon Estate

In November 2022, OFFICE was invited by local public housing residents to undertake a second RRR feasibility study on the Barak Beacon Estate in Port Melbourne. The Estate was identified under the Big Housing Build, and was financed through a new Ground Lease Model (GLM) which enables the government to retain ownership of the land, while providing a 40 year lease to Community Housing Providers to deliver social housing. Similarly to the PHRP, the GLM continues the approach to Estate upgrades with tenant relocation, demolition, and new build through a private-public-partnership model. The feasibility study found that a RRR strategy could address all of the objectives of the BHB and GLM, and deliver improved living conditions for significantly lower direct financial investment from the government. The RRR model also proposed strategic infill on the site to increase new homes during a housing crisis while retaining and refurbishing the existing buildings. The report found that the GLM did not provide greater financial, social or environmental benefit, and improved outcomes could be delivered for significantly less government and private sector investment via RRR.

In November 2023, the Barak Beacon Estate public housing was demolished, and the Building Communities Consortium was selected to deliver the new community, affordable and private housing.

Barak Beacon Estate was demolished in 2023 as part of the Big Housing Build despite resistance from residents and advocates. Photo by Ben Hosking.

1.3 Walk-up Updates

While HV have not directly engaged with the previous RRR reports, there have been a number of subsequent developments in relation to walk-up class public housing in Victoria.

Since completing the RRR: Ascot Vale feasibility study and design proposal, the Ascot Vale Estate is no longer listed on the Homes Victoria website as a future site for renewal.[1] In June 2023, the Victorian Government awarded Fieldwork Architects a consultancy tender, listed as 'Walk up Asset, Class Retention; Feasibility.'[2] This $423,868 contract to conduct a feasibility study on the potential of retaining walk up public housing in Victoria suggests there are now considerations of the viability and affordability of refurbishment as an option.

OFFICE hope that this feasibility study of the Flemington Towers will provide specific information about the viability of refurbishment, in a transparent way to assist residents and the community to understand the decision-making process by the government.

The Flemington Estate is full of established trees and communal facilities, although car parks dominate the current ground plane. Photo by Ben Hosking.

[1] The DHHS Ascot Vale Estate website previously described a full estate renewal over the 'next 15-20 years' and detailed that buildings across the Estate were 'built 40–50 years ago are costly to maintain, are uncomfortable in very hot or cold weather, and are difficult for many residents to access.' The 2019-2022 version of the website detailed, 'the Ascot Vale Renewal will replace the ageing public housing with brand new, sustainable homes and will increase the amount of housing available on the site.'

[2] As detailed in the June 2023 Homes Victoria Contract Disclosures

1.4 Objectives and scope

Objectives

This report compares the Victorian government's plans for the demolition of the Flemington Estate high-rise towers to a refurbishment of the buildings. The analysis demonstrates how the RRR approach can address the key concerns identified by Homes Victoria by bringing the towers up to contemporary living, energy and accessibility standards, and deliver an increase of social housing through infill. The report shows how retrofitting can ensure the towers meet modern standards for;

- Noise
- Sustainability
- Waste and recycling
- Seismic compliance
- Bedroom area dimensions
- Room depth
- Ventilation
- Private open space
- Accessibility
- Minimum amenity[3]

While the design standards for the new build community housing have not yet been detailed by Homes Victoria, this report shows that the RRR strategy can meet HV's standards for contemporary codes and energy rating schemes employed at the recently constructed Victoria Street and Holland Court community housing on the Estate. This includes ensuring the towers offer:

- 1,2, and 3 bedrooms*
- Gold liveable housing design*
- Gas-free homes
- Accessible accommodation
- 5 star Green Star rating
- 7 Star natHERS average rating[4]

[3] Harriet Shing, MP Minister for Housing in response to Petition #572, 1 August 2024.

[4] These standards are taken from the HV Victoria Street webpage.

* The Victoria Street redevelopment also offered four-bedroom rooms, however here we have aligned our RRR plans with the Ernst and Young/Hayball master plan as a more recent and site-specific comparison. Additionally, the Victoria Street redevelopment provides Silver livability standards, but the RRR can exceed this with Gold.

1.5 Report scope

The RRR refurbishment and infill proposal for Flemington Estate responds to the stated objectives of Homes Victoria, as well as the specific rationale for the Estate's demolition and rebuild. It is informed by resident enthusiasm to retain their homes and existing communities, through improving the under-maintained buildings.

While the immediate HRRP demolition is for 120 Racecourse Road, all four towers at the Estate are set to be demolished as part of the Homes Victoria plans. As such, this RRR study uses the tower at 120 Racecourse Road as the primary site of investigation but proposes a plan for retrofit of all four towers.

We understand that a financial, ownership and governance model for Flemington Towers is yet to be confirmed, however there is a guarantee that land will not be sold to private developers. In the absence of publicly available information, we have assumed a Ground Lease Model approach will be employed, aligned with HV's most recent estate renewal projects under the Big Housing Build. This RRR proposal focuses on how to best meet the objective of HV's estate renewal with minimal financial, economic and social costs. The scope of the project is also informed by the architectural particularities of the site, and the community feedback about how they value the Estate.

Through an accurate understanding of the existing sites and buildings these cost savings could be passed on to the construction of new dwellings resulting in a similar outlay for the government.

RRR: Flemington demonstrates that alternative approaches are both possible and cost effective, while having a lower impact on the environment and health and wellbeing of current residents. These findings should be considered in any future renewal of public housing estates.

1.6 Report Structure

This report provides three key elements:

1. The Retain Repair Reinvest Strategy

The report establishes the Retain, Repair, Reinvest strategy by documenting and providing contextual information about the disbenefits and uncaptured costs of the demolition and new build approach under the High-Rise Redevelopment Project.

2. The Flemington Estate Case Study

The report introduces Retain, Repair, Reinvest: Flemington — a specific feasibility case study of the Flemington Estate. Through a comparative analysis of the High-Rise Redevelopment Project and a proposed Retain, Repair, Reinvest approach; the feasibility of the alternative model is demonstrated.

3. Flemington Estate Design Proposal

The final section of the report presents a detailed design proposal for Flemington demonstrating the technical and financial success of the refurbishment and proposed infill.

1.7 Approach

To meet the objectives and scope of this feasibility study, the approach involved the following components:

- Developing a research plan
- Document review and analysis - this included, but was not limited to
    - publicly available reports
    - submissions
    - academic literature
    - government plans and policies
- Two community engagement sessions with Flemington Estate residents
- Analysis of public housing resident feedback
- Commissioned reports from a Quantity Surveyor, Structural Engineer and Environmental Consultant
- Consultation with housing researchers, academics and economists
- Presentation of preliminary designs to Flemington Estate residents
- Revision of design based on feedback
- Final report (this document)

1.8 Limitations

This report is based on data, budgets, reports and findings that are publicly available.

OFFICE and collaborators have submitted formal FOI requests and direct information requests to Department of Families, Fairness and Housing (DFFH) for the following information in relation to the Flemington Estate demolition and redevelopment:

- Recent structural assessments that determine the structural condition of 120 Racecourse Road
- Maintenance reports and service assessments for 120 Racecourse Road
- Public Records of Victoria Index number for the original architectural and structural drawings form 120 Racecourse Road
- The asset management work that details the government's review and costings for the 2.3 billion for maintenance and upgrades, including details of what that 2.3 billion would cover (e.g painting, renovations)[5]
- Details of the current energy efficiency ratings of the Flemington and North Melbourne public housing towers[6]
- The number of currently vacant public housing tower dwellings, in non-vacated towers
- Government costings for the temporary relocation of public housing residents, including translator fees, cleaning fees, removalists, and private-rental costs for any residents not accommodated in alternative public housing[7]
- Documents of the level of government investment, built outcomes and ongoing maintenance budgets for the recently renovated North Richmond and Collingwood public housing towers[8]
- The rationale for commencing with Flemington and North Melbourne sites being in the first tranche of demolition and redevelopment
- Any HV commissioned or internally conducted studies exploring alternatives to demolition and rebuild
- Current tenant and household numbers currently residing at Flemington Estate
- How many bedrooms are in the new community housing at Victoria and Abbotsford Street
- Clarification on Section H of the Relocation Agreement on the right to return, and how this is managed in relation to ‘Insufficient redevelopment housing’ where there is not sufficient space for original tenants to return to.

[5] Referenced by Simon Newport in the Transcript for the Legislative Council Legal and Social Issues Committee, Inquiry into the Rental and Housing Affordability Crisis in Victoria, p.78.
[6] Ibid, p.81
[7] This number was provided on-notice as part of the Public Accounts and Estimates Committee, Inquiry into the 2024-25 Budget Estimates, May 2024.
[8] Transcript for the Legislative Council Legal and Social Issues Committee, Inquiry into the Rental and Housing Affordability Crisis in Victoria. p.79.

Following complaints submitted to OVIC to assist with the FOI requests, we received:

- 37 pages of redacted visual site assessments, asset records and maintenance site visit logs for 120 Racecourse Road
- The Public Records Index Number (however the two contracts/drawings were not held by the PROV and were not found by DHHS).
- Data that there were 513 public housing dwellings in the non-vacated towers

In the absence of access to almost all requested key documents, this report is based on publicly available information. As reported by The Age - which was denied access to 941 pages of documentation—there is a lack of transparency around the High-Rise Redevelopment Project. In July 2024, Labor responded to a motion from the Greens that demanded the release of documents justifying the wholesale destruction of the towers, by blocking 146 out of 158 relevant documents.[9] This has both limited the evidence available to draw upon in this feasibility study, while simultaneously highlighting the necessity of a publicly available report that details either the necessity for demolition or potential for retrofitting.

[9] Greens Victoria, Media Release 'Labor to keep 148 (of out 158 documents) relating to demolition and privatisation of public housing towers secret, 20 June 2024.

2. Housing Statement Announcement

2.1 High-Rise Redevelopment Project

In late September 2023, Homes Victoria announced plans to demolish 44 high rise public housing towers in Melbourne. The project aims to increase the number of residents across the 44 sites from 10,000 to 30,000. The 30,000 residents will include 1,1000 community housing tenants, and the remaining 19,000 a mix of affordable and market homes. as well as increase the number of social homes by 1000 (10%).

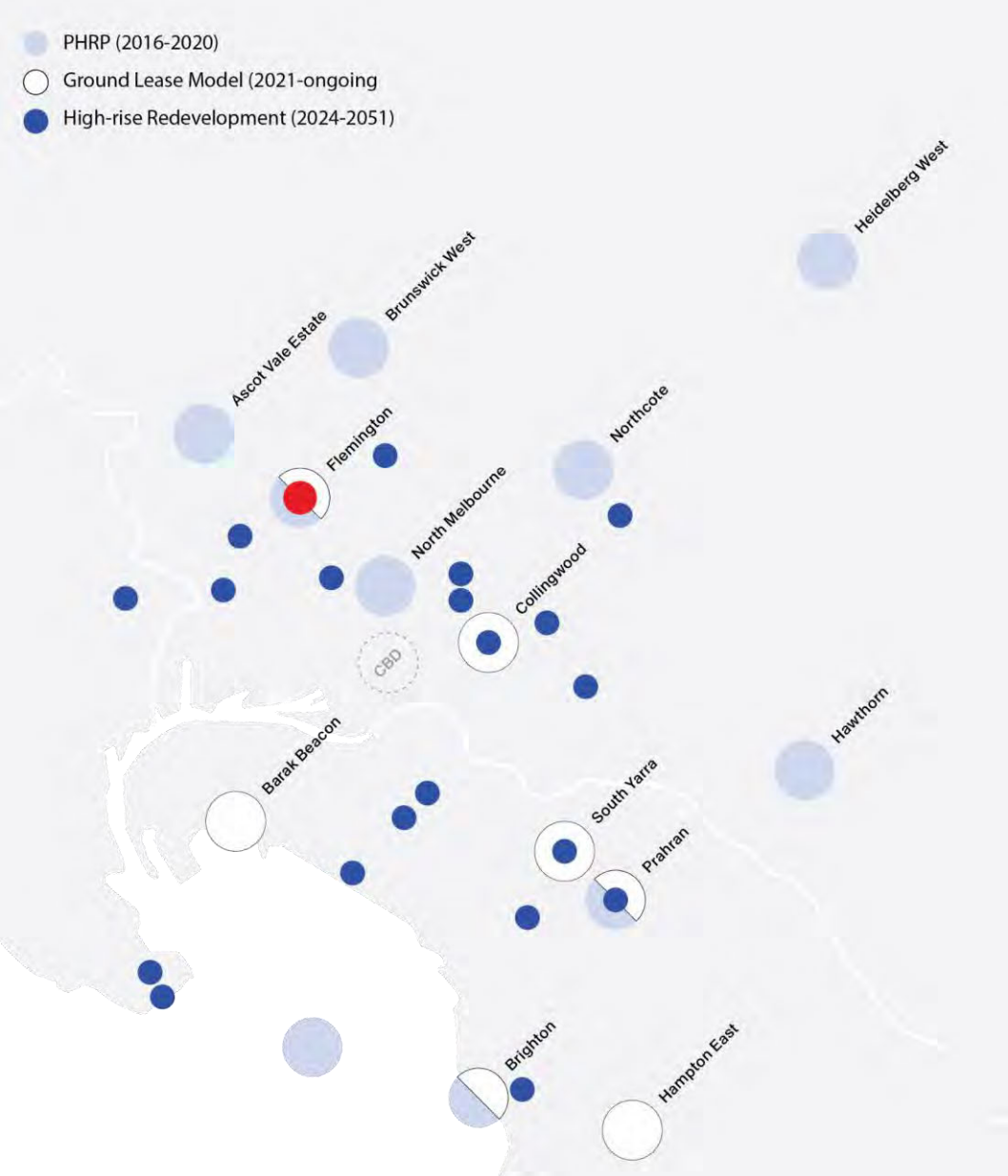

Figure 3: Map showing the sites of renewal from 2016 to 2024. The majority of sites are located in inner-Melbourne on sites with high land value.

The government investment in this 10% increase is not yet budgeted for all of the 44 towers, however the kickstart funding for the Flemington and North Melbourne towers has an allocation of $436 million (funded outside of the Big Housing Build [BHB]).[10] As part of this, Homes Victoria has made an 'initial allocation' of $10.4 million for the relocation of residents, including moving cost, connection to utilities, translators and staffing costs.[11] While described as the HRRP on the Homes Victoria website, budget papers and funding is allocated to the 'Public Housing Revitalisation Program' (Metropolitan).

Homes Victoria deemed refurbishment of towers as non-viable due to the required investment of $2.3bn over 20 years for maintenance alone, at approximately $55m per tower. Homes Victoria Chief Executive Simon Newport described the potential of upgrades to the towers as akin to 'putting lipstick on a pig.'[12] While it has not been made available how the $2.3bn was calculated,[13] Homes Victoria detailed that this would cover planned maintenance, asset renewal and responsive maintenance.[14] Newport identified that this $2.3billion would be 'over the next 20 years just to keep them in the condition that they are in now' - **indicating it did not include improving thermal efficiency or meeting contemporary design standards.**

Newport further explained factors that resulted in the decision to demolish included 'the construction methodology, ceiling heights that don't permit services to run between floors, no heating, no cooling, no balconies, it's difficult to clean windows. All of those factors were taken into account.'[15]

The 44 towers, which were built between the 1950s and 1970s are described by the Victorian Government as 'constructed at a time that predates current building codes' resulting in towers that 'no longer meet the minimum standards Victorians expect.'[16]

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[10] Public Accounts and Estimates Committee, Inquiry into the 2024-25 Budget Estimates, May 2024. This included $8.9 million reallocated from the Cooling Our Public Housing Towers (metropolitan) initiative.

[11] Questions on Notice in the Public Accounts and Estimates Committee, Inquiry into the 2024-25 Budget Estimates, 24 May 2024.

[12] Cait Kelly, 'Green say Melbourne housing towers should be fixed amid claims that would be "putting lipstick on a pig"', *The Guardian,* 12 October 2023.

[13] See Limitations section for the FOI requests.

[14] Operating costs include security, cleaning, the maintenance of grounds, the carrying out of safety checks to individual apartments under the Residential Tenancies Act (RTA) and the cost of utilities for common services. Planned maintenance relates to the service of essential infrastructure such as firefighting systems and lifts to maintain them in operating condition and treating concrete spalling to maintain building integrity and public safety. Asset renewal covers renewing the building services before they become unreliable or fail and the periodic renewal of apartments. Responsive maintenance entails the make good of the fit out of individual apartments, common areas and essential infrastructure, upon request or to restore service. This is detailed in the response to Questions on Notice in the Public Accounts and Estimates Committee, Inquiry into the 2024-25 Budget Estimates, 24 May 2024.

[15] Ibid.

[16] See the 'More social housing' page on the Victorian Government webpage.

The website explains ‘they’re reaching the end of their useful lives and are no longer fit for modern living.’

> The towers fail against noise, sustainability, waste and recycling, bedroom area dimensions, room depth, ventilation, private open space, accessibility and minimum amenity standards. Substantial investment would be needed to retrofit the towers. But even then, their design means that many tower homes would never be able to meet contemporary codes, nationwide energy rating schemes or accessibility needs for many households.[17]

In addition to these design and built limitations, the Homes Victoria website further explains:

> In recent years, building faults and breakdowns (electrical, plumbing, lifts) have become more common and cause frequent disruption to renters. The design of the buildings also means that it is not feasible to upgrade them to modern design liveability and accessibility standards.[18]

The government identified five high-rise towers in the initial tranche for redevelopment by 2031 as:

- 120 Racecourse Road, Flemington
- 12 Holland Court, Flemington
- 33 Alfred Street, North Melbourne
- 20 Elgin Street, Carlton (by 2028)
- 141 Nicholson Street, Carlton (by 2028)

In September 2024, in the middle of a class action against Homes Victoria from residents in the first tranche of towers slated for demolition, HV announced a second set of sites for demolition and redevelopment.

- 259 Malvern Road, South Yarra (tower)
- 139 Highett Street, Richmond (tower)
- 111, 119 and 127 Elizabeth Street, Richmond (low-rise)
- 6 and 8 Anderson Court, Richmond (low-rise)
- 1-5, 7 and 9 Williams Court, Richmond (low-rise)

This second tranche of towers included low-rise properties, where the justification for their necessary demolition has not been provided. The scale of the high-rise redevelopment program has enabled other public housing properties and estates to be absorbed into the project, without HV providing the same level of justification and rationale for their demolition had they been identified independently. This could result in

[17] Ibid.

[18] Homes Victoria, ‘High-rise development project frequently asked questions’, HV website.

more residents being relocated than the stated 10,000 and larger scale shifts from public to community housing in Victoria.

The two ‘red brick’ buildings in Carlton have already seen residents relocated. The funding for this demolition and rebuild is supported by the Federal Government's Housing Australia Future Fund, which sees Victoria receive a $500m accelerator fund for new housing that is publicly owned. This will ensure that the two Carlton sites remain publicly owned, however the operation of this housing can be undertaken by CHPs. While this site remains as public housing it is understood that the new homes will be used to house relocated residents from towers scheduled for demolition rather than applicants on the VHR not already living in public housing.[19]

The first towers to be demolished are the two red brick buildings in Carlton. There has been a commitment from the government that the new development will be public housing. There is currently no public information around the tenure of the other 42 towers. Photo from Homes Victoria.

[19] Joint Media Release, Prime Minister Anthony Albanese and Premier Daniel Andrews, ‘First Social Housing Accelerator Project in Carlton.’ *Australian Government and Victorian State Government.* 19 September 2023.

In July 2024 the Victoria Government awarded John Holland a $100 million contract for the demolition of the two Flemington, North Melbourne and Carlton Estates, despite an ongoing class action against Homes Victoria by resident groups.

The financing arrangements for these three estates have not yet been detailed; however, will require private investment. The Homes Victoria CEO explained,

> …those two towers that are in Carlton were absolutely a decision that we made early on: because it was available to be funded, we said they will be public. So those two will be public. The next three – we have to go through the commercial models.[20]

In the absence of financial and procurement information available for the Flemington redevelopment, OFFICE have assumed the approach will be similar to previous Ground Lease Model (GLM) arrangements delivered under the BHB. This study presumes that no public land would be sold as part of the High-Rise Redevelopment Project, as is consistent with the most recent GLM arrangements for recent estate renewal in the state.

The thoughtful design and layout of flats allows for every room to have a window and cross ventilation. Visually, the towers show no signs of cracking or spalling. Photo by Ben Hosking.

[20] Transcript for the Legislative Council Legal and Social Issues Committee, Inquiry into the Rental and Housing Affordability Crisis in Victoria.

2.2 Budget allocations so far

Of the $436 million allocated to the Flemington and North Melbourne towers, $17.52 million was spent in the 2023-24 financial year, and $72.54 million is projected for the 2024-25 budget.[21]

Contracts awarded to date include:

Table 2: Contracts awarded to date for the HRRP

Contractor	Description	Value	Dates awarded and completed
KPMG	High Rise Redevelopment Communications and Engagement - engagement with renters	$152,075.97	27/2/2024 - 30/6/2024
Hayball Leonard Stent	Towers Redevelopment Program - Pipeline and Program. Pipeline massing and yield studies	$358,600	4/4/2024 - 1/8/2024
MGS Architects	Pipelines massing, yield, retrofit and compliance studies	$344,080	4/4/2024 - 1/8/2024
KPMG	High-rise Redevelopment Market Research - to provide strategic insights to HB based on research findings	$299, 696	May 2024 - December 2024
BECA	Variation to a previous contract 10040531 High-rise Seismic Assessment*	$506,000	2/5/2024 - X/12/2024
MBMPL PTY LTD	Quantity Surveying Services - Pipeline Towers Redevelopment	$250,000	13/6/2024 - 1/3/2027
Think HQ	Delivery of a campaign strategy (including advertising tactics) and associated content that supports the State Government's program of works relating to public housing, in particular its commitment to retire and redevelop 44 high-rise public housing towers across inner urban Melbourne, also known as the High-rise redevelopment project.	$249,299.30	19/6/2024 - 30/9/2024
MBMPL PTY LTD	Quantity surveying services - Tranche 1 of Towers Redevelopment	$547,414	26/6/2024 - 1/3/2027
Building	GLM1 Deliberation, Execution and Mobilisation	$1,271,133.62	25/06/2024 -

[21] Public Accounts and Estimates Committee, 2024-25 Budget Estimates questionnaire, Department of Families, Fairness and Housing

Communities LTD	Payment, HV Facilitated Placements Modification Towers Redevelopment Tranche 1 Sites		10/07/2029
Lovell Chen	Heritage Assessment High Rise Portfolio	$253,000	12/8/2024 - 28/3/2025
John Holland	Demolition of Flemington, North Melbourne and Carlton public housing towers	$100,000,000	Not yet on Contract portal
Total value of awarded contracts to date:		**$104,232,294.89**	

*This contract was originally issued in April 2022 for completion by December 2022 for the value of $697,400.

These contracts were all awarded after the announcement of the High-Rise Refurbishment Program in September 2023. Based on the available contract details, it appears that a retrofit feasibility study (MGS Architects) and a Heritage Assessment Study (Lovell Chen), have been awarded for buildings which the government has already stated are unviable to retrofit. Further, the one hundred-million-dollar contract to John Holland for the Flemington, North Melbourne and Carlton has been signed prior to the heritage studies being completed. In the case of the Barak Beacon demolition (as part of the BHB), the issuing of a demolition contract was used at VCAT as legal level to evict public housing residents.

3. Victorian Estate Renewal Context

Big Housing Build

The High-Rise Redevelopment Project is not part of the Big Housing Build (BHB) funding or program but is being delivered alongside this $5.3 billion investment into housing and job creation. Within the BHB, estate renewal has largely been delivered under a Ground Lease Model (GLM) approach.

The Ground Lease Model (GLM) approach to public housing renewal was first introduced under the Big Housing Build in 2020. The Homes Victoria website describes the model as following a process where:

- Vacant land is leased to a not-for-profit project group
- Not-for-profit project group finances, designs and constructs new social, specialist disability, affordable and market rental homes for Victorians
- Community housing provider manages and maintains the social housing for 40 years
- At the end of the lease term, all land and buildings are returned to Homes Victoria in their original condition, meaning no sale of public land.

Our previous RRR Barak Beacon study found that in reality the GLM (both 1 and 2) resulted in:

- Buildings deemed beyond repair without having conducted a feasibility study.
- Multiple estates (e.g South Yarra, Prahran, Flemington Estate, and Hampton East) are packaged into a single tender, limiting market competition.
- State government commits a capital contribution of hundreds of millions of dollars for project development, market testing, and procurement costs. Three tenders are selected, and each awarded $1 Million to develop their proposals.
- The state government relocates residents into much-needed public housing, private rentals, or properties spot-purchased off the market for the duration of construction. (For one estate that was regenerated under GLM2, this amounted to an estimated $16.2 million).[22]
- The state government awards the contract to the preferred tenderer, exposing themselves to the volatility of the market having demolished their assets.
- The state government provides quarterly service payments to the developer over the 40-year lease. **(For one estate in GLM2, this resulted in the government contributing $474.6 million for an uplift of 50 additional community housing dwellings).[23]**

[22] OFFICE, *RRR Barak Beacon Feasibility Study and Design Proposal,* 2022.
[23] Ibid.

BHB Review

In 2024, the Victorian Auditor General's Office (VAGO) report on Planned Social Housing examined the delivery of HV's Big Housing Bill. It found that HV was on track to deliver the BHB within the original budget, however this was being achieved through changes to the original plans, by a 2023 revised option to;

- Increase the number of homes that community housing providers would build and manage
- Reduce the number of projects on land owned by Homes Victoria and other government agencies.

The result of this is Homes Victoria will now build and own fewer public housing homes than it planned while using all its original budget. This was achieved by removing 15 crown land sites from the BHB to cut costs. These sites include Miller Street in Preston, where 140 social and affordable homes were to be built. HV claimed this site was never part of the BHB, despite their own documents including it in the program.[24]

The VAGO *Planning Public Housing* report also cited Victoria's infrastructure strategy 2021–2051 which recommends the government increase the state's social housing supply to keep up with the national average of 4.5 percent of all dwellings being social housing. It set a baseline target to achieve this figure by 2031. The government supported the intent of the recommendation but said it needed to further investigate the timeframe for meeting the goal. In 2023, only 3 percent of all Victorian dwellings were social housing. Homes Victoria estimates that to maintain this percentage and keep pace with population growth, the state will need to build an additional 22,000 social housing homes by 2036.[25]

As demonstrated in Figure 4 below, this low baseline of social housing in the state is informed by decades of underfunding of public housing in Victoria. Victoria has the lowest level of social housing in the country.[26]

[24] Rachel Eddie, 'Land set aside for social housing to be sold off for private development', *The Age,* 11 August 2024.
[25] Victorian Auditor-General's Office, *Planning Social Housing: Independent assurance report to Parliament 2023-24.* June 2024.
[26] ABS, Housing Assistance in Australia 2024.

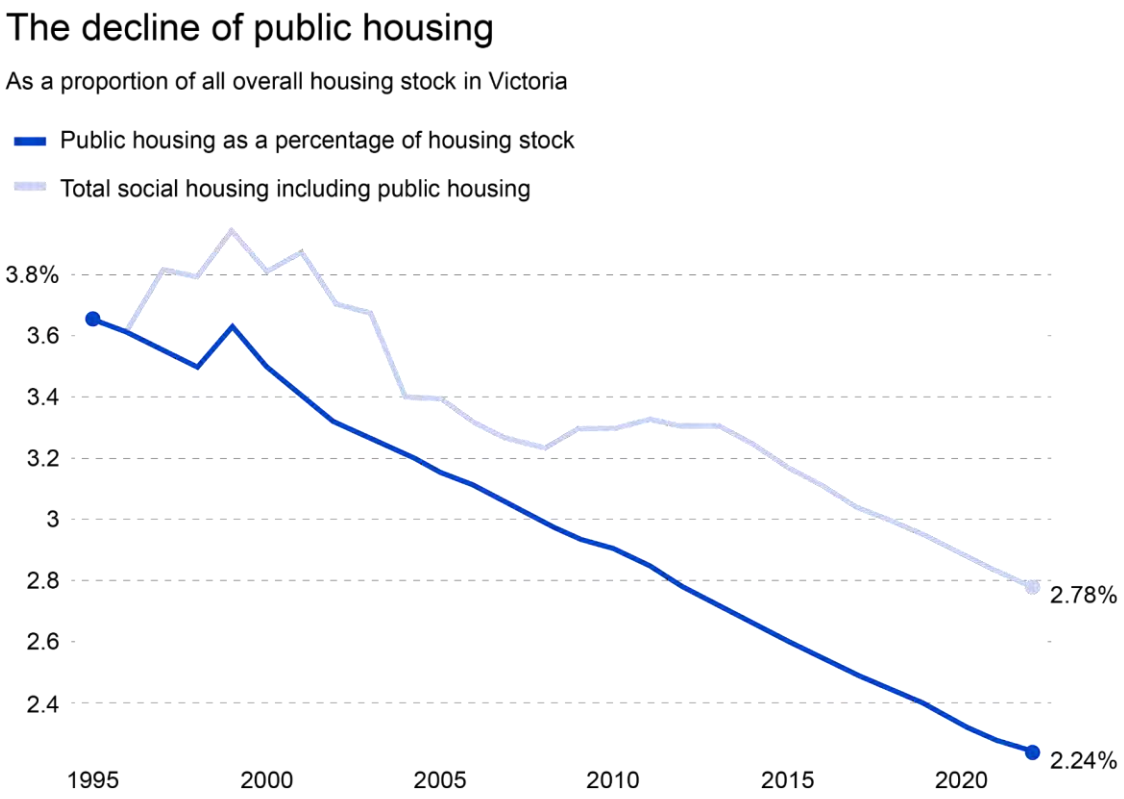

Figure 4: Decline of public housing as a percentage of all housing stock in Victoria over time.

Financing and Community Housing Providers

New community housing that will replace the demolished public housing will be delivered by Community Housing Providers (CHP). This is consistent with a broader Victorian (and national) shift, away from public housing and towards community housing.

As detailed by Simon Newport in the Legislative Council Inquiry into the Rental and Housing Affordability Crisis, the delivery of housing by the government accrues a 10% GST penalty, compared with a non-government delivery of housing. Newport also highlights the Commonwealth Rental Assistance income that CHPs can access, which is not made available to state government housing providers. In describing the shift from public housing to CHP managed properties, Newport explained, 'they do a fantastic job, but they have a couple of head starts that public housing does not.'[27] In 2023, Homes Victoria advised that its maintenance costs are growing at double the rate of its rental income growth, and make up around 50 per cent of its total operating costs.[28]

[27] Transcript for the Legislative Council Legal and Social Issues Committee, Inquiry into the Rental and Housing Affordability Crisis in Victoria.

[28] Victorian Auditor-General's Office, *Planning Social Housing: Independent assurance report to Parliament 2023-24.* June 2024.

As described by Newport above, and research findings by Porter and Kelly show, the shift from public to community housing has been largely informed by financial settings around maintenance and management.[29] While CHP's have a key role in providing housing in Australia, the shift to community housing to replace the towers was informed by finances, rather than analysis of the best delivery of services and positive outcomes for tenants.

The 2021 *Social Housing Regulation Review*[30] established there is a lack of regulation to ensure responsiveness to maintenance requests for CHPs, and an absence of clear pathways for community housing residents to be represented by a peak body (the Victorian Public Tenants Association does not have a formal role to represent community housing tenants).[31] This was also identified in the Victorian Ombudsman's Parliamentary Report on Social Housing Complains, which found that community housing residents have 'fewer options to escalate complaints' and recommended that FOI legislation be extended to cover CHP's and a new Social Housing Ombudsman function be established.[32]

Additionally, satisfaction over maintenance and disability modifications in community housing has declined in Victoria, dropping from 88% satisfaction in 2016, to 77% in 2018. Providers highlighted a lack of funding to provide modifications to meet resident's disability needs.[33]

Of key concern is that CHP's are only required to make 75% of their allocations to people from the priority section of the Victorian Housing Register. This means that if all 10,000 residents displaced through the High-Rise Redevelopment Program return to the community housing - and there is an additional 10% increase of 1000 new homes: it is possible that only an additional 750 people from the priority section of the VHR will be housed at the end of the 27 year project. In June 2024, the Victorian Housing Register had 27,983 priority applicants. 14,592 of these applications were from people who are homeless without support.

[29] Libby Porter and David Kelly, *Does the Big Housing Build address the housing crisis in Victoria,* RMIT University, 2020.
[30] Victorian Government, *Social Housing Regulation Review: interim report,* December 2021.
[31] Ibid, p. 21.
[32] Victorian Ombudsman, *Social housing complaining handling - progress report.* Parliament of Victoria, March 2024.
[33] Ibid, p.36.

Special Purpose Vehicles and Community Housing

In addition to findings about outcomes for residents in the Social Housing Regulation Review, the report also identified risks regarding the use of Special Purpose Vehicles (SPV) as a mechanism for CHPs to partner with developers under the GLM, as part of a consortium delivering and managing community housing. Based on our understanding of the High-Rise Refurbishment Project, the funding and delivery mechanism is likely to involve an SPV approach.

SPV's allow for-profit entities to enter the sector, through the consortium model which allows a subsidiary company to form in order to undertake a specific business purpose of activity (e.g. community and affordable housing). This SPV is treated as a not-for-profit organisation.

The Social Housing Regulation Review found that the SVP approach allowed 'for-profit entitled and new entrants in the sector' which 'may pose risks in relation to service delivery and tenant outcomes, financial stability, governance and probity and reputation risks to the sector if things go wrong.'[34] The Review cites overseas cases where the inclusion of for-profit partners had resulted in poor outcomes for tenants, and reflects that the regulatory system was not designed with for-profit partnerships in mind. There is a risk that the model enables SVPs to be used as a means to 'secure benefits for organisations that are not registered housing agencies leaving the regulator unable to confidently exercise its regulatory powers to protect the interests of tenants or creditors.'[35]

The Housing Act 1983 details the objects of the Act as to:

> ensure that every person in Victoria has adequate and appropriate housing at a price within his or her means by encouraging
> (i) the provision of well-maintained public housing of suitable quality and location;
> (ia) the participation of non-profit bodies in the provision of well-maintained affordable rental housing of suitable quality and location

The Act stipulates that Homes Victoria may enter into joint ventures, including to 'form, or participate in the formation of, a corporation, trust, joint venture, partnership or other body, including a non-profit body.' A non-profit is defined in the act as a body that is not 'carried on for the purposes of profit or gain to its individual members.'[36]

While the SPV model does align with the wording of the Act, the introduction of for-profit actors entering into housing delivery as a partner to the not-for-profit housing provider opens the government up to new risks; as well as shifting towards a for-profit led model of delivery.

This profit-led model for community housing is already being promoted as providing a guaranteed 8-12% return on investment via the Housing Australia Future Fund (HAFF) for social and affordable housing development.[37]

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[34] *Social Housing Regulation Review: interim report,* p.80.
[35] Ibid, p.81.
[36] Housing Act, 1983.
[37] Michael Bleby, 'Social housing offers 8-12pc infrastructure-like returns', *Financial Review,* 6 September 2024.

Subtle hints of individuality to each tower are displayed in the colour of the window frames. Photo by Ben Hosking.

Affordability

After the announcement of the demolition of the 44 towers, some residents were informed in July 2024 that their public housing rent would increase by up to 85%.[38] These increases were informed by the government's annual market rent reviews which were informed by a government valuer, rather than rental bond data. For the majority of public housing tenants, rent is capped at 25% of household income - however approximately 10% of public housing residents pay market rent.

In addition to current stress placed on public housing residents who will be relocated when their homes are demolished, the 'affordability' of the developer-built housing on the Flemington site is also of concern. Based on the delivery of Phase 1 and Phase 2 Ground Lease Model at Holland Court, we anticipate that the Government proposal for replacing the demolished Flemington towers will incorporate 'affordable housing.' The modelling below is based upon the median weekly rents for Moonee Valley (June 2023) and the Building Communities guidelines that 'affordable' is 74.5% of market rent.[39]

[38] Jess Thompson, 'Heated property market sends Victoria's public housing market rents soaring.' *ABC Online,* July 5, 2024.

[39] Building Communities/Building Better Communities have been used as the reference point as the consortium appointed for the GLM1 and 2 projects.

While the DHHS Budget Questionnaire document identifies that the Public Housing Revitalisation Program's impact on housing affordability is 'n/a' (it notes an increase in private and social housing, but does not mention affordable housing)[40] - commentary from the government continually references affordability in relation to the towers renewal project.[41] As such, we assume that affordable housing is likely to be included in the housing mix as part of the Flemington redevelopment.

For a single person receiving rent allowance and job seeker, a one-bedroom flat in Moonee Valley at an 'affordable' level would take 60% of their income on rent.[42] The State Government places anyone paying more than 30% of their income as in 'rental stress.' This rental stress is further pronounced for low-income individuals as the remaining 40% available is a smaller overall amount.

For a single person receiving job seeker and paying rent in an 'affordable' Flemington Estate apartment under the HV plans, their remaining weekly would be $182 to cover all food, bills, transport, doctor fees, medication, and other key items. For both the 10% of current public housing residents paying market rent, and future 'affordable' housing tenants - the affordability of the Flemington demolition and rebuild is unaffordable.

Maintenance

As detailed in previous RRR studies on Ascot Vale and Barak Beacon Estates, the need for significant investment in public housing maintenance is the result of a long history of inadequate care and upkeep of public housing, identified in reports and audits since 1993.[43]

As part of the feedback collected during the Flemington Local Action Plan 2022-23, residents reported to the DHHS that:

> *When you are late on rent, communication is immediate, but if you ask about maintenance, you get no response.*[44]

For a full analysis of government underspend on public housing maintenance, see previous RRR studies.

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[40] Public Accounts and Estimates Committee, Inquiry into the 2024-25 Budget Estimates, May 2024, p.208.

[41] Minister Harriet Singh, as recorded in Hansard from the Legislation Council Victoria, 11 September 2024.

[42] This measure of affordability is informed by the 60% rate provided by Building Communities as part of the GLM model. We have assumed a similar modelling would be used across HV redeveloped sites.

[43] See *RRR: Ascot Vale Feasibility Study and Design Proposal, and RRR: Barak Beacon Feasibility Study and Design Proposal.*

[44] DHHS, *Flemington Local Action Plan*, 2022-23.

High-rise towers - Construction Typology

In 1964 the first high-rise tower was completed using the prefabricated large panel concrete technology produced at Holmesglen. The Holmesglen Factory was a concrete housing factory operated by the Housing Commission of Victoria from 1946-1962. The factory adopted a system of precast concrete building named the “Fowler” System and produced a range of precast concrete homes from single storey dwelling to four storey mid-rise estates (e.g. Barak Beacon).[45] All walls and floors were trucked to site and craned into configuration, allowing for efficiency in construction time. Wall panels are connected together via steel dowels and bolted connections, with floor panels welded together by steel tie bars.[46] While this approach offered efficiency of construction, the load bearing walls make any future alterations or spatial reconfigurations difficult. In total 42 high-rise towers were produced using this construction technique,[47] which at its time were ‘sophisticated and highly regarded in the industry’.[48]

(Left to right) Concrete panels at the Holmesglen Factory. Placing a load bearing wall panel on site. Steel rod connectors can be seen at the top of the panel. Placement on top of the steel rods. Photos from ‘High-rise at a Glance.’

These structures have the ability to resist lateral earthquake loading, but structural alterations would require testing to ensure this has not been compromised. When the buildings were designed, the code of practice outlined a 50-year life span for these structures. Since 2000, there have been updates for building facades with reports that concrete spalling has occurred to some, although there is no public record of this. As detailed in the Case Studies in Section 4.1 there are strategies for addressing concrete spalling to extend the lifespan of buildings.

[45] Industrialised precast load bearing wall construction, W.P.Brown.

[46] Karen Vella, *The High Rise at a Glance, A summary paper profiling Ministry of Housing and Construction Accommodation,* Ministry of Housing and Construction, 1990, p. 10.

[47] 200 Dorcas St South Melbourne and Hotham Hill Estate North Melbourne are insitu concrete.

[48] Karen Vella, *The High Rise at a Glance, A summary paper profiling Ministry of Housing and Construction Accommodation,* p.9.

Comparable approaches at other Victorian estates

Kensington Estate

Large-scale tower demolition has not frequently occurred in Victoria. The most comparable example was the 1998 redevelopment plans for the Kensington Estate. This process involved the initial relocation of tenants and subsequent demolition of one of the three-high rise towers on the site. The 13-storey block of 108 flats was demolished between October 1998 and June 1999. While the process aimed to deliver a public-private mix of housing in the redevelopment, a change from the Liberal to Labor government in 1999 saw a commitment for public housing investment on the site and retaining of the existing high-rise towers. The two remaining high-rise towers were refurbished.[49]

In 2013 the then Liberal government developed a similar plan for the demolition and privatisation of public housing Fitzroy, Richmond and Prahran Estates. This was met with opposition from Labor and the unions, as well as First Nations groups. At the time, Labor MP Richard Wynne described,

> We feel there is merit in saving all of public space for the lower-income members of the community. The last thing they need is to be built in.[50]

Tower Turnaround

In 2007, the Department of Human Services ran a competition called 'Tower Turnaround' for proposals to improve the use and sustainability of the high-rise towers in Melbourne. The winning entry by BKK Architects with Peter Elliot Architecture + Urban Design proposed a new facade element that could be plugged into an estate tower, offering an extension of space for residents. The prefabricated pod offered 1.2 by 3m bay-window living room extension, and extended the habitable space of the apartment by 25%. After winning the competition, the pod was successfully constructed and installed as a single prototype pod, however, was not installed more widely.

BKK's prefabricated pod being installed onto the existing high-rise building. Photo by BKK.

[49] Kate Shaw, Peter Raisbeck, Chris Chaplin and Kath Hulse, *Evaluation of the Kensington redevelopment and place management models. Final Report.* Prepared for the Department of Human Services. 2013.

[50] Minister Harriet Singh, as recorded in Hansard from the Legislation Council Victoria, 11 September 2024.

North Richmond Estate

In March 2022, MGS Architects released the Homes Victoria North Richmond Draft Master Plan. This plan retained the existing high-rise towers, and proposed the demolition of the low-medium rise public housing to be replaced in infill around the five retained towers. In this 2022 document, the towers directly informed the design of the master plan. As part of the works, the towers were set to be upgraded:

> *The existing towers will be upgraded to maximise the quality of the existing housing stock, providing modernised fitouts with improved thermal performance*[51] *The documentation also details the 'already underway' upgrades to the interiors of the towers.*[52]

These previous plans, considerations and investments appear not to have been considered in the tower refurbishment announcement - and it is unclear what has changed since 2022 regarding the feasibility of upgrading the five North Richmond towers which are now set for demolition.

Excerpt from the North Richmond Draft Master Plan March 2022 completed by MGS Architects which shows the 'upgraded existing buildings' with new infill.

[51] Homes Victoria and MGS, *North Richmond Draft Master Plan,* March 2022, p. 41.
[52] Ibid, p. 56.

4. Refurbishment as an alternative

This feasibility study is also informed by analysis of the sustainability and efficiency of a demolition and rebuilding approach to renewal. This section identifies how a demolition and rebuild model can overlook key forms of value, particularly: environmental sustainability and social impact. The HV approach also delivers outcomes which are counter to other housing and environmental objectives in Victorian policies:

Table 3: HRRP strategy misalignment with other Victorian Government strategies

Policy	**Misalignment**
Housing Statement 2024-35	The Housing Statement is considering opportunities to transform 80 commercial office spaces into 10-12,000 residential and mixed-use properties. This highlights a government appetite for adaptive reuse, and the potential for retrofitting existing buildings to bring them to contemporary living standards for residents.
Sustainability Victoria: ***The Next Wave,* 2013** ***Commercial building sector research and reports,* 2018** ***Comprehensive Energy Efficiency Retrofits to Existing Victorian Houses,* 2019**	The 2013 and 2018 reports found that commercial buildings constructed between 1960 and 1999 would yield the most success from a targeted performance-based retrofitting scheme, due to the large numbers of these buildings spread across CBD, metropolitan and regional areas. This pragmatic approach is significantly different from VAGO findings, which cited the age of public housing stock in Victoria (42% over 30 years old) as having a high maintenance liability. However, the document also identified that buildings 60 years and older had a significantly lower maintenance liability than those aged 20-40 years. The 2019 report highlighted that **existing house stock represents the largest potential for energy saving and greenhouse gas abatement in the Australian residential sector.**
State Government of Victoria, *Victoria's 2035 Emissions Reduction Target,* 2023	Reaching net zero emissions by 2045 will be impossible without prioritising the retrofitting of existing buildings, over demolition and new building.

4.1 Precedents: Refurbished Case Studies

A number of exemplary international tower refurbishment projects have been visited and documented by OFFICE as part of an Alastair International Research Grant. Titled *Retain, Repair, Reinvest: An International Study of Exemplary Public Housing Tower Refurbishment Projects,* the study tour incorporated 23 projects across nine countries. The case studies below are particularly relevant for the Flemington proposal and demonstrate the potential of refurbishment as a viable option.

Cedar Court, Glasgow, Scotland - Collective Architecture

Photo of the refurbished towers at Ceder Court Estate in Glasgow. Photo by OFFICE.

Designed by Boswell Mitchell and Johnston (BMJ Architects) in the 1960s, the three 23-storey towers—Torridon Court, Lorne Court, and Katrine Court—are located in the Red Road Estate in the northern part of Glasgow. While the original duplex apartments featured thoughtful designs, the Bison Manufacturing large panel system resulted in poor insulation and inadequate soundproofing due to thin internal partitions.

As time passed, the buildings' exterior deteriorated, and all three towers were eventually marked for demolition, reflecting a broader trend in Glasgow, where nearly a third of the city's tower blocks were demolished over the past 15 years. However, the decision to demolish the Cedar Court towers was reversed as the city adopted a more progressive approach to its high-rise housing. After years of neglect, the Estate was transferred to Queens Cross Housing Association (QCHA), which then engaged Collective Architecture to conduct a study on the future of the towers, with a focus on resident input. The refurbishment plan included entrance and ground-level improvements, enhanced energy efficiency, and minimal disruption to existing residents. Collective Architecture held community workshops and interviews to develop a detailed report proposing a retrofit solution.

Prior to the project commencing a structural investigation of the existing towers was undertaken. While there were some signs of structural deterioration, such as cracking and spalling, were observed, particularly on exposed elements. None of these were deemed to be beyond repair and, overall, the towers were in good structural condition given their age.[53]

Throughout the retrofit, the towers remained occupied, which required careful scheduling and site management to minimise disruption for residents. The retrofit strategy included enclosing balconies into winter gardens, adding insulation, and eliminating thermal bridging. New entrances with dual access were added at the base of each tower, along with internal gardens, community meeting rooms, children's play areas, and art studio spaces. New lifts were also installed. Externally, the buildings were wrapped in insulation and existing windows were replaced with triple-glazed units. The retrofit, guided by Passivhaus principles, achieved an 80% reduction in heating demand, and significantly reduced fuel poverty for 1,000 residents.

Telli Row B and C, Aarau, Switzerland - Meili, Peter and Partner Architekten

The prefabricated concrete balconies integrate into the existing building fabric while giving the façade a refresh. Photo by OFFICE.

The Telli Housing Estate consists of four housing blocks, built between 1971-91. The Estate is made up of 1,258 apartments, designed in blocks which have 6-8 floors at the ends, stepping up to 19 floors in the centre. The Estate is mostly car-free, with underground parking on the perimeter. Open spaces, communal facilities, and views of nearby mountains characterise the site.

[53] Alan Dunlop, 'Getting warmer: Collective Architecture upgrades Glasgow tower blocks', *Architects Journal*, November 2019.

In 2015, AXA began refurbishing Blocks B and C (581 apartments) to improve energy efficiency and replace outdated gas heating. Architects Meili, Peter & Partner were tasked with implementing the renovation without relocating residents. Key goals included improving energy performance, achieving Swiss sustainability certification, and keeping residents in place.

The renovation involved replacing the front facades with larger prefabricated balconies and wall linings that matched the original design. Improved ventilation, upgraded insulation, triple glazing reduced the heating demand by 62%. Seismic upgrades were made to the prefabricated stair course through the introduction of steel plates tying it back to the main building, along with fire safety upgrades.

Keeping residents on-site was a priority, minimising relocation costs and disruption. A prototype balcony was installed in 2018 and helped to test and refine methods. Tenants were temporarily relocated for 10 days while work was completed. During this time, new balconies were introduced which increased living space by 90 cm and included features like thermal breaks, riser cupboards for exhaust ducts, and retractable louvres.

Rent increases were offset by energy savings, and overall living quality improved with larger balconies, better insulation, and stairwell upgrades. Open communication with residents ensured minimal disruption, and most rental contracts remained unchanged, reflecting the success of this careful and socially considerate renovation.

Wilmcote House, Portsmouth, England - ECD Architects

Over cladding to the existing estate building have drastically increased the thermal performance, allowed for structural maintenance and reinvested the identity of the building for the residents. Photos by OFFICE.

Constructed in 1968, the block was built using the large Bison REEMA concrete panel design and would have been unlikely to last another 30 years without intervention. The windows and roof needed replacement, and the block’s outdated electric heating system

was costly for residents to operate, contributing to condensation issues and making the block expensive to maintain. Additionally, the lift lobbies in both stair towers experienced sporadic water ingress, damaging plaster and decorations.

Demolition was considered as an option due to ongoing maintenance issues, but the council ultimately rejected it for several reasons. The process of decanting residents, demolishing the buildings, and rebuilding would have taken a long time, requiring families to be temporarily relocated, and there was a shortage of available three-bedroom family units. Based on past experiences with decanting blocks like Horatia House and analysing the number of three-bedroom properties let in the last two years, it is expected that decanting could take 18-24 months, followed by at least another year for demolition before new dwellings could be constructed on the site. This lengthy process would not only adversely affect the local area but also strain the housing options waiting list, where demand for three-bedroom properties is particularly high.

A feasibility report for the cladding and refurbishment of Wilmcote House, prepared by external consultants ECD Architects Ltd, outlined a comprehensive plan to insulate the building's entire external envelope using a combination of cladding and render finishes, along with an inverted flat roof finish. The proposal included replacing the existing windows with high-performance triple-glazed units, with the goal of dramatically reducing the building's energy demand and, in turn, lowering residents' energy costs. The scheme also encompasses structural repairs, external and communal area redecoration, and the conversion of the redundant housing office into two new ground-floor three-bedroom flats. Additional improvements address fire safety, communal lighting, restricted access to communal areas, efficient electric heating and hot water systems, and the installation of over bath showers.

The success of this project has been evaluated by both Southampton University and the London School of Economics (LSE). Southampton University monitored the building’s thermal performance before and after the project, while the LSE surveyed residents at various stages—before, during, and after the works—to understand the challenges and benefits of keeping residents in place and the overall impact on their lives.

After the project’s completion, Southampton's findings indicated a significant increase in thermal comfort and reduced energy use in the flats. Meanwhile, the LSE report highlighted residents’ positive satisfaction. As a crucial advancement for affordable housing, Wilmcote House has garnered attention in the press and received multiple awards for its improvements.

Gueterstrasse 30, Pforzheim, Germany - Freivogel Architekten

The new façade and cladding has not only increased resident comfort, but also the building's appearance. Photo by OFFICE.

Located near Pforzheim train station, the nine-story residential block built in the 1970s was recently refurbished to meet contemporary standards and achieve nearly zero carbon emissions. The existing building had issues such as leaks, outdated bathrooms, and high energy costs. The retrofit aimed to improve the buildings energy performance, add decentralised ventilation, and create larger private outdoor spaces. New balconies and an additional level were added, increasing unit numbers and enhancing the building's appearance.

The works were undertaken while the residents still occupied the building. Due to this the interventions within the apartments were kept to a minimum with onsite work reduced through extensive prefabrication. The entire new facade is reclad in precast stone panelling with the prefabricated concrete balconies and structure assembled onsite.

The old electric systems were replaced with a new integrated HVAC system using capillary absorbers, a heat pump, and an ice storage tank for energy storage. Renewable energy systems, including photovoltaic panels and a wind turbine, provide sufficient electricity, with surplus fed into the public grid.

The energy consumption of the new proposal is significantly lower than previously. Due to lower energy costs the increase in rent was offset for the residents will drastically increase their comfort and well-being. The carbon emissions of the new retrofit are 95% lower than prior to the works.

5.0 Flemington Estate

Overview of the Estate

The Flemington public housing Estate is home to a vibrant, multicultural community, with nearly 1,500 people living across its 716 properties in four high-rise towers. The community is notably diverse, with almost 60% of residents coming from culturally varied backgrounds, including Ethiopia, Somalia, and Vietnam, in addition to Australia.[54] The Estate is home to both the young and the elderly, with around 33% of households including children or young people, and approximately 15% having at least one person over the age of 65. Many residents have formed deep roots in Flemington, with over half (57%) having lived there for six or more years.[55]

Existing site plan of Flemington Estate from early 2024.

1- 12 Holland Court High-rise tower
2 - 120 Racecourse Rd High-rise tower
3 - 130 Racecourse Rd High-rise tower
4 - 126 Racecourse Rd High-rise tower

A - Racecourse Rd
B - M2 Freeway
C - Community Garden
D - Playground and BBQs
E - Phase 2 GLM (in construction)
F - Phase 1 GLM complete
G - Djerring Community Hub
H - Debneys Park

Flemington Estate is located in Melbourne's inner north-west, approximately 3km from the CBD. The 1960s Estate sits within the City of Moonee Valley, and contains four high rise towers of 21 storeys each, as well as the recently demolished three and four storey walk-up unit blocks. The Estate also provides car parking, playgrounds and communal open spaces.

[54] DHHS, *Local action plan 2022-2023*: *Paving the Way Forward Flemington*, p.8.
[55] Ibid, p. 8.

Over the past nine years, the site has been earmarked for renovations and upgrades, focused on the walk-up units. Holland Court, within the Estate, was originally one of the 11 walk-up sites slated for demolition under the Public Housing Renewal Program in 2017. It was subsequently developed under the GLM2 as part of the Big Housing Build, as detailed below.

(Left) This masterplan is from the Debney Precinct Structure Plan completed in 2017 by Message Planning and Urban Design. (Right) This masterplan commissioned by DHHS from Hayball Architects was part of the Design Framework in support of the 2017 planning amendment. Both show infill development around the retained towers.[56][57]

Flemington Estate tower. Photo by Ben Hosking.

[56] Hayball, *Design Framework, Public Housing Renewal Project: Flemington Estate,* June 2017.
[57] Message Consultants, *Debney's Precinct Structure Plan,* June 2017.

The timeline below details the process of amending the planning scheme which facilitated both the Holland Court walk-up demolition, as well as creating the conditions for larger scale estate renewal through zoning and other planning controls and governance. (For further details, See Appendix 1).

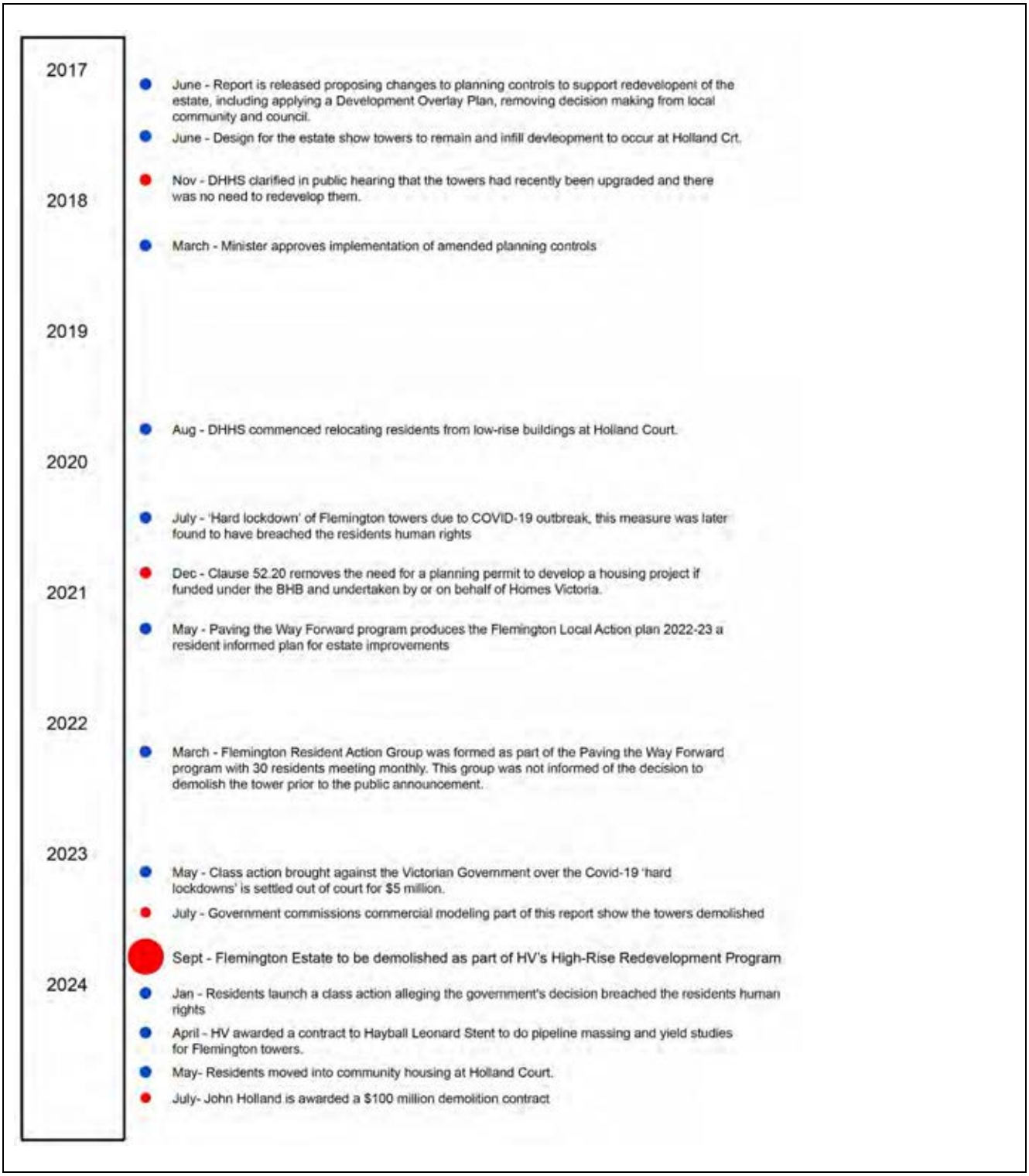


Figure 5: Timeline of key changes to the planning scheme and subsequent activities at Flemington Estate.

In addition to Homes Victoria announcing the demolition of the towers in 2023 after confirming they had no intended to replace them due to recent upgrade in 2017 - this timeline also highlights that Homes Victoria has not upheld the recommendations that it 'continue to engage in meaningful consultation with both Council and the community in relation to any Development Plans for future proposals to redevelop the towers.'[58] The announcement in 2023 was a surprise to residents, who found out about the plans at the same time as the broader Victorian public.

Holland Court

Following the 2019 relocation of residents and demolition of Holland Court walk-ups, Phase 1 of the redevelopment was announced (then under the PHRP). The 198 previous dwellings were replaced by 218 new community homes, and 126 affordable dwellings, delivered by the Building Communities Consortium through the GLM2.

Visualisation showing the proposed Holland Court redevelopment by 6 Degrees Architects. Image from Homes Victoria.

In 2023, Phase 2 of the Flemington Housing Estate redevelopment for 58, 60 and 62 Holland Court was delivered by Building Communities Consortium through the Ground Lease Model. This project sees the site of demolished public housing walk-ups replaced with 50 community and 236 affordable new dwellings. The three buildings have been designed by Six Degrees Architects, and separate the community and affordable tenants across the site (one six-story community housing block, and two twelve-story affordable housing buildings). This approach sits in opposition to the support for the redevelopment provided by Victorian Public Tenants Association, who highlight that a 'tenure blind' approach that is limited to the appearance of the building does not deliver a 'salt and pepper' mix of tenants and sees social housing residents confined to their building.[59]

[58] Social Housing Renewal Standing Advisory Committee Debney's Precinct, Flemington, Report 2 | 10 November 2017, Page 12

[59] Victorian Public Tenants Association, *Submission to: Public Housing Renewal Standing Advisory Committee - Flemington Estate Renewal.* 2017, p. 9.

This ‘Tenure Equity’ is one of the 13 Design Principles established for the redevelopment of the Estate by Hayball Architects.

The majority of the new dwellings will be one bedroom (171 units), with 108 two-bedroom units (100) and townhouses (8). Only six units will be three bedrooms, suggesting limited opportunity for families with multiple children to move into this development. It is not currently clear how these dwellings will be split across the 50 community and 236 affordable dwellings.

Covid-19 lockdowns and class action

Prior to the demolition of low-rise (Holland and Victoria St) and now high-rise housing on the Estate, Flemington residents also experienced significant stress in 2020 during the COVID-19 lockdowns. Thousands of residents across Flemington and North Melbourne public housing towers were detained in their homes by police, in an effort to minimise the spread of COVID-19. Private apartment blocks in high-risk areas did not experience this same 14-day hard lockdown. In a 2020 review the Victorian ombudsman found that the government had breached the human rights of residents, and the 14-day detainment was not consistent with the health advice at the time. The government has not apologised for these actions, despite the ombudsman findings and recommendations to do so from the state’s complaints watchdog. In May 2023, a class action was settled against the government, who were required to pay $5 million in compensation to 2,500 public housing residents who filed the claim.[60]

Flemington tower demolition announcement

In September 2023, Flemington Estate was announced as one of five estates first tranche of towers to be demolished as part of HV’s High-Rise Redevelopment Program. Residents received fliers under their doors or handed leaflets by HV staff ‘along with chocolates and biscuits’, however, many first heard about the demolition of their homes on the news.[61]

In January 2024 a resident group launched a class action against the government and housing minister, Harriet Shing. Residents alleged the government's decision breached the residents human rights, through interfering with their homes, property rights and had detrimental impacts on children. The lead plaintiff described,

> The decision has taken an emotional and physical toll on me and my community. The government didn't consult with us or tell us about the decision. We found out from the media.[62]

[60] David Estcourt, ‘Tower tenants win $5m in pandemic lockdown settlement, but no apology.’ *The Age,* 9 May 2023.
[61] Rachel Dexter and Cara Waters, ‘Wholesale destruction of public housing’: Fears raised over tower knockdowns.’ *The Age,* 21 September 2023.
[62] Kristian Silva and Richard Willingham, ‘Residents sue the Victorian government over public housing demolition plans.’ *ABC News,* 25 January 2024.

In May, supreme court justice Melinda Richard's rejected the argument that the government and minister should be defendants. The case is now proceedings with HV listed as the sole defendant.

130 Racecourse Road will be demolished as part of the High-Rise Redevelopment Program. Photo by Ben Hosking.

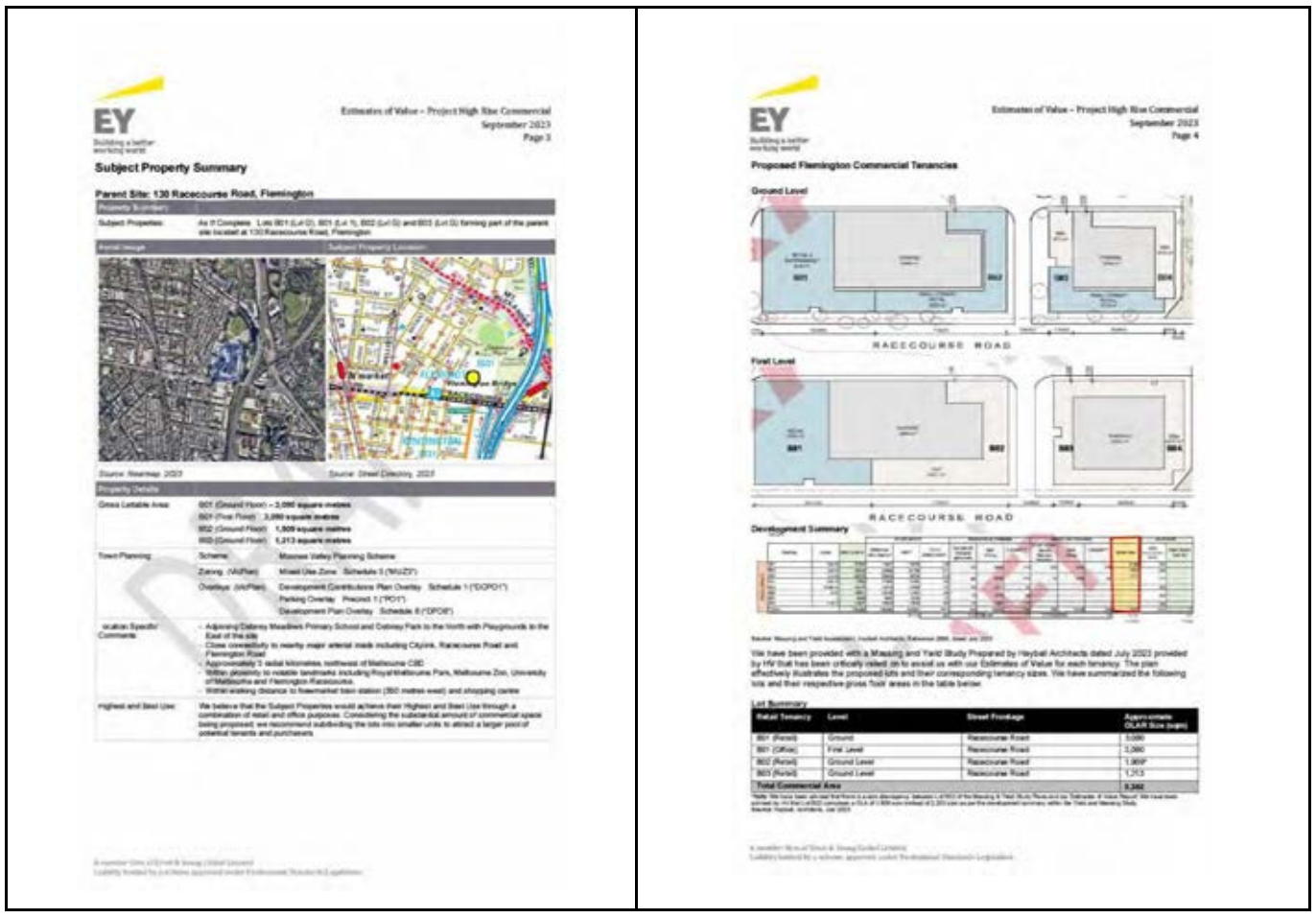
Commercial Modelling

In July 2023, Ernst and Young (EY) were awarded a $150,000 contract for 'Commercial/Financial Support' for the 'regeneration of several HV's high-density sites within Melbourne.' *The Estimate of Value - Project High Rise Commercial* aims to determine the 'highest and best use' for the first two floors of the high-rise tower at 120 Racecourse Road. Flemington Estate had previously been identified by EY as one of nine 'high yield' focus sites. The report recommends the combined 9302 square metres of gross lettable area be transformed into a combination of retail and office uses.

The document suggests that due to the 'substantial amount of commercial space being proposed, we recommend subdividing the lots into smaller units to attract a larger pool of potential tenants and purchasers.' This inclusion of property sale is also referenced in EY's Commercial and Retail Demand Study where the unlet levels of demand for commercial/retail assets for the sites are described as 'either as a rental product or a

purchase product.' If this approach were pursued by HV, it could result in the privatisation and loss of public land.

Significantly, the report is informed by the Massing and Yield Study undertaken by Hayball Architects in July 2023. This plan, which predates the announcement of the tower demolition in September 2023, does not include the towers in the site master plan. As this is the most recent and only publicly accessible proposal for the Flemington site, the RRR study will be assessed against this Hayball plan. Refer to Appendix 15.



Excerpts from the Ernst and Young financial report clearly showing the Hayball Architects yield study for commercial tenancies along Racecourse Road.

Community Consultation

In 2021 the Department of Families, Fairness and Housing set up Paving the Way Forward (PTWF). This initiative was established to find better ways that the DFFH and residents of North Melbourne and Flemington Estates could work together. This program went on to inform the Flemington Local Action plan 2022-23 with the intention to;

- develop a new way of working with residents at the Flemington and North Melbourne public housing Estates
- solve local issues
- build on local strengths.[63]

The action plan identified 'communication and participation' as a key focus area, in response to resident needs for 'more opportunities to express what we want and need and participate in decision making.'[64] Residents reported communication barriers with DHHS through a lack of 'respect and understanding' as well as a lack of 'transparency and trust.'[65]

In March 2022, the Flemington Resident Action Group was formed as part of the program. Made up of 30 residents it is stated in the action plan that the group will meet monthly up to June 2023.[66] In September 2023 the tower demolition was announced to the public, with no prior communication from DHHS or 'input on decision making' from tower residents.

Relocation process

In May 2024, Homes Victoria reported that

- 98% of Flemington and North Melbourne residents had met with the relocations team
- 94% had submitted an application form to work with the relocations team to 'find a home that is right for them and their needs'

HV has allocated $10.4 million for the relocation process for the Flemington and North Melbourne tower residents, and in September 2024, Homes Victoria interim CEO Dannii de Krester announced that "over half of residents have either relocated to, or are matched to, a new home that suits their needs."[67] However residents have reported

[63] DHHS, *Flemington Local Action Plan*, 2022-23, p.3.
[64] Ibid.
[65] Ibid.
[66] Ibid, p.8.
[67] Homes Victoria, 'Big Housing Build's next big step to provide more and better homes', *Homes Victoria website,* September 2024.

feeling pressured to move out of their homes, and 'made to feel there was no other option.'[68]

A resident's group from the Flemington and North Melbourne towers wrote to Homes Victoria and Minister Shing to report the inadequacy of the Victoria Street option for many residents. The letter explains 'These units do not meet our needs - they are cramped, lack space for our families and cultural practices, and fail to provide essential privacy and amenities.'[69] In order to move into the smaller units, public housing residents were told to 'place our kitchen tables on the balcony, downsize to a small fridge, and sell our vehicles.'

The letter also identified the key issue of the limited housing available at Victoria Street—which has also been touted as available to returning residents from the demolished walk up, along with displaced residents from the Flemington and North Melbourne towers. The Victoria Street site redevelopment has 240 community homes, which is less than a quarter of the homes required for all 120 Racecourse Road Flemington, North Melbourne and returning Victoria St residents.

In the survey's OFFICE conducted with residents as part of the RRR process, residents also expressed frustration over the relocation process.

Staff are coming to front doors to speak about moving - not giving full details on property offers (Flemington resident survey feedback)

The 'right to return'

The question of the 'right to return' has also been queried by residents, who have been assured by HV they can return to their homes once the demolition and rebuild is complete. However, despite a guaranteed 10% increase in community housing, based on previous BHB and PHRP delivery, there are likely to be fewer overall rooms in the newly developed towers. Rather than provide a guarantee to residents that they will be guaranteed a return to Flemington Estate, HV have stated that

> Renters will be given the opportunity to return to their new neighbourhood following the redevelopment **based on their ongoing eligibility and needs, and the suitability of the new homes.**[70]

Request for further clarification from HV or assurances that they will develop homes that are suitable for the current residents to return to have not received a response.

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[68] Benita Kolovos, 'Melbourne public housing towers demolition to go ahead despite residents' class action', *The Guardian,* 18 July 2024.
[69] Residents Letter, sent to Homes Victoria, 15 July 2024.
[70] Homes Victoria, 'Big Housing Build's next big step to provide more and better homes', *Homes Victoria website,* September 2024.

6.0 Retain, Repair, Reinvest: Flemington

This report examines the feasibility of applying the Retain, Repair, Reinvest strategy to the Flemington Estate.

In the Homes Victoria plan, the entire Flemington Estate will be redeveloped, with all towers slated for demolition. Low and medium density public housing at Holland Court and Victoria Street has already been demolished and replaced with community housing. The broad rationale for the high-rise demolition which has been applied to all 44 towers across Melbourne is that they are coming to the end of their operational life and no longer meet current building codes and contemporary living standards. It has been deemed 'not feasible to upgrade them to modern design liveability and accessibility standards.'[71]

While there is no clear reasoning why specifically the Flemington towers are being demolished, we have assumed that the issues outlined in Simon Newport's Inquiry comments and also listed on the HV site to being the reasons:

- Ceiling heights that do not permit services to run between floors
- Faults and breakdowns with electrical, plumbing and lifts
- No heating or cooling, and poor thermal comfort for residents across the seasons
- No verandahs and difficulty cleaning windows

There has been no publicly available feasibility study to determine if retrofitting the towers is possible. Section 8.2 identifies how the Retain, Repair, Reinvest model can deliver against all of the above objectives, while also providing improved economic, social, and environmental outcomes.

Environmental Sustainability

Globally, the building and construction industry is accountable for 39% of the world's carbon emissions. 28% of this relates to the operation of the buildings and the remaining 11% resulting from the manufacturing of new materials such as steel, cement and glass.[72]

There are increasing shifts internationally towards retrofitting and refurbishment as an alternative to demolition. This approach has been identified internationally in the Greater London Authority's draft London Plan, which sets out design principles that will prioritise

[71] Homes Victoria, 'High-Rise Redevelopment - Frequently Asked Questions' 2024.

[72] United Nations Environmental Program, *Global Status Report for Buildings and Construction Sector, 2019 Global Status Report for Buildings and Construction Sector* | UNEP - UN Environment Programme

the retention and refurbishment of existing buildings.[73] In March 2024, the British Royal Institute of Chartered Surveyors (RICS) launched a new Residential Retrofit Standard, in response to increasingly high energy prices and government net-zero targets.[74]

Victoria has its own target to reach net-zero by 2050, as outlined in the Victorian Climate Change Act 2017. ³ To meet these ambitious net zero emission targets, it will be essential that construction practices change and buildings reduce their embodied carbon emissions.[75]

Social and wellbeing impacts of relocation

There has been no publicly available social impact analysis conducted to measure the potential impact of the demolition, relocation and rebuild of Flemington Estate. However, we can draw upon evidence from comparable renewal programs, and economic data on the health and education impacts of temporary displacement and interruption to community networks and connections to indicate some of the costs associated with the planned HV model at Flemington.

Evidence from previous Estate renewals include the findings from the Kensington Estate, which saw only 20% of residents return to the newly built dwellings. While there were a number of reasons for this — including residents being happy with their alternative accommodation — research also highlights that others did not return out of a 'desire to avoid the disruption of a second relocation, the time taken for new units to become available, and the reconfiguration of dwelling styles on the redeveloped Estate which meant not all households were able to be re-accommodated.'[76] For further discussion of the impact of relocation during estate renewal, see the RRR: Ascot Vale, and RRR: Flemington Estate report.

Internationally, there is evidence to suggest that the relocation of residents as part of urban renewal schemes comes at a cost with detrimental impacts on physical and mental health, as well as impacts of 'families, friends and communities' who are 'all impacted as the social, economic and health effects of those displaced ripple out.'[77]

Reports show documented evidence of death, suicide and self-harm as a direct result of displacement from urban renewal.[78] One researcher in the UK found that 1 in every

[73] As cited in. Cheshire, D. and Burton, M. The carbon business case for choosing refurbishment over new build, AECOM. https:// aecom.com/without-limits/article/refurbishment-vs-new-build-the-carbon-and-business-case/

[74] RICS, *RICS Launch Pioneering New Standard to Revolutionise Retrofitting Practices across the UK,* March 2024.

[75] For a full list of the Victorian Government's action on climate change, see the policies outlined at https://www.climatechange.vic.gov.au/victorian-government-action-on-climate-change

[76] Shaw, K. et al. *Evaluation of the Kensington redevelopment and place management models Final Report.* (Victoria, Department of Human Services, 2013).

[77] *Understanding the assumptions and impacts of the Victorian Public Housing Renewal Program,* p.27.

[78] See Appendix 2, *Demographic Analysis: racial composition.*

hundred residents died during estate renewal.[79] If extrapolated to the 10,000 relocated residents as part of the High-Rise Redevelopment Program, this would account for 100 avoidable deaths.

While it is impossible to quantify the full extent of the impacts of relocation and displacement for residents and communities, modelling provided previously by SGS Economics and Planning into the health and education costs of temporary relocation provides some insights into the scale of cost. See Appendix 3 for details of how these costs were calculated.

Table 4: Health and Education costs of relocation at Flemington Estate under the HRRP.

HRRP Flemington Estate Social Costs (720 Dwellings)	
Health Cost (1500 people[80])	$2,088,000
Education Cost (380 children[81])	$2,492,724
Total Social Costs	$4,580,724

Flemington Resident feedback

OFFICE held two community engagement sessions with Flemington residents, to understand what they liked about living on the Estate, and what needed improvement.

Nineteen residents provided formal feedback via surveys, who lived in the 120 and 130 Racecourse Road towers, as well as one resident who had previously lived in the demolished walk-up in Holland Court. Residents had lived on the Estate for an average of 14.5 years, with one resident living in the Estate for 26 years with four other family members.

[79] Paul Watt, *Estate Regeneration and Its Discontents: Public Housing, Place and Inequity in London,* Policy Press, 2021.

[80] There are almost 1,500 people living across the 720 properties in the Flemington Estate. As cited in: DHHS, *Local Action Plan 2022–2023 Paving the Way Forward Flemington*

[81] About a third (33 per cent) of all households on the Flemington Estate include children or young people. 380 children is calculated on demographic studies of 1.6 children per family.

OFFICE presenting at a community event in Flemington Estate in 2024. Photo by Ruby Yao.

13/19 participating residents highlighted the importance of community and connection as a key value of living in the Estate. The central location was also highlighted by 12/19 residents, who cited the connection to family, key services, and public transport as very important to them.

'The community and the togetherness. It is close to my family, the hospital and the city.' (Flemington resident survey feedback)

Residents mentioned the liveability and friendly neighbourhood of Flemington, and a sense of safety in the community. The playground and community hub were also valued by residents.

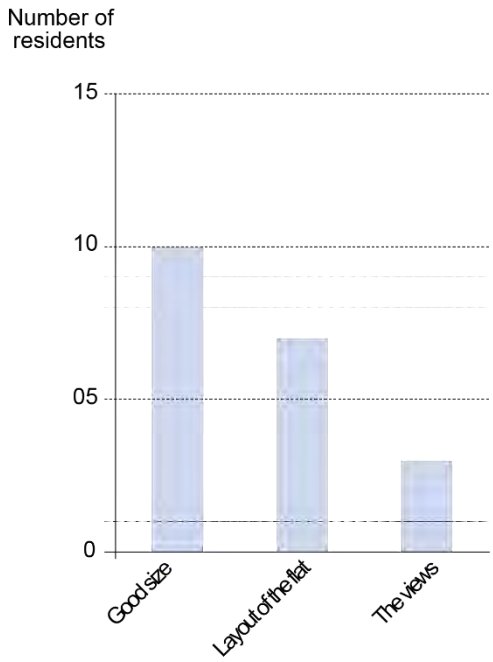


Figure 6: Resident responses to a survey question asking what they liked most about living on the Estate.

The most cited improvement for the Estate was the need for increased maintenance and cleaning. This included a need for the installation of air conditioning, and dealing with mould. Other Estate concerns included safety, creating more secure car parking for residents as well as playgrounds and sports fields.

Other comments from residents about their upcoming relocation for the demolition of the towers highlighted concerns about leaving their community, the size of the new apartments, and frustrations over engagements with the relocations team.

Two residents reported a sense of loss of community and ‘disruption’ to their lives.

> Please don't demolish our homes. It's a sense of belonging for us, lots of different ethnicities and cultures live here and we will be devastated. (Flemington resident survey feedback)

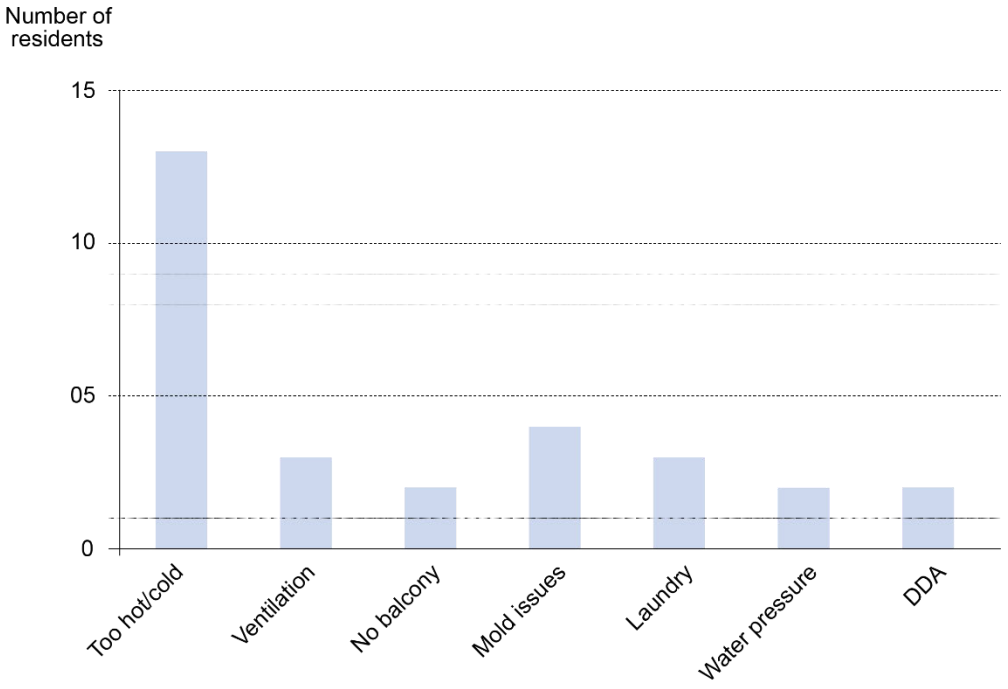


Figure 7: Resident responses to survey question about what needed improvement at the Estate.

Demographic Analysis

Research by RMIT academics has analysed the current racial composition of the Flemington and North Melbourne towers, compared with the broader Moonee Valley and City of Melbourne LGAs. The demographic profiles of the tower residents, based on 2016-2021 Census data demonstrate that towers are home to residents where at least 69% identified as having overseas ancestry.

Compared to their surrounding suburbs, the Estates have high concentrations of people from Sub-Saharan ancestral groupings. As demonstrated in Map 1, the declared ancestry groups of tower residents are significantly more diverse than the predominantly 'Australian' declared ancestry of Flemington or North Melbourne.

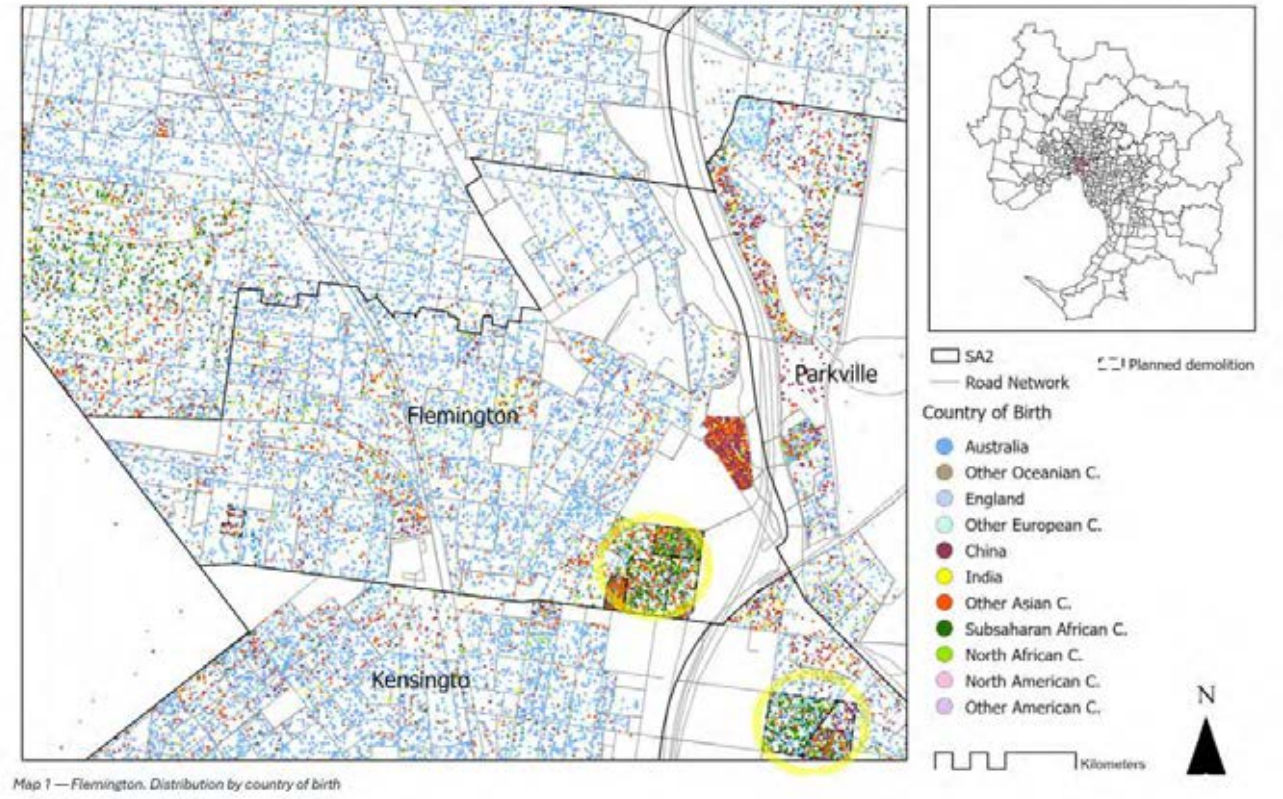


Figure 8: Distribution of residents by country of birth. Map by RMIT.

Flemington has a particular concentration of tenants born in both North and Sub-Saharan Africa, compared with broader LGA demographics. This mapping highlights both the potential loss of community resilience and strength that would occur through relocating residents, as well as the loss of diversity within the wider LGA if these residents do not return to Flemington in 2031 when the new development is complete. Given the 15/20% return rate at Kensington and Carlton, it is likely that Flemington as a suburb could lose up to:

- 81% of people born in Sub Saharan African and 80% of Sub-Saharan ancestry
- 38% of people born in North Africa and 48% of North African ancestry
- 38% of people of North African and Middle Eastern ancestry

See Appendix 2 for the full demographic analysis and methodology for this study.

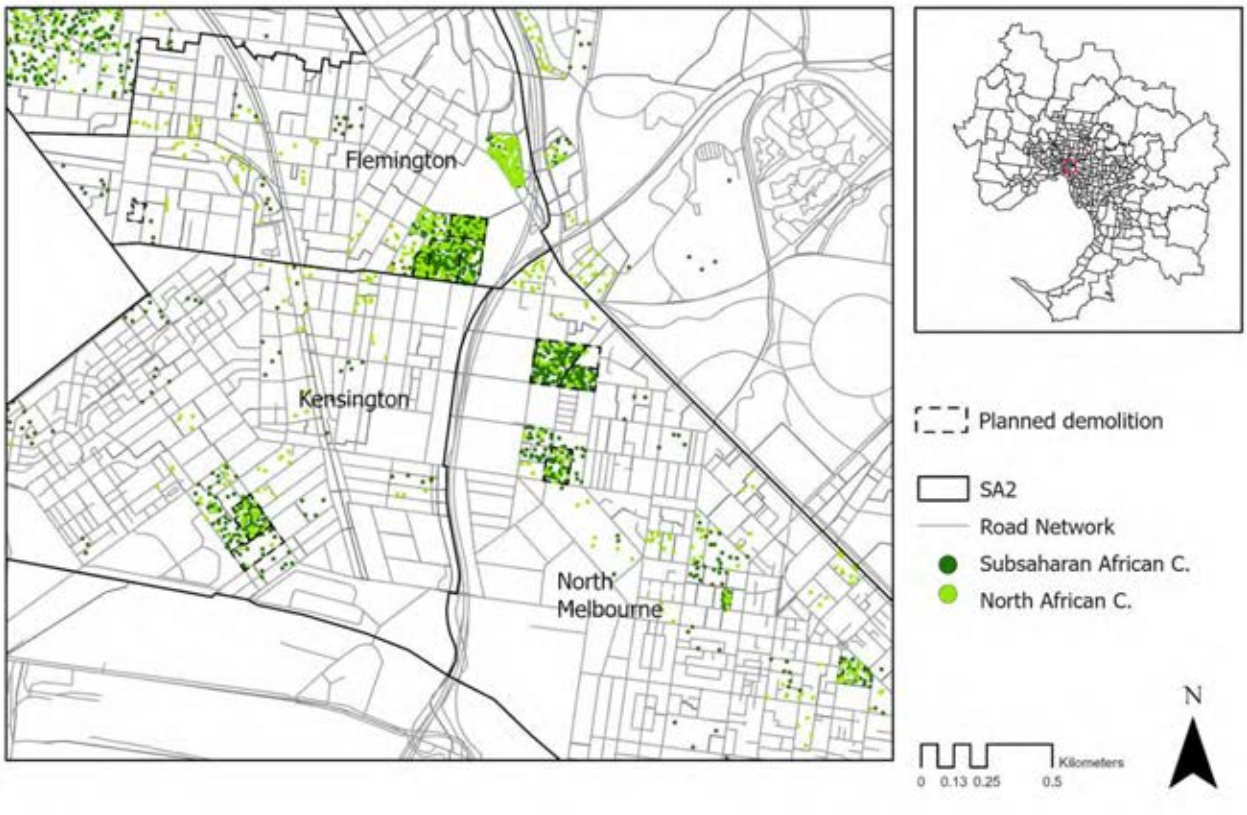


Figure 9: Distribution of Sub Saharan and North African residents in Flemington, Kensington and North Melbourne. Map by RMIT.

7. High-Rise Redevelopment Project: Homes Victoria Flemington Design Proposal

7.1 Design context: Hayball Flemington Estate Redevelopment Proposal

In July 2023, two months prior to the announcement by then Premier Daniel Andrews that all 44 towers would be demolished, business consultants Ernst and Young received a Massing and Yield summary prepared by Hayball for Flemington Estate (refer to Appendix 15). Pages from this summary were obtained through a FOI request and show the demolition of all four high rise towers with a new commercial and residential development.[82] These plans include five new 4-20 storey developments with integrated car park podiums. The development strategy favours a commercial objective with 9,302m2 of tenancies occupying ground and first floors along Racecourse Road. The plan details 1,297 dwellings, with a mixture of one, two and three-bedroom units. As this is the only proposal for the site publicly available, OFFICE will use this to assess against a RRR proposal.

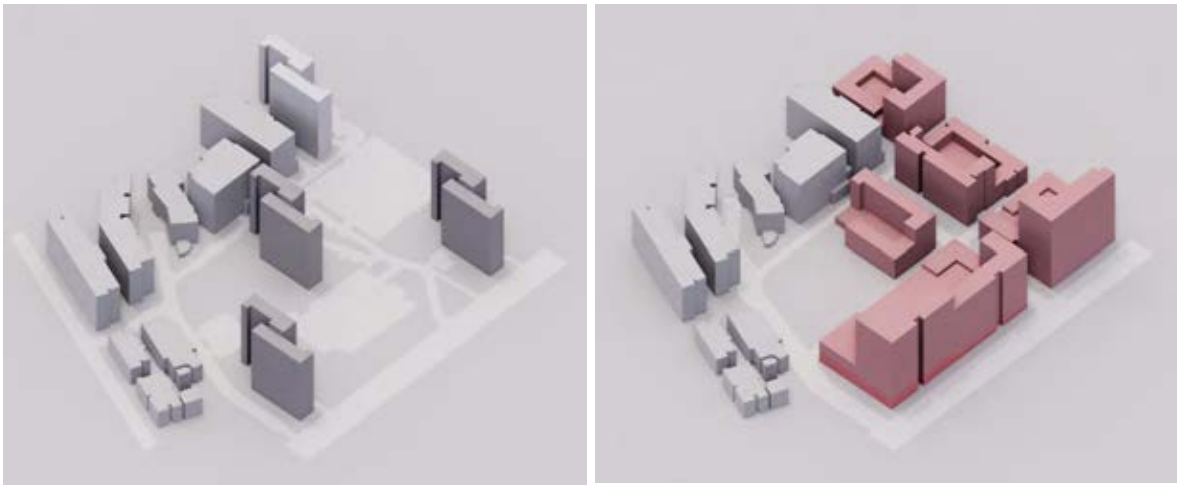


Figure 10: (Left) Model showing the current condition of the Flemington Estate. (Right) The HRRP proposal for new buildings and the demolition of all four towers. Images by OFFICE.

HRRP Flemington Proposed Dwelling Numbers

The HRRP proposal for Flemington Estate includes 1297 dwellings, this is an increase of 557 units. With the stated uplift of 10% social housing, this will result in an overall of 72 new community housing units. As has been observed in renewal proposals as part of the PHRP and BHB, while there is an increase in unit numbers due to the large numbers of one-bedroom flats replacing two or three-bedroom flats there is frequently an overall decrease in occupants. This loss of overall bedrooms means that the 'right to return' will not be possible for all temporarily relocated public housing residents to return to the newly developed social housing.[83]

[82] Ernst and Young, *Estimates of Value (Commercial) – Project High Rise*, September 2023.

[83] Kelly, D., et al., 'Shh! Don't mention the public housing shortage. But no serious action on homelessness can ignore it', *The Conversation,* 2019.

HRRP Costings

While official costs are not publicly available, Table 5 and Table 6 outline the key redevelopment costs associated with the proposed demolition, resident relocation and rebuild of the entire Flemington Estate using the 1297 new dwellings as the basis for our cost estimates. These calculations aim to include the true cost of the renewal program and are not currently captured in available government budgets. As detailed in Appendix 4, where uncertain, we have applied the most conservative cost projections. The rationale for each costing is also outlined in Appendix 4, and the method has previously been peer reviewed by SGS Economics and Planning as part of RRR: Ascot Vale.

Table 5: HRRP new construction costs for 1297 dwellings

HRRP Flemington Estate Construction Costs	
Total Building Costs (including demolition)	$591,518,620
Contingencies	$59,151,862
Total Construction Cost (1297 dwellings + 9302m2 commercial)	$650,670,482

Table 6: HRRP relocation costs for 620 dwellings

HRRP Flemington Estate Relocation Costs	
Existing Resident Relocation Costs*	$218,870,850
Relocation Managerial Costs*	$8,872,779
Total Relocation Costs (620** dwellings)	$227,743,629

*These costs are based on DHHS daily rates per dwelling of $150, and managerial cost of 1.5% of construction costs as provided in the Supreme Court hearing NO. SCI 2020 02563 by Jamin Ben Crawley government representative. See Appendix 5 for a spreadsheet of the costs per day multiplied by the number of units and the projected minimum relocation period.

** Not all 720 existing dwellings have been included in the calculation. We have assumed 100 dwellings will be relocated into the recently completed community housing projects at Victoria Street or other vacant public housing.

As outlined in Table 7the full costs for demolition, relocation and construction of the 1297 new private and community housing using the HRRP is calculated at $878,414,111.

Table 7: HRRP Flemington Estate total construction and relocation costs

HRRP Flemington Estate Construction and Relocation Costs	
Total Construction Costs	$650,670,482
Total Relocation Costs	$227,743,629
Total Costs exc Fees	$878,414,111

This cost per new community housing dwelling represents the direct financial costs associated with demolition, relocation and rebuilding of the demolished public housing. In Section 6, this feasibility study introduces previously uncaptured value loss and project costs relating to social impact.

8.0 RRR: Flemington Estate

8.1 Design Limitations and Approach

Due to the lack of access to documentation and assessment reports of the towers, OFFICE has made use of the available data in preparing this alternative design proposal for 120 Racecourse Road. The following assessments and design proposal is based on the 1963 structural drawings of the S-Type tower at Atherton Towers produced by the structural engineers W.P.Brown and Associates. Due to the similar layout and construction system it has been assumed that these findings can be applied to the S-type towers at Flemington Estate at a concept design level. It is noted that further investigations on the current condition of each tower would need to be conducted as a site-specific investigation is required.

Aerial photos of Atherton Gardens Estate in Fitzroy (Left) and Flemington Estate (Right). Both contain four 20-storey S-type towers with minor differences to the layouts of north and south facing apartments.

8.2 Proposal for Flemington Estate

A feasibility study has been conducted into the refurbishment of all existing four towers at Flemington Estate with proposed infill housing on the site.

The feasibility study contains:

- Architectural Drawing Set
- Site Masterplan
- Structural Engineer Report
- Sustainability Assessment Report (existing buildings)
- Cost Plan Report

View of the RRR proposal shows a new cream brick entry and SDA units on the ground floor. Above are the new prefabricated concreate balconies with glass louvers for passive heat and cooling, as well as safety. Image by OFFICE.

8.3 Existing Buildings at Flemington Estate

The Flemington Public Housing Estate consists of four 20 storey towers with 720 units in total. Designed and built in the 1960s the towers are constructed using a prefabricated large panel system which was popular in Europe, and North and South America at the time.

The towers are all orientated north with units facing east and west. Serviced by a central lift core the units are accessed via two rear walkways which allows for cross ventilation and good access to daylight for all apartments. Three apartment types are replicated on each floor and are a mixture of two and three-bedroom. All rooms have windows and access to fresh air.

The towers are located on a large plot of land dominated by carparks and through roads. To the east of the site is a large community garden, play courts and BBQs. To the north is the Debneys Park sports field and the Djerring Flemington Hub.

The existing layout of each floor is identical, with all flats having a window to each room and cross ventilation. In total there are 180 units per tower. Image by OFFICE.

Infill - Alternative proposal

In June 2017, DHHS commissioned Hayball Architects and Message Planning Urban design consultants to undertake a design framework masterplan for Flemington Estate, specifically the walk-up development as part of the PHRP. While the study focuses on the redevelopment of the walk-up flats along Holland Court and Victoria Street, a masterplan for the future development of the whole Estate was proposed with the retention of all four high-rise towers and infill within the open space.

As demonstrated in the 2017 Design Framework masterplan, it is possible to retain the existing towers while reserving parts of the site for future development. OFFICE has incorporated this framework into the RRR Flemington Proposal, locating future infill sites on the existing carparks. Instead of developing the design for the new building envelopes, the team has focused on refurbishing the existing towers.

The 2017 master plan design response by Hayball, which shows the retention of the towers and new development throughout the Estate.

9.0 RRR: Design Proposal

The design team's approach to the feasibility study is to Retain, Repair and Reinvest.

- Retain existing communities by not relocating residents,
- Repair existing buildings to reduce environmental impact,
- Reinvest savings to improve comfort and upgrade public housing.

The Retain Repair Reinvest design proposal is to bring the existing high-rise towers up to contemporary standards of living while retaining the residents. This is achieved through the staging of new infill works with the refurbishment of the existing buildings.

The design has been informed by;

- Existing Flemington Estate resident feedback
- Architectural and landscape architectural input
- Structural Engineering input
- Environmental and sustainability design solutions
- Energy performance targets
- Quantity surveyor costings

Render of the retrofitted towers and surrounding infill. Image by OFFICE.

Table 8 provides an overview of how the RRR: Flemington Estate proposal meets all the environmental, liveability and access objectives of Homes Victoria.

Table 8: RRR Feasibility Study addressing key rationale for HRRP

HV housing objectives*	Synopsis of Proposed RRR Response
Liveable Housing Design Guidelines (LHDG) Silver and Gold Level	Gold Level is able to be achieved in all refurbished dwellings. (See Appendix 6 for full details)
Minimum standard of NatHERS 6 Stars with a 7-star average (social housing dwellings)	An environmental sustainability design consultant and quantity surveyor have provided a report on how to introduce small interventions into the existing buildings to bring them up to 7.5 Star NatHERS average rating. The new housing infill will achieve these minimum standards.
Increase housing numbers	The proposed infill housing in combination with the newly refurbished dwellings will achieve the same density as the HRRP plans.
Meeting Better Apartment Design Standards	This design proposal for renovating the existing building meets all aspects of the Better Apartment Design Standards. Except for the minimum dimension of secondary bedrooms. (See Appendix 7 for full details)
Redevelopment will include 1,2 and 3, 4-bedroom homes, responding to the changing needs of Victorian households	The refurbishment and infill will have a range of 1,2, 3 and 4-bedroom dwellings.
5% of new community housing dwellings will be easy to access for Victorians with disabilities	Five new ground floor SDA flats will be provided in each refurbished tower, with the infill also incorporating accessible units. All refurbished units are Gold level LHDG.
Social housing supply: innovatively increase the supply of social housing by maximising the number of new dwellings at each Site, achieving at least a 10% increase in the number of social housing dwellings above the existing number of dwellings per Site.	All new infill is proposed to be social housing. 80% increase

- In the absence of the High-Rise Redevelopment Program having stated objectives, these objectives are taken from the GLM and GLM2 developments as the most recent standards for estate renewal from HV.

9.1 Community Design Consultation

In addition to understanding what residents valued about living on the Estate, OFFICE also asked for feedback, insights and suggestions about the design, layout and functionality of their existing homes.

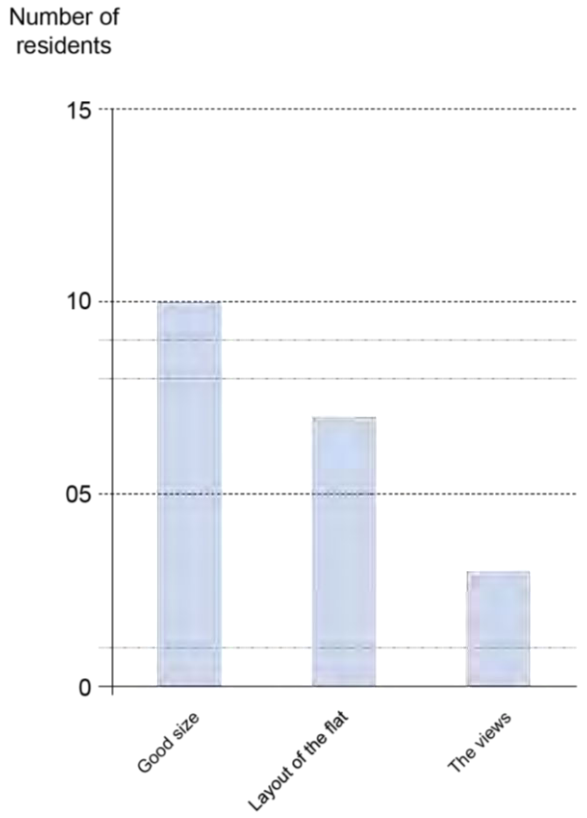


Figure 11: Resident response to survey question asking what worked well about the design of their flats.

Across two sessions, 19 residents provided feedback on their units. Residents reflected on their individual homes, which were largely viewed as having a good room size and layout. For larger families, the overall space was limited; however, residents reported generous storage.

I love the open and beautiful design (Flemington resident survey feedback)

I'm happy in my Estate. There is enough space for my belongings and my family. It is clean. I love everything about it. (Flemington resident survey feedback)

The key improvement to flats for 13/19 residents was a need for air conditioning to be installed (for both heating and cooling). Other key issues were mould and ventilation, where four residents reflected that the lack of ventilation was resulting in mould, which was not dealt with by Homes Victoria for over a year. Other improvements included updating the laundry (painting the space, and maintaining the machines so they don't break down), adding balconies and improved water pressure. The need for pre-emptive maintenance, through improved cleaning schedules and addressing issues like blocked drains, was cited by three residents.

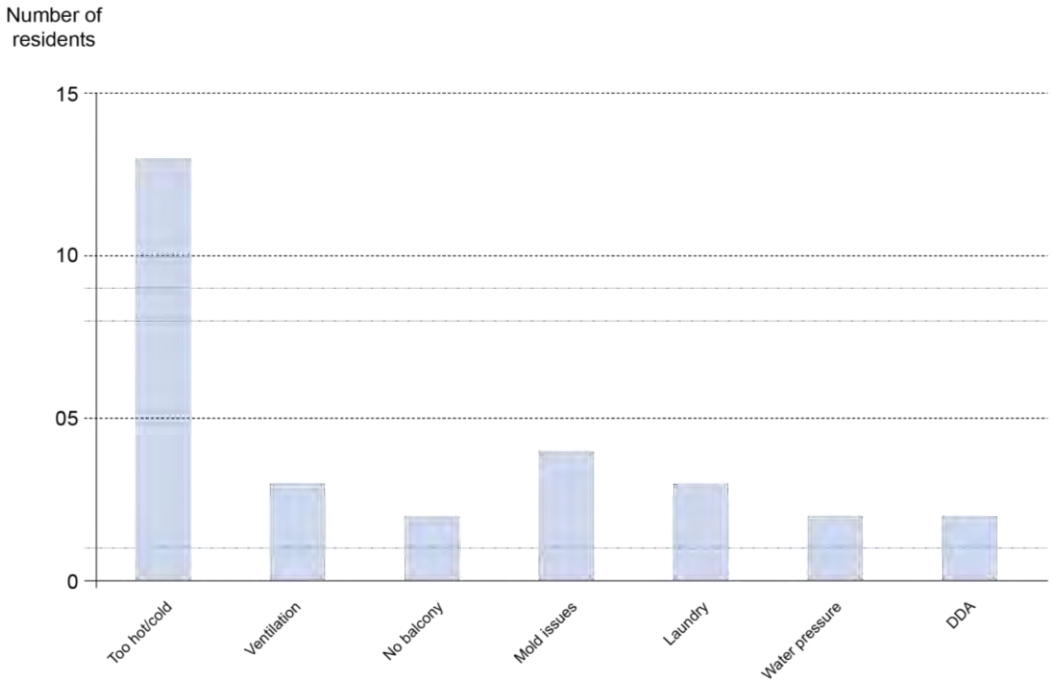


Figure 12: Resident responses to survey question asking what about their homes needed improvement

This feedback was incorporated into the proposed retrofit design through a number of design solutions:

- New kitchen and bathroom joinery, fixtures and fittings throughout.
- New double-glazed operable windows and doors.
- A balcony addition to the east and west facades, creating additional living space and providing sun shading to bedrooms and living areas.
- AC split system to each unit for heating and cooling.
- Allowance for upgrades to plumbing systems.
- New SDA apartments on ground floor, widening of corridors and doorways throughout to increase accessibility.

9.2 Structural Assessment

A structural assessment was undertaken by Sheer Force Engineering, a Victorian structural engineering company who has expertise in adaptive reuse and heritage buildings. The assessment was undertaken on the construction drawing set of the S-Type tower at Atherton Gardens drawn by W. P. Brown & Associates and generally dated 1963.

As part of the structural assessment, three different scenarios were explored:

- Assessment of the building under earthquake loading equivalent to that of 33% of current design standards
- Assessment of the building under earthquake loading requirements as outlined in current design standards (100% of design seismic load)
- Assessment of the building under earthquake loading requirements as outlined in current design standards however with the north and south façade concrete precast panels removed to allow installation of an apartment “extension” to facilitate increase in floor area per apartment.

The structural assessment identified both non-compliance within the existing building to current code as well as strength deficiencies in the event of an earthquake. While these factors deem the existing building to be non-compliant through the retrofitting of bolted steel plates the building can be made to comply.

General Non-Compliances with Current Code
A number of construction elements within the existing building were deemed to be non-compliant when assessed against current codes (refer to Appendix 12 for further detail) The scope of this assessed the S-Type building against current code requirements which include:

• NCC 2022 Volume 1 (for structural related elements)
• AS1170.0 :2002 – Structural Design Actions – General Principles
• AS1170.1 :2002 – Structural Design Actions –Permanent, Imposed and other Actions
• AS1170.2 :2021 – Structural Design Actions – Wind
• AS1170.4 :2007 – Earthquake Actions in Australia
• AS3600 :2018 – Concrete Structures
• AS3826 :1998 – Strengthening Existing Buildings for Earthquake [84]

[84] *AS3826 is not referenced in the NCC as it is not applicable to new buildings, but is a good basis for an assessment procedure which specifically deals with earthquake actions with respect to existing buildings.

Existing building non-compliances with current code:

1. **Wall Reinforcement Spacing** - *the maximum allowable spacing of vertical and horizontal reinforcement within structural walls*. A number of existing walls are non-compliant as the vertical and horizontal reinforcement exceed the maximum distance.

2. **Minimum Wall Reinforcement Requirements** - *the minimum quantity of reinforcement required within structural walls.* While the majority of existing walls meet the minimum quantity of structural reinforcement, a few do not. It is worth noting that the few that are non-compliant are also the lesser load-bearing walls as opposed to the principle load-bearing walls of which all pass.

3. **Minimum Dowel Bar Requirements** - *the minimum requirements for dowel connection of prefabricated structural walls.* The base connection for the majority of the pre-cast panels (both the principal load-bearing panels and the secondary load-bearing panels) relies on a half inch embedment (12.7mm) of the base of the panel into the wet-stich grout connection of the prefabricated wall panels, without the inclusion of reinforcement ties/dowels. This detail does not satisfy code compliance.

Existing building Strength Compliance:

1. Typical Slab Assessment: The typical slab structure has been assessed given the required design loading and proportions which have been provided within the structural documentation and summarised within this report. The typical slab/floor arrangement was generally found to be adequate and code compliant with current design standards. This includes the assessment for removal of the north and south façade pre-cast panels and
installation of the apartment extension.

2. Wind Assessment: Our assessment indicates that the building is structurally adequate under wind loading conditions when assessed based on current code requirements.

Existing building Strength Deficiencies:

1. **Seismic Loading:** Design deficiencies were observed with wall strength in both tension and shear action for seismic loading conditions. This was the case for both the 30% load application and 100% load application.

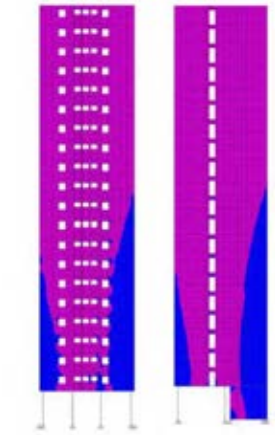


Figure 13: Elevation of the westmost primary load-bearing wall (Left) and the next internal wall immediately to the east (Right) indicating locations where the walls are overstressed based don seismic loading conditions (blue shaded area). Image by Sheer Force Engineering.

Rectification

These identified deficiencies can be rectified through installation of steel plate reinforcing retrofitted to the faces of the concrete shear walls. Through the introduction of these plates the design proposal is able to achieve 100% compliance with current building code.

In order to achieve the minimum connection requirements from wall to wall, it is proposed that a short length of steel plate be provided either side of the pre-cast panel which are connected to the panel via through-bolts. The steel plates are to continue from the top of one panel through the slab immediately above and connect to the base of the panel above.

There are also a number of locations where horizontal plate strengthening and continuous vertical plates are required due to insufficient shear capacity of the walls themselves.

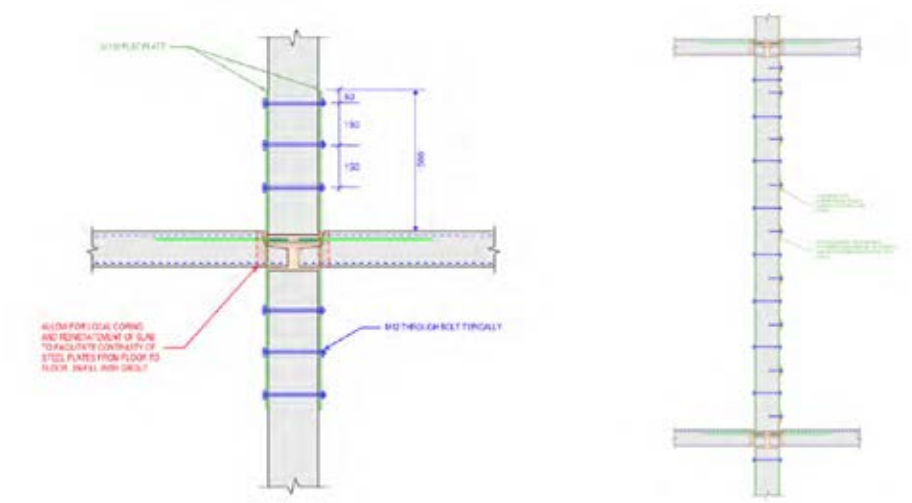


Figure 14: Proposed structural connection detail to make the building compliant to seismic requirements. Image by Sheer Force Engineering.

Carbon Fibre Strengthening

In addition to steel plate insulation, carbon fibre reinforcement offers an alternative solution. Carbon fibre strengthening has gained popularity over recent decades, often matching or exceeding the performance of traditional steel plate strengthening. While the placement of the reinforcement remains similar, installation time may decrease since bolting to concrete walls is not necessary. Carbon fibre strands are arranged in both directions to provide vertical tension and horizontal shear capacity. Due to the specialised nature of these systems, qualified operators experienced in carbon fibre strengthening for concrete shear walls should be involved in the design and installation.

Figure 15: Example image of a concrete shear wall strengthened through the introduction of carbon fibre reinforcing in both vertical and horizonal directions. Image by Sheer Force Engineering.

Concrete Cancer

Concrete cancer occurs when the steel reinforcement within a concrete slab starts to rust. As the steel corrodes, it expands, pushing against the surrounding concrete. This leads to the concrete becoming brittle and cracking, which worsens the problem. Due to the efficiency in material usage the external walls of the high-rise towers range from (Level 1-5 178mm, Level 6 + 150mm[85]) this leaves the steel reinforcement susceptible to moisture and rusting. While there are no publicly available reports detailing concrete cancer as an issue or justification for demolition, engineer consultants identified this as a potential issue. This can be addressed by rectification works undertaken on the affected panels, with over cladding becoming an option to panels which require further weather protection.

[85] Industrialised precast load bearing wall construction, W.P.Brown, p. 19.

Building Lifespan

The *Redbrick Towers-Feasibility Study and Option Testing Revision 2* by Hayball January 2022 commissioned by Homes Victoria referenced structural report findings - that the towers would remain structurally sound for another 50 years.[86] While acknowledging the red brick and Flemington towers are a different structural system and built earlier, it is feasible that a similar lifespan for the concrete towers is possible.

Once the theoretical design-life of a building has been reached it is advised that routine inspection and maintenance is undertaken. This level of inspection and maintenance is highly dependent on a number of factors including the quality of original construction, maintenance undertaken throughout its theoretical service life and if water has successfully been prevented from entering any structural elements. If any issues are identified improvements and strengthening can be retrofitted to the existing structure as required. While the structural upgrades proposed as part of the RRR study are solely for compliance with seismic ratings —the invasive nature of the works would mean that each wall panel could be inspected and assessed with structural strengthening to concur as required.

[86] Hayball, *Redbrick Towers -Feasibility Study and Option Testing Revision 2*, January 2022, p. 9.

9.3 Building Surveyor

Melbourne based building surveyor, Approval Systems, were engaged by Homes Victoria to undertake an assessment of the red brick public housing towers in Carlton[87]. It appears from this report that the building surveyor deemed it not feasible or practicable to 'retrospectively' upgrade the building, this is despite, from publicly available information, no structural engineer, ESD input or costings having been produced.

While there are differences in design and construction systems between the Carlton red brick towers and the large panel system high-rise flats, relevant non-compliances can be drawn from the surveyor report to inform this RRR proposal.

The surveyor report also notes that since the construction of the towers, several building standards and codes have evolved:

- Access for people with disabilities
- Structural design standards
- Energy efficiency requirements. Each dwelling is to achieve a minimum 6-star energy rating
- Weatherproofing of external walls
- Fire safety standards
- Adoption of DHHS Fire Risk Management Guidelines

Below is a table of items that were raised in Approval Systems' report for the Carlton towers and how the RRR design proposal has addressed each point.

Table 9: RRR approach to addressing identified compliance issues in the Carlton towers

Approval Systems Existing Conditions Review and Report 2022	RRR Flemington
Evidence that sewer risers/stacks were failing and were subject to significant leaks throughout.	Existing sewer stacks to be inspected. Allowance made in costings to replace sewer pipework and works to risers.
Evidence of dampness in walls throughout the building and the formation of efflorescence and mould within sole occupancy units. The sewer stacks appear to be the source of internal dampness.	N/A
Smoke alarms not compliant with the Building Code of Australia where smoke alarms were not located between bedrooms and the remainder of the SOU.	Installation of smoke alarms.

[87] Approval Systems, *Red Brick Buildings. Existing Conditions Review and Report*, Aprill 2022.

Access for people with disabilities to and within the building in accordance with BCA Part D3 and AS1428.1	Building serviced by lift and entry at ground floor compliant with standards. Signage to be installed.
Evidence of incomplete fire stopping at service penetrations particularly in the waste chutes and sewer stacks.	Allowance to inspect and instate fire stopping to services penetrations.
Absence of fire doors to SOU entries and fire stair entries.	All doors to SOUs are to be replaced with fire doors.
Non-compliant door hardware on SOU entry doors.	All door hardware to SOUs are to be replaced with compliant fittings.
Evidence of extensive corrosion of concrete reinforcement.	Inspections to be undertaken on each building independently. The new facade will protect 65 % of the existing exposed panels. Overcladding of affected panels on the north and south facades can be incorporated depending on the specific building's condition.
Non-compliant ceiling heights in common corridors.	All ceilings are compliant.
The building lacked substantive energy efficiency measures with windows and external doors lacking weather seals, low performance glass, absence of thermal insulation to floors, walls, and roof and lack of energy efficient lighting, power and mechanical services.	All windows to be replaced with double glazed units. R2.0 insulation plasterboard panels fixed internally to all external walls. All lighting replaced with LED fixtures, plumbing futures replaced with water saving measures. Ac units to all living areas. PV cells to roof top with water retention and grey water usage integrated.

A number of addition considerations have been identified through discussions with Nicholas Building Surveyors:

Sprinklers are required to all balconies.	Existing fire sprinklers are retained with extension to new balconies.
Stairs are required to be in a fire-enclosed stairway achieving 90min FRL with -/60/30 fire doors.	New fire doors and wall proposed to stairs.
The concrete floor slab is approximately 150mm thick. A 200mm thick slab, acoustic underlay to floor finishes and/or acoustic insulation within the ceiling space are needed to provide the required acoustic and fire rating between floors.	New ceiling lining and insulation foam fixed to soffit with carpet and acoustic underlay to floors to achieve required acoustic and fire rating.

The structure needs to comply with the current earthquake code.	Structural seismic upgrades proposed. (Refer to the structural engineer report.
Stairs are also required to be pressurised with mechanical ventilation in accordance with AS1668.	Windows have been removed making it an open stair and avoiding the need for pressurisation. Fire engineer performance review required.
Public Corridors exceed 40m in length and are required to be separated into intervals not greater than 40m via smoke walls/doors.	New smoke doors installed along corridors.
Hydrant Coverage and location is required to be confirmed for compliance	Existing hydrants assumed to be compliant as buildings were recently upgraded with sprinklers.
Travel distance from SOU's to the nearest stair exceeds 12m	Performance solution required.
Provision of laundry facilities to each SOU	New laundry to each SOU proposed.
NBS Comment: NCC 2022 requires the following for liveable housing requirements: ● 820mm clear front entry doors ● 1200mm x 1200mm clearance from front entry door ● Internal corridors to be provided with 1000mm clear width. ● Minimum One closet pan shall have a clear space of 1200mm x 900mm clear space in front of the closet pan ● Shower in the same bathroom shall be provided with a step free entrance (hobless)	All requirements are satisfied through widening of corridors and doors. (Refer to architectural plans.)

9.4 Architectural Design

The architectural design for the retrofitting of the high-rise towers has three key objectives:

- Bring the existing building up to contemporary standards (access, energy usage, structural integrity)
- Redefine the ground plane with SDA apartments, community spaces, bike lockers, storage facilities and landscaping.
- Reimagine the identity of the towers with a new facade and extended living spaces.

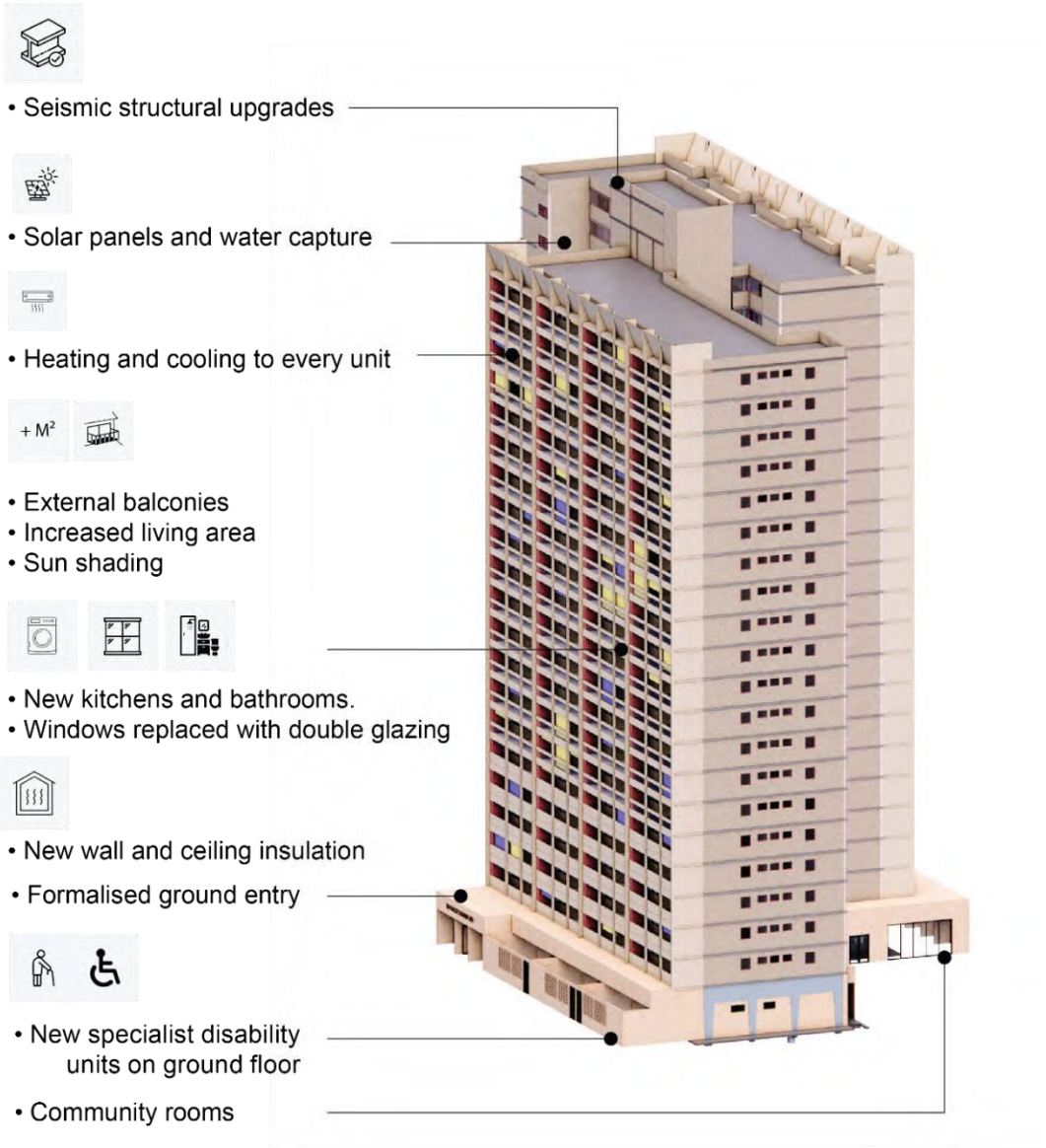


Figure 16: Diagram of the RRR tower proposal. Image by OFFICE

The approach to the refurbishment of the high-rise tower incorporates feedback from the current Estate residents, and commentary from the government around broader issues with the towers. It acknowledges the value of the existing buildings and apartment designs while introducing a new addition which serves a practical purpose of providing private open space to the dwellings but also redefines a contemporary identity for the towers.

Key elements of the design are:

- The incorporation of prefabricated balconies with service risers for hydraulic and mechanical services.
- New one, two and three-bedroom SDA flats to the ground level
- The widening of doors, corridors and bathrooms to make all flats compliant
- Heating and cooling upgrades

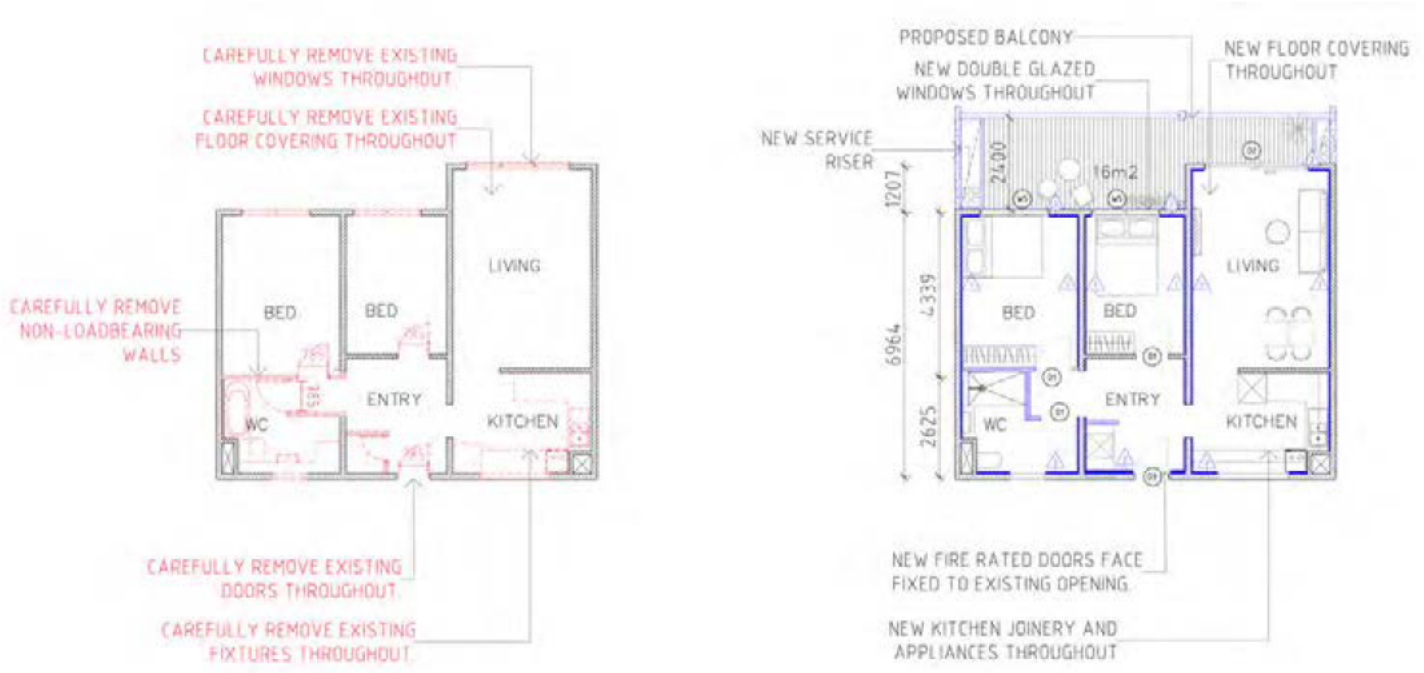


Figure 17: Demolition and proposed plan for flat Type A. OFFICE

Internally there are minimal interventions made. All existing joinery and fixtures are replaced, non-load bearing walls are altered to achieve minimum circulation requirements and wet areas are re-orientated. The retrofit will include new carpet with acoustic underlay in the bedrooms and living areas. New wall and ceiling linings are proposed to conceal the structural plate fixings as well as increase the acoustic and fire rating of all units. This also provides an opportunity for extensive caulking and sealing of panel joins and junctions. Windows and doors are replaced with operable double-glazed units, ac units to living areas, photovoltaic cells and water harvesting retrofitted achieving high energy efficiency targets.

Externally, the key design intervention is the inclusion of new prefabricated concrete balconies. Paying respect to the original construction type of the prefabricated panel system the new balconies follow the same structural logic and layout, redefining the facades and providing additional outdoor living areas. These balconies are enclosed with operable louvres, and also contain new service risers. Fabricated off-site these balconies are self-supported and tied back to the existing building increasing efficiencies in installation and minimising disturbance to the existing building structure.

The ground plane is redefined as a new cream brick ‘plinth’ houses five SDA units, community facility, bicycle lockers, bathrooms, storage, and service rooms. Through occupying the ground floor, increased interactions with residents can be achieved adding to passive surveillance around the building and adding to the sense of community.

See Appendix 8 for full architectural drawings.

Render of the retrofitted Flemington Towers with brick base and new balconies. Image by OFFICE.

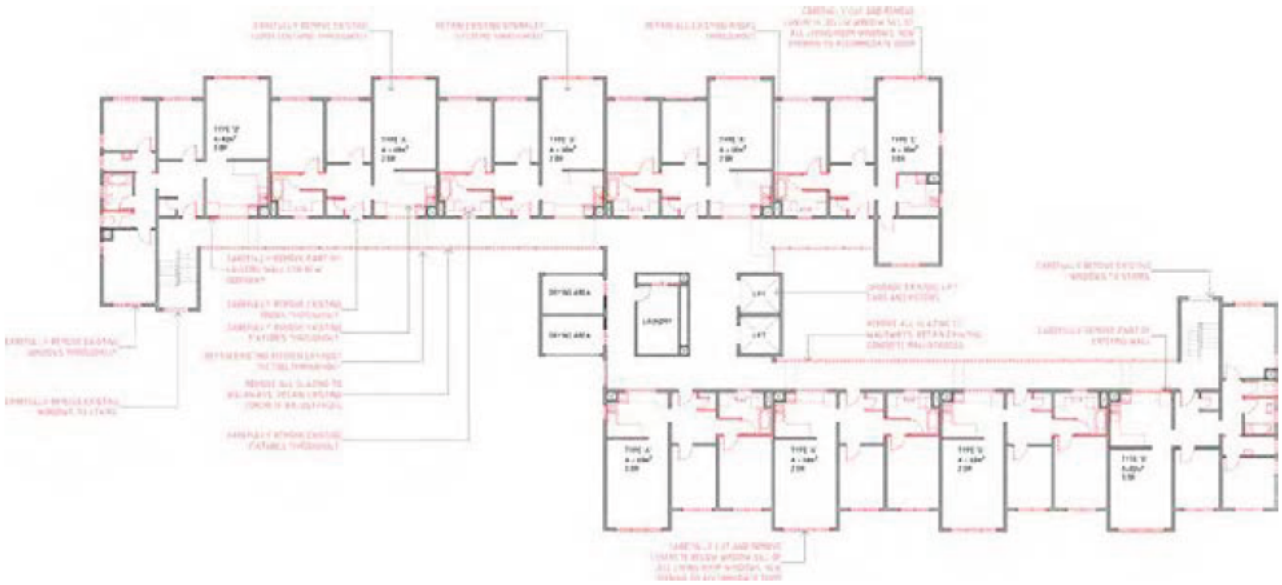


Figure 18: Demolition plan of the typical floor. OFFICE

Figure 19: Demolition Elevation (east and north). OFFICE

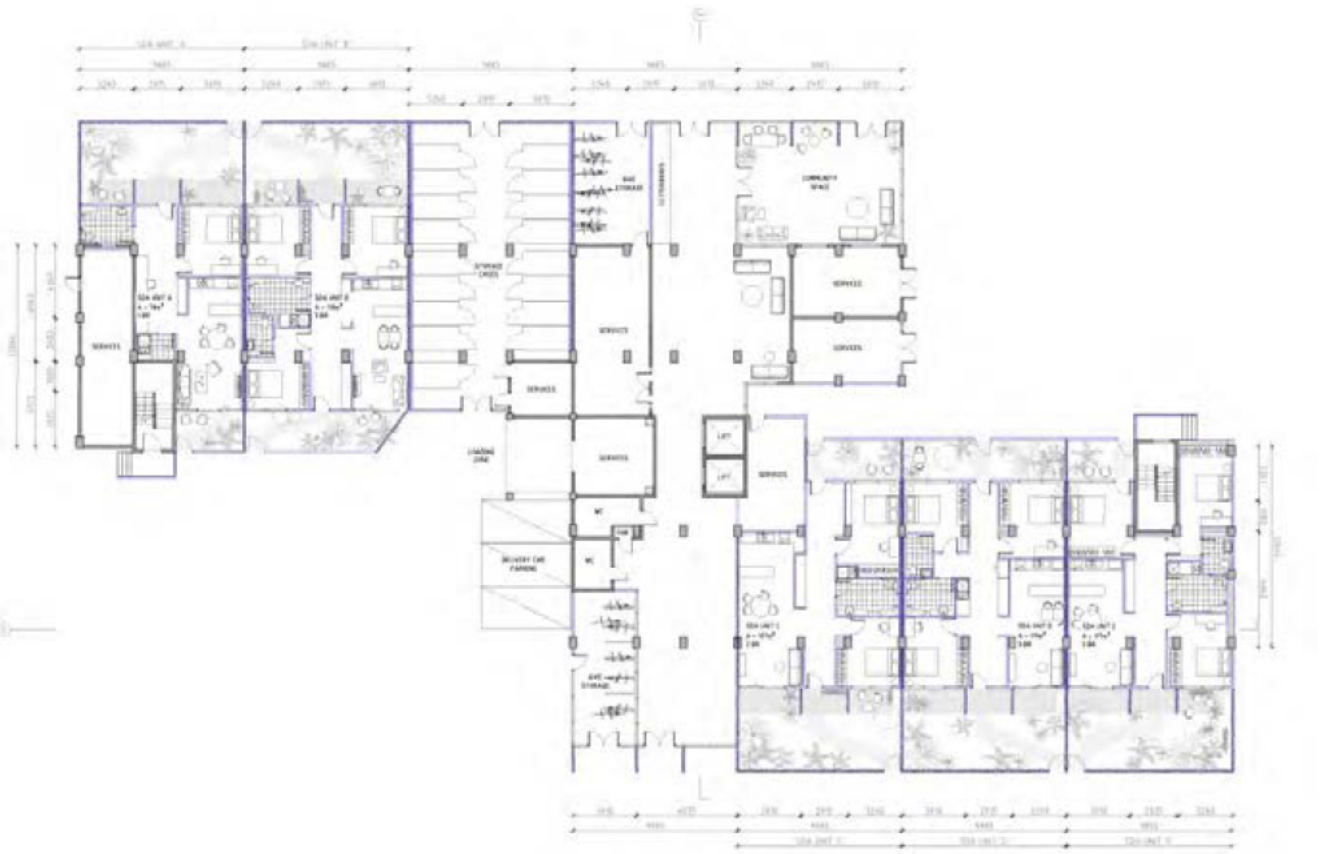


Figure 20: Proposed plan of the ground floor. OFFICE

Figure 21: Proposed plan of the typical floor. OFFICE

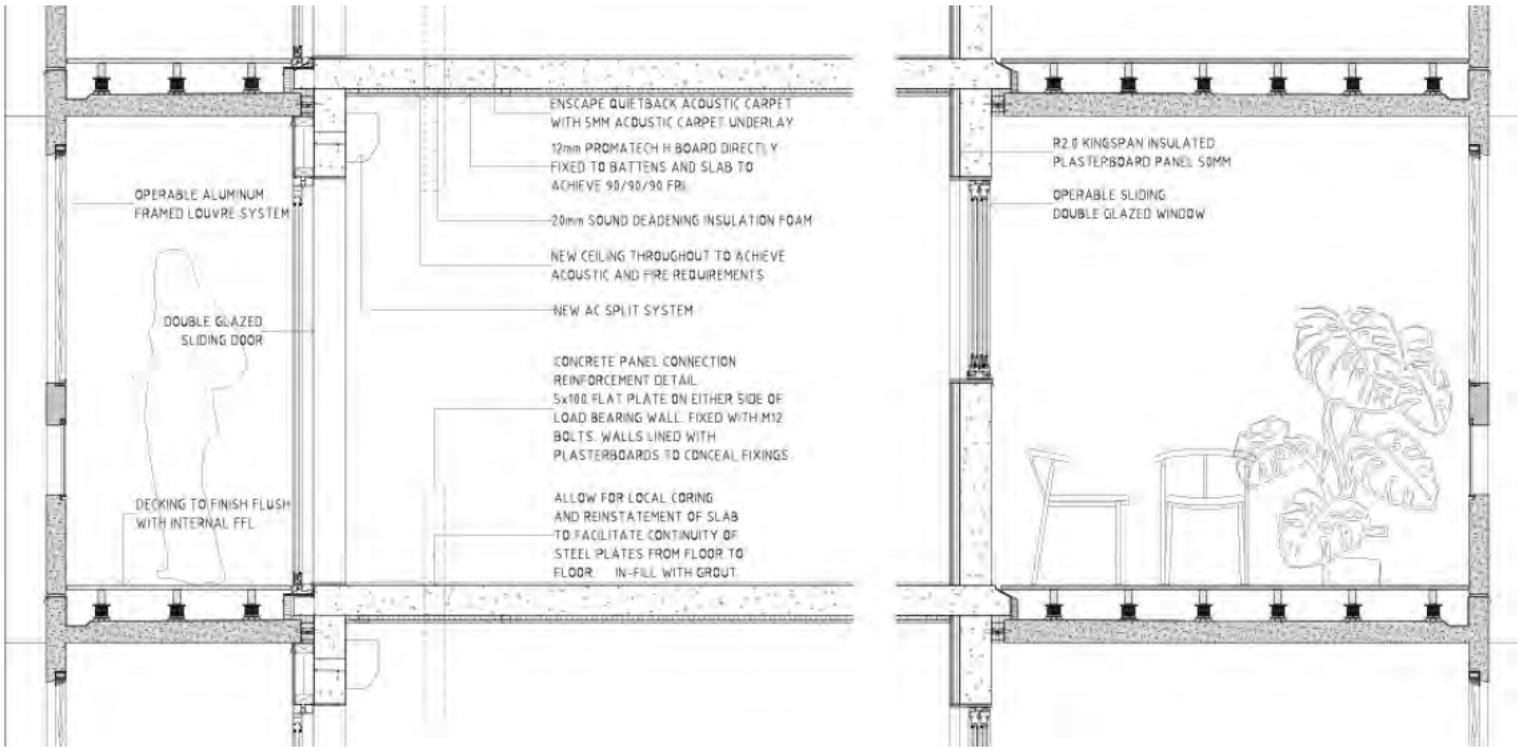


Figure 22: Sectional detail of the new balconies and building fabric upgrades. OFFICE

View of the west facing faced with new prefabricated concrete balconies, louvre windows and colour retractable blinds. Image by OFFICE

9.5 Better Apartment Design Standards

The RRR retrofit proposal addresses all except for one of the Better Apartment Design Standards (BADS) making the redevelopment comply with best practice. Many of the standards are already achieved without having to alter the design due to the original arrangement of units. Key upgrades include the addition of private open spaces through new balconies, and increased accessibility to apartments which included the widening doorways and corridors. The only standard that the units do not meet is the minimum internal room dimension of the secondary bedrooms, this could be achieved through the relocation of the internal wall if the adherence to this standard was critical.

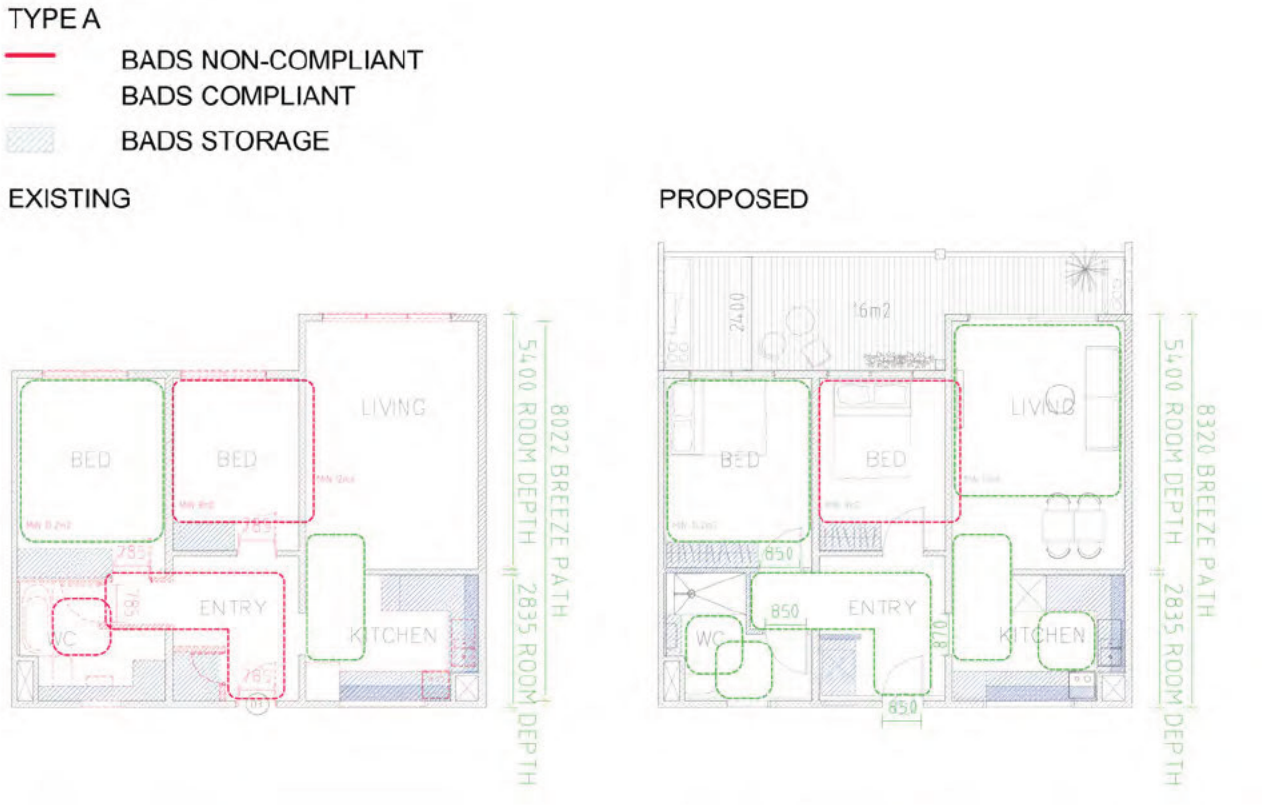


Figure 23: Proposed Type A unit layout showing full compliance with BADS except for the bedroom size. Image by OFFICE.

Ceiling Heights
A common misconception is ceiling height of the high-rise flats not meeting the current standards. In Victoria the minimum ceiling heights are set by the National Construction Code with no mention of minimum ceiling heights within the BADS. Rather, in the BADS, ceiling heights set the maximum room depths:

Where habitable rooms have a ceiling height of 2.4m the maximum room depth is 6m (2.5 x 2.4m) or 2.5 times the height of the ceiling..[88]

As such all units within the high-rise tower meet the BADS for ceiling heights and room depths.

Acoustics
The BADS states that new dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.[89] Despite the acoustic barrier of the M2 Freeway, due to its close vicinity further acoustic impact from the motorway has been taken into account and treated through the provision of glazing to the enclosed balconies and solid balconies acting as a buffer from the noise source. Acoustic seals will be provided on all new double-glazed windows and sliding doors.

[88] Department of Environment, Land, Water and Planning, *Apartment Design Guidelines for Victoria*, 221, p. 118.
[89] *Apartment Design Guidelines for Victoria*, p. 95.

9.6 Livable Housing Design Standards

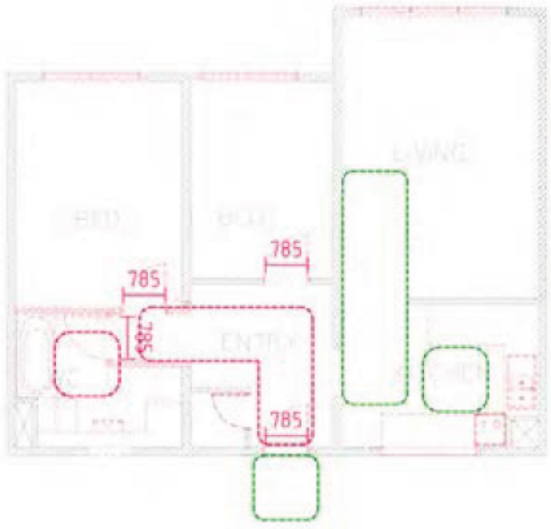
The RRR retrofit proposal achieves compliance with all of the Livable Housing Design standards, achieving a Gold Level of compliance for all apartment types. Similarly to the BADS, the existing layouts achieve the majority of the requirements, with strategic demolition to non-load bearing walls in the corridors, wet areas, and doorways to achieve accessibility requirements.

TYPE A

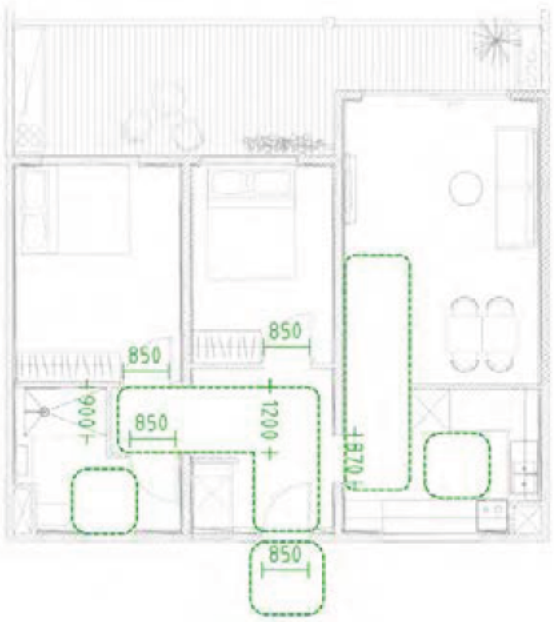
GOLD NON-COMPLIANT

GOLD COMPLIANT

EXISTING



PROPOSED



9.7 Environmental and Sustainability Upgrades

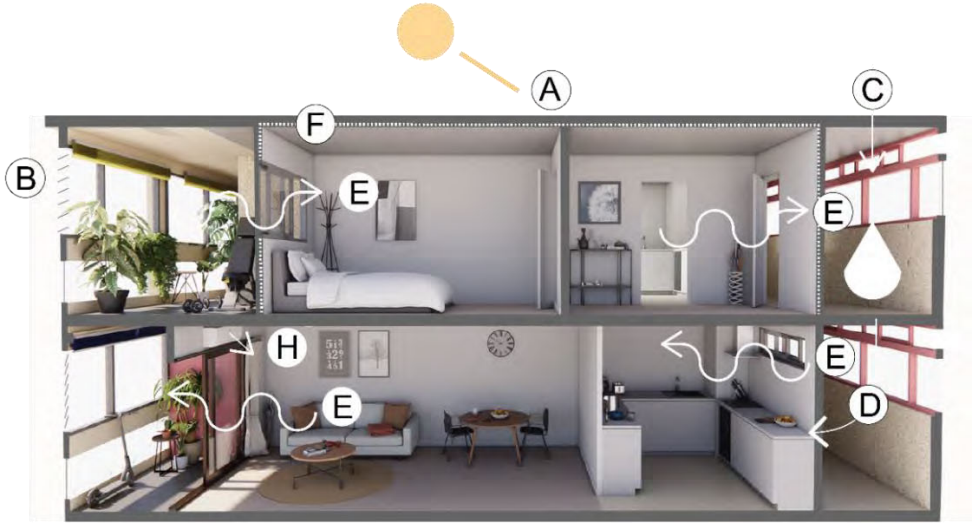
A NatHERS thermal assessment report was prepared for the existing buildings at Flemington Estate by Makao Sustainability and ESD engineering. This report demonstrates how the refurbishment achieves an average 7.5 Star NatHERS Rating and a 5 Star Green Star Rating. See Appendix 9.

In summary the sustainability initiatives that have been integrated into the development achieve:

- An average 7.5 Star NatHERS energy rating exceeding NCC minimum rating. With the middle units performing as high as 9.1
- Achieves a minimum 5 Star Green Star
- Transition from gas to electricity through renewable solar photovoltaic systems
- Onsite water harvesting and reuse
- Contribute to the protection of waterways by improving stormwater quality
- Promote indoor environment quality and comfort
- Provide convenient ways to manage operational waste streams.

Energy strategies have been incorporated through the upgrade of double-glazed operable windows throughout and the inclusion of a secondary wall and insulation internally to all flats. Heating of the flats will be achieved through the incorporation of an individual AC units, and operable windows for cross ventilation. A centralised hot water heat pump will be located on the roof and services each unit.

A. SOLAR PV SYSTEM	E. CROSS VENTILATION	7.5 AVERAGE NATHERS
B. OPERABLE LOURVES	F. ADDITIONAL INSULATION	55% GLOBAL WARMING
C. RAINWATER CAPTURE	G. OPERABLE SHADING	POTENTIAL SAVING
D. RAINWATER REUSE	H. AC UNIT	(36,463t CARBON)



Sectional study of the proposed RRR design with integrated ESD initiatives. Image by OFFICE.

A thermal performance assessment was conducted on the heating and cooling loads of the proposed design. This proposed design scored an average 7.5 NatHERS star rating outperforming the objectives of the HRRP.

Rainwater harvesting will be captured from the roof into 20KL water tanks. This water will be reused in the toilets, laundries and irrigation. Additionally, this captured water can be used for non-potable uses such as washing cars, bikes or bins. This system will help conserve water use through water efficient fixtures and fittings.

Large established trees are located throughout the estate. Photo by Ben Hosking.

9.8 Landscape Architecture

The current ground plane at the Flemington Estate is typical of many modernist planned estates, in that it is dominated by cars, with 45% of the ground plan being given to parking and roads. This gives little quality open space for the residents, despite the high percentage of the ground plane being open space (44%), the site is poorly planned for pedestrian use and high-quality community spaces. This poor design is exacerbated by the ongoing lack of maintenance of community facilities including playgrounds that are fenced off. The site has a number of well-established mature trees, and through the engagement process the community regularly mentioned how much the green open space is used for community events, though regularly cited poor maintenance of these spaces.

Key issues on the Estate highlighted through resident engagement undertaken by OFFICE and also documented in the *2022-2023 Paving the Way Forward Flemingto*n report include:

- Secure car and bike parking
- Improved safety
- Upgrade community facilities
- Improve playgrounds.
- Improve sports courts
- Better maintenance of trees and gardens
- Spaces for community celebrations

Landscape architecture plan for the RRR proposal. Image by OFFICE.

The key design move is to build infill housing on the currently underutilised surface car parking, this allows increased density on the site whilst retaining the existing buildings and communities. New below ground car parking can be built in the infill housing, while some surface car parking is retained to allow for deliveries, drop off, and allow DDA access.

The central green offers a focal point of the Estate, creating a space for large-scale community gatherings and celebrations. Smaller neighbourhood scale parks create space for smaller family gatherings and smaller moments of seating throughout the Estate. These spaces provide opportunity for outdoor study and passive recreation. Each tower has a community gathering space on the ground floor to give residents to gather, while acknowledging the larger scale community spaces and services provided at the newly built Djerring Hub. Two large playgrounds are proposed as this was a key need through the community engagement, along with the retention of the majority of the mature trees on the site. The RRR proposal retains 65% of the trees onsite while the HRRP retains only 25%. Retention of existing mature trees on site has effects sequestering carbon, reducing the urban heat island effect and providing amenity to residents whilst the new landscape takes time to become established.

Figure 25:RRR proposal (left) retains 65% of existing trees onsite compared with HRRP proposal (right) which only retains 25% of existing trees.

The planting and material selection through the landscape will create a low cost, low maintenance and high-quality landscape. Low ongoing maintenance and community buy-in is key to ensure that the landscape remains at a high-quality throughout the life of the buildings. By increasing native vegetation, ongoing maintenance of the landscape will be reduced while providing higher quality amenity and greater biodiversity.

All dwellings on the ground floor have private open spaces with the edge between public and private being mediated by planting and low fences providing privacy whilst still

retaining site lines throughout the Estate. This active ground plane creates strong connections to the wider landscape and provides visual amenity to all dwellings.

Proposed communal landscape areas around the entrance of the refurbished towers. Image by OFFICE

Though a more active ground plane that is no longer dominated by cars the proposal will increase 'eyes on the street' and improve safety. Creating diversity of uses including playgrounds, sports courts, spaces for community gatherings and smaller scale spaces for more passive recreation, ensures activity on the Estate improving community safety.

The proposed ground plane, improves community safety, increases the quantity and quality of public open space on the Estate and provides a diverse set of community spaces at ground level.

Table 10: Area calculations of current condition and the RRR proposal.

	Current % of site	RRR Proposed % of site	Difference
Existing towers	4,960M2 (11%)	7,000m2 (16%)	+2,310m2 (+5%)
On street parking and roads	19,370m2 (45%)	1,160m2 (3%)	-18,210m2 (-42%)
Open space	**19,620m2 (44%)**	**28,380m2 (64%)**	**+4,570m2 (+20%)**
Infill housing	0 (0%)	7,410m2 (17%)	+9,950m2 (+26%)

9.9 Life Cycle Assessment

A life cycle assessment was undertaken focussing on the refurbishment of the four Flemington towers compared with demolition and rebuild. As the quantity of infill in the RRR proposal is equivalent to the HV proposal and a similar construction methodology can be assumed, this was emitted from the life cycle assessment.

By comparing the refurbishment works of the four towers at the Flemington Estate with the demolition and rebuilding of units to an equivalent size a 55% saving of in global warming potential or 36,463 tonnes of carbon prevented from being emitted per tower.

For summaries of the life cycle assessment see Appendix 10.

Table 11: Life cycle assessment outcomes

Life Cycle Assessment	Global Warming* Potential (tonnes CO eq)	Land Use*** (m^2 .year arable)
Demolition & Rebuild	264,936 tonnes CO eq	665m2
RRR Refurbishment	119,084 tonnes CO eq	526m2
Reduction achieved by RRR	**145,852 tonnes CO eq (55%)**	**21%**

*Global warming is caused by an increase of greenhouse gases in the earth's atmosphere. Global Warming Potential is expressed in equivalent greenhouse gases released, measured in kgCO2e.
***Land Use is measured in years of use of arable land (m2.year). This describes the area and time land is occupied by production systems both natural and industrial to produce the building materials but not the occupation of the building itself.

9.10 Costings

A detailed cost plan was prepared for the proposed refurbishment of the high-rise tower by Melbourne Quantity Surveyors. The cost plan itemises the construction costs for all works to be carried out. For costing details see Appendix 13.

As outlined in Table 12, the existing public housing could be refurbished and brought up to HV environmental and apartment standards, without displacing communities or demolishing – for the cost of $359,798 per dwelling.

Table 12: RRR Flemington Estate Refurbishment costs

RRR Flemington Estate Refurbishment Costs	
Total Building Costs	$237,140,000
Contingencies	$23,714,000
Total Refurbishment Costs exc fees	$260,854,000
Cost per dwelling to refurbish	$359,798

Table 13: RRR Flemington Estate proposed infill costs

RRR Flemington Estate Proposed Infill Costs	
Total Building Costs	$235,029,620
Contingencies	$23,502,962
Total Infill Costs (excluding fees)	$258,532,582

In combining the cost of refurbishment and infill the total construction cost for RRR: Flemington Estate is $519,386,582.

Table 14: RRR Flemington Estate construction costs

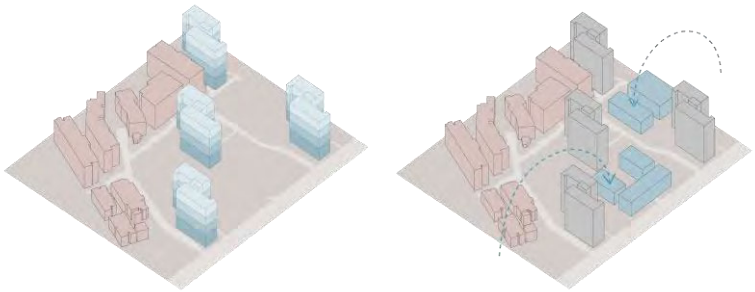
RRR Flemington Estate Construction Costs	
Total Refurbishment Costs	$260,854,000
Total Proposed Infill Costs	$258,532,582
Total RRR Construction Costs exc fees	$519,386,582

9.11 Staging of Refurbishments

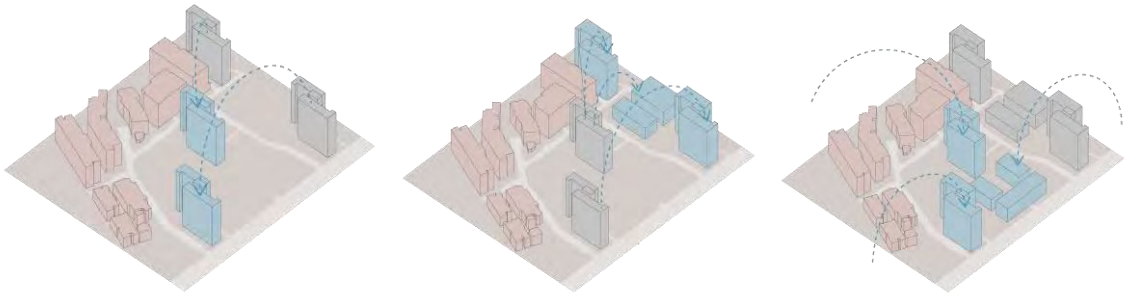
Staging of retrofit

There are three options for the refurbishment of the Estate towers, all of which should be communicated clearly to residents and their input factored into the most appropriate approach.

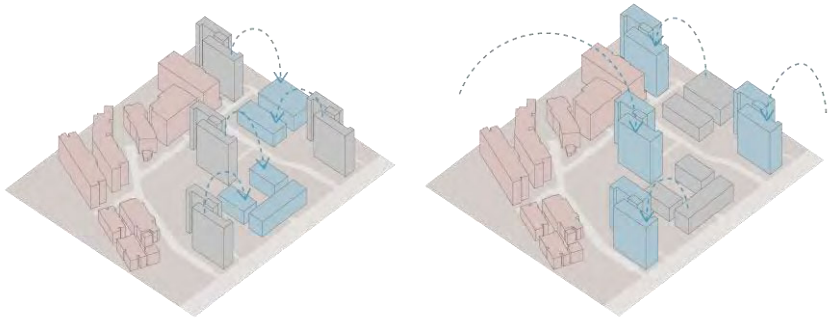
1. Stage refurbishment of inhabited tower. Refurbishment works would occur five floors at a time with residents of those floors relocated during the works. Once completed to those floors tenants would move back, and construction would continue to the five floors above until the tower was full refurbished.



2. Stage refurbishment of uninhabited tower. Due to some tenants wanting to be relocated off the estate a tower could be completely decanted and refurbished. This could happen sequentially across the Estate with the infill occurring at the same time.



3. Infill developments are completed first. The infill units are completed around the existing buildings and house the tower residents while the buildings are refurbished. The residents could then decide if they wanted to remain in the new builds or return to their refurbished flat.



10.0 Comparative BHB and RRR Financial Findings

Overall, this feasibility study demonstrates the economic, social, environmental benefits and viability of applying a Retain, Repair, Reinvest refurbishment and infill approach to the Flemington Estate.

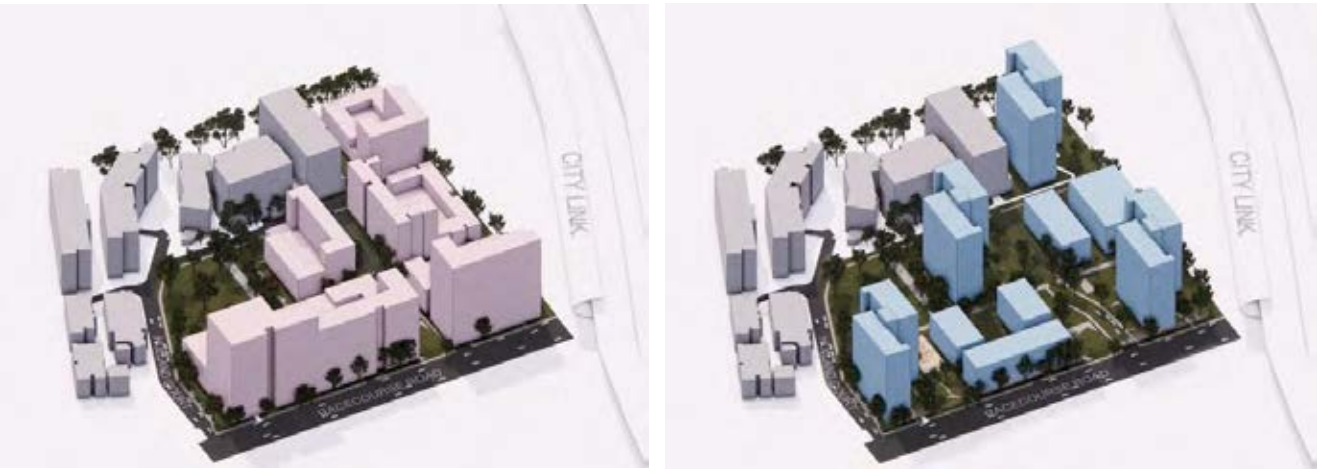


Figure 26: (Left) Homes Victoria's HRRP proposal for Flemington Estate, (Right) RRR proposal for retaining the existing towers with infill to achieve an equal number of dwellings. Image by OFFICE.

The below tables combine all of these values in financial terms, and compare the costs and benefits of the HRRP and a Retain, Repair, Reinvest approach.

The RRR feasibility study has found that a refurbishment of the existing public housing, combined with infill of new social housing dwellings can be delivered for $519,386,582, while retaining the existing community on site and avoiding the social impact and economic costs of relocation (see Table 15).

Table 15: RRR total construction costs

RRR Construction Costs	
RRR Refurb and Infill Construction Costs	$519,386,582
Cost per dwelling (1297)	$400,452

Table 16: HRRP Flemington Estate total construction costs

HRRP Construction Costs	
HRRP Construction Costs	$650,670,482
Relocation Costs	$227,743,629
Total	$878,414,111
Cost per dwelling (1297)	$677,266

Table 17: HRRP Flemington Estate total project costs

HRRP Project Costs	
Construction Costs	$650,670,482
Relocation Costs	$227,743,629
Displacement Health Costs	$2,088,000
Displacement Education Costs	$2,492,724
Total Project Cost (1297)	$882,994,835

This saves the government $227.7 million in direct relocation costs, and approximately $5 million in associated health and well-being costs. The RRR proposal also provides a 55% reduction of global warming potential compared with the HRRP approach.

Table 18 details a full breakdown of the costs associated with both the HRRP approach and RRR Flemington Estate proposal. The RRR study proposes that it is possible for the $363.6 million of financial savings to be reinvested back into the refurbishment of the existing public housing and development of new social housing. The HRRP does not provide financial, social or environmental benefit, and improved outcomes could be delivered for significantly less government and private investment.

Table 18: Comparison of costs between HRRP and RRR Flemington Estate

	HRRP Flemington Estate	RRR: Flemington Estate Proposal
RETAIN		
External Relocation costs	The total relocation costs of existing tenants within the HRRP project is estimated to be $227.7 million	Relocation costs for RRR are minimal due to the staging of works. We anticipate there might be a small budget to cover a removalist fee from relocating remaining residents within the Estate during the new build and refurbishment. The RRR strategy saves $227.7 million in State Government financing.
Health and wellbeing cost	The cost to health and wellbeing is estimated at $2,088,000 for relocated residents.	By retaining community, there are no health and wellbeing impacts through relocation. The RRR strategy has no health and wellbeing cost.

Education costs	The cost of interruption to education during this period is estimated as $2,492,724 for relocated residents.	By retaining the existing community, there are no educational impacts through relocation. The RRR strategy has no educational impact cost.
REPAIR		
Demolition and construction costs	The construction costs of the HRRP development will be approximately $650,670,482.	Flemington Estate can be refurbished with new infill housing achieving the HV environmental and apartments standards without displacing communities or demolishing buildings for $519,386,582. The RRR refurbishment and infill cost is therefore $131,283,900 less than the HRRP.
HV Objectives (Lifts, Energy Efficiency, Accessibility)	Addressed through demolition, relocation and rebuild.	Addressed through refurbishment and infill. The RRR refurbishment strategy can meet all HV objectives, for a lower financial investment.
Global Warming Potential	The global warming potential to demolish and replace with new housing is calculated at 264,3936 tonnes CO eq	The global warming potential of the refurbishment proposal is **145,852 tonnes CO eq.** The RRR model has an global warming potential saving of 55%.

Increase Housing Numbers	HV will increase the number of dwellings on Flemington Estate by 557, to 1297 new community, affordable and market dwellings. .	RRR will retain the 720 public housing units and introduce infill to match 1297 dwellings on site.
REINVEST		
Overall cost savings	The full costs for demolition, relocation, construction and health impacts of the new community housing under the HRRP is calculated at $882,994,835 .	The RRR strategy would see the Flemington Estate refurbished and housing infill without displacing communities or demolishing buildings for $519,386,582. Refurbishing and infill at the Flemington Estate is financially viable, and savings could be invested into other public housing maintenance and building. **The overall cost savings to government by retrofitting rather than demolishing would be $363,608,253.**

11. Future Directions

Retain, Repair, Reinvest is a strategy for evaluating the refurbishment potential of existing public housing stock both locally and nationally. It is the intention of OFFICE that this strategy be undertaken on other housing estates - particularly the 43 other high-rise towers - to accurately determine the viability of refurbishment rather than demolition and rebuild.

As the 2017 VAGO maintenance report highlighted, public housing estates in Victoria require extensive refurbishment and upgrades to improve conditions for residents. While the government is currently following the approach of demolition, this Retain, Repair, Reinvest strategy offers an alternative strategy. By conducting publicly available feasibility studies into these sites significant social impact and environmental damage can be avoided - as well as financial savings made.

We suggest that future renewal feasibility studies include not just a cost-benefit analysis through a real-estate model, but also captures:

- The full costs of relocation
- Social impact on residents
- Environmental impact of demolition
- Other site-specific elements

Future research should establish a robust social impact assessment framework to capture the full extent of the cost of relocation on residents and the surrounding community. As well as an environmental impact assessment to determine the ecological footprint of the proposed development. Increased transparency in the decision-making process can empower residents about changes to their homes and communities, as well as increase public understanding of the value of public and community housing.

The RRR model also provides opportunities for the savings made through a Retain, Repair, Reinvest approach to be re-invested in the building of new public community and affordable housing at other government owned sites.

By making these findings public we hope that this study can be used to advocate for feasibility studies to be undertaken on the retrofitting of public housing, and - where appropriate - the retention of estates and the communities that inhabit them.

11.1 Project Team

Design Lead
OFFICE - a not-for-profit multidisciplinary design and research practice based in Melbourne.

Architect - Simon Robinson
Landscape Architect - Steve Mintern
Research - Miriam McGarry
Structural Engineer - Sheer Force Engineering
ESD Engineer - Makao Group
Quantity Surveyor - Melbourne Quantity Surveyor
Building Surveyor - Nicolas Building Surveyors
Photography - Ben Hosking

OFFICE is a charitable not-for-profit design and research practice committed to using the tools of architecture and design for the public good. As Australia's only registered architectural charity and cultural organisation, OFFICE is leading the way in alternative ways to practice.

This research has been largely undertaken pro-bono, if you are in the position to support financially, please follow the QR code or link below to donate. OFFICE has recently been endorsed as a deductible gift recipient making your donation tax deductible. Each donation will go towards supporting and assisting OFFICE's work as a registered cultural organisation.

https://support-office.raiselysite.com/

Appendix

1. Details of Amendments to planning scheme - Flemington Estate

In 2015, DHHS commenced a master planning process for public housing renewal for the Flemington Estate, for the demolition of the walk-up unit blocks. This process included changes to the planning controls of the Estate, to enable the redevelopment - as outlined below.

Date	Key Action	Outcomes
June 2017	Message Consultants Australia on behalf of the Department of Health and Human Services and the City of Moonee Valley(CoMV) produced two reports; Debneys Precinct Structure Plan[90] and a Town Planning Report in support of the Amendment C177 to Moonee Valley Planning Scheme.[91] These two reports formed part of the application to the Minister of Planning from DHHS and CoMV to amend planning controls on the Flemington Estate to guide the future development of the site, which is located within Debneys Precinct. The report also includes a Design Framework, developed by Hayball Architects (March 2017). The report clearly states that the four towers will remain with infill development occurring on Holland Court.[92]	-The rezoning of the Estate from a General Residential Zone to a Mixed Use Zone -Applied a new Development Plan Overlay DPO8 -Introduced a new Parking Overlay -Changes to Clause 21.06 to reference the preparation of the Debneys Precinct Structure Plan -Made the Minister for Planning the Responsible Authority for the Flemington Estate under the Planning Scheme. **The report supported changing a number of planning controls to redevelop Debney's Precinct and in turn the Flemington Estate redevelopment.** **The report also provided justification for the use of a Development Overlay Plan to**

[90] Message Consultants, *Debney's Precinct Structure Plan,* June 2017.

[91] Ibid.

[92] 'The Debneys Precinct Structure Plan provides a framework to guide any future development within the Precinct, managing the way land is developed and the types of developments that occur. In this report it clearly states that the 4 towers will remain with infill development occurring on Holland Court and later between the towers.' *Debney's Precinct Structure Plan,* p. 11.

		remove decision making from the local community and council.[93]
Nov 2017	The submission to the Minister of Planning was referred Social Housing Renewal Standing Advisory Committee(SHRSAC) to conduct two public hearings and provide advice. Despite the Moonee Valley City Council being noted as jointly submitting the Amendment C177 [94], the council later responded to the SHRSAC with a submission regarding losing their role as Responsible Authority for the council owned land until the Development Plan was prepared. While the Draft Amendment C117 was intended to facilitate the redevelopment of the walk-up towers, it is noted in the SHRSAC Report 2[95] that the proposed DPO should also include the existing high-rise towers.	DHHS framed the inclusion of the towers in the extended DPO8 as a means 'to provide a planning framework to guide any future proposals that might arise, and to ensure that any future redevelopment of the towers is consistent with, and integrated with, the redevelopment that will have occurred on other parts of the site.'[96] Findings and recommendations from the report detailed that -**DHHS clarified that the towers had recently been upgraded and there is no current intention to replace them.** -**The Development Plan Overlay should be extended to cover the existing high-rise towers on the site, subject to the requirement that a new Development Plan be prepared for any future proposals to redevelop the towers.** **- It will be important for DHHS to continue to engage in meaningful consultation with both Council and the community in relation to**

[93] 'By providing certainty for how the future of the land could be developed, the DPO removes the ability for third parties such as the community to be consulted on the development plan itself when it is prepared by the land owner. This approach is considered warranted as the consultation has been undertaken as part of the preparation and approval of the DPO.*Debney's Precinct Structure Plan,* p. 21.

[94] Planning Panels Victoria, Social Housing Renewal Standing Advisory Committee: Debney's Precinct, Flemington. Amendment C177 to the Moonee Valley Planning Scheme.

[95] Planning Panels Victoria, *Social Housing Renewal Standing Advisory Committee Debney's Precinct, Flemington* 10 November 2017

[96] Ibid, p.12.

		any Development Plans for future proposals to redevelop the towers.[97]
March 2018	The DPO was approved by the Minister of Planning	**Amended planning controls implemented.**
Aug 2019	DHHS commenced relocating residents from low-rise buildings at Holland Court.	**Holland Court residents relocated**
Dec 2020	Amendment VC190 was introduced into the Victorian Planning Scheme. Clause 52.20 'Victoria's Big Housing Build' was gazetted.	**Clause 52.20 removes the need for a planning permit to develop a housing project if funded under the BHB and undertaken by or on behalf of Homes Victoria.**
April 2024	HV awarded a contract to Hayball Leonard Stent to do pipeline massing and yield studies for Flemington towers.	

[97] Ibid.

indicate that tenants may "choose" to return to a redeveloped estate "where there are suitable homes that meet their needs and eligibility." It includes the caveat that there may not be enough redeveloped homes for tenants to return to, in which case tenants will be "offered a property at a location in close proximity to the redeveloped site or in alternative locations if tenants agree". (DFFH, 2023)"
Many factors influence a household's decision to return, including rootedness in current home, desire to avoid disruption, and long redevelopment timelines. Anticipating a likely rate of return is a complex multi-variable process, however structural factors inherent to the renewal program may suggest lower rates, including:

- *Change of tenure*: all public housing at North Melbourne and Flemington will be removed. A private community housing organisation will assume management of future social housing properties. This will require tenants to change landlord.
- *Increased cost*: community housing operators charge higher rent (30% of household income) and have the authority to garnish the statutory income of tenants (e.g. Commonwealth Rental Assistance).
- *Increased disadvantage*: tenants who are relocated once are more likely to experience multiple forced moves, compounding negative economic and health outcomes (Brackertz et al., 2020). Whilst some tenants will be relocated into existing public or community housing and may remain there, the scale of relocation necessitates that a majority will require multiple moves, the effects of which will impact on a household's willingness to return, as well as their long-term wellbeing.
- *Disconnection*: the renewal of these sites is anticipated to be complete in 2031. Community connections will be significantly reconfigured, and in some cases extinguished, through the dispersal of estate communities. A lack of social connection to the new community will impact on rates of return for public housing tenants.
- *Service environment*: during the redevelopment process, relocated tenants will need to rebuild their lives in the properties and locations they have been moved to. This includes the labour of establishing new connections to social and health services, such as schooling for children if moving out of district and primary care physicians. The significant administrative burden associated with just one move may make public housing tenants reluctant to undertake this process again to relocate back to the redeveloped estate.
- *Newly configured dwelling types*: Redeveloped sites are spatially reconfigured to maximise housing density, resulting in smaller apartments with fewer bedrooms. This means that not all households (especially ones with children) are able to return (Shaw et al., 2013). The shrinking of dwelling sizes has a racialised impact as it fails to take into account household compositions that

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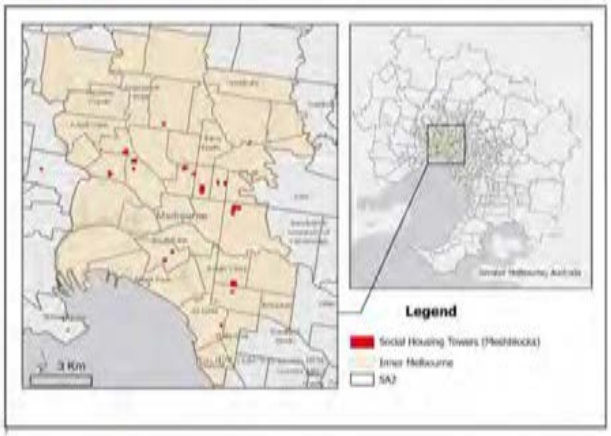
Demographic Analysis: racial composition

This section reports on the current demographic context of the North Melbourne and Flemington high-rise public housing estates[1] and their neighbourhoods. These estates are scheduled for demolition in 2025, the first in a broad renewal agenda that effectively includes all public housing estates in Melbourne (see map).



As the program is currently structured, and according to previous research findings in public housing renewal and relocation programs (Kelly & Porter, 2019; Porter et al., 2023), the displacement of existing communities is a central feature of public housing renewal programs in Australia. In some instances households are granted a right to return, however previous research on public housing renewal at Kensington and Carlton indicate low rates of return between 15-20% (Kelly & Porter, 2019). The Department of Families, Fairness and Housing's most recent relocation guidelines

[1] Hereafter referred to as 'Estates' throughout this section.

[2] We refer to 'social housing' here to denote the fact that public housing and community housing are co-located on these identified sites. Although most high-rise tower estates are public housing estates, some estates such as Williamstown host a substantial amount of community housing tenures. Public housing refers to housing that is owned and managed by a state housing department, often called a State Housing Authority. Community housing refers to housing that is owned or the tenancy managed by a Community Housing Organisation. Social housing is used to refer to the combined provision of non-market or subsidised low-income housing being both public and community housing.

represent the data in maps, we randomised points inside mesh blocks, each one representing an individual, using ArcGIS pro.

Social characteristics of existing community

The North Melbourne and Flemington estates have approximately 1,200 residents, at least 69% of which identified as having overseas ancestry. Compared with the rest of Inner Melbourne (see Table 1), these populations are on average:

- More likely to be children aged 0-14 and young adults 15-24
- More likely to be born overseas
- More likely to be of non-European ancestry
- More likely to be from Sub-Saharan African countries
- Less likely to hold a Bachelor or postgraduate degree
- More likely to live on less than $800 weekly income
- Less likely to participate in the labour force

Table 1 — summary of social characteristics of Estates

Characteristic	12 Holland Court Flemington	120 Racecourse Rd Flemington	33 Alfred North Melbourne	Total all 3 Towers
Total population	330	424	471	1225
% children 0-14	21%	25%	26%	25%
% young adults 15-24	14%	14%	24%	18%
% Elderly 65+	14%	12%	7%	11%
% overseas born	55%	53%	37%	47%
% overseas ancestry	76%	69%	65%	69%
% households with income under $800 pw	47%	42%	34%	41%
% people not in the labour force	42%	37%	29%	35%
% people working full or part time	22%	15%	22%	19%
% of people born in Sub-Saharan Africa	27%	31%	27%	28%

The estates make possible the conditions for dwelling for a number of diasporic communities, predominantly from Africa and Asia. Unlike the majority of public housing tenants in Victoria, these estates typically host fewer people from European ancestry. Declared ancestry alone is not a reliable proxy for 'race' given the diversity of individual interpretations of one's ancestry to include culture, language, ethnicity and complicated histories.

Table 2, below, represents (first response) declared ancestry grouped according to global regions and compares those to the inner Melbourne average. When compared to inner Melbourne, the Estates demographics clearly demonstrate that there are high concentrations of people from declared ancestries in the sum of Sub-

deviate from a western nuclear family structure, such as multiple generations co-residing for cultural or practical (e.g. division of care labour) reasons.

Taking these structural factors into consideration, we provide a scenario analysis whereby relocated households *do not return* and speculate with available demographic data as to the likely demographic trends we expect to see upon the completion of the renewal in 2031.

Methodology

To examine the demographic profile[3] of the public housing estates in Flemington and North Melbourne, we compiled 2016-2021 Census data. In the analysis below, we provide a basic demographic analysis, describing the key demographic indicators, with a particular focus on variables that discern a *racialised non-white demographic* category: place of birth and ancestry.

The Australian Census does not collect data that explicitly refers to racial demographic categories, unlike places like the United States where racial self-identification is facilitated in their decadal population census. Whilst some researchers have argued for better race and ethnicity data in the Australian census, they also caution that 'the collection of ethnicity data and the categorisation of the population into groups is not without risk', and can reinforce already discriminatory categorisations, power imbalances and normative whiteness (Renzaho 2023).

Estates are also not defined statistical boundaries according to the ABS, nor are they considered a residential typology in the common sense of Australian urban planning and housing policy. For this reason, there are no publicly available datasets, in accessible formats, that facilitate a better public understanding and awareness of the social demographic composition of public housing estates and how this contributes to their communities.

To create a geographical boundary to analyse the racial composition of public housing estates in North Melbourne and Flemington we aggregate multiple proximate mesh block data points, which represent the smallest ABS statistical geographical area. Given that estates are mono-tenure and typically denser than their surrounding neighbourhoods, data points are clearly identifiable and able to be differentiated from other tenure types in adjacent areas.

To represent the neighbourhoods that these public housing estates form a part of, we use ABS Census data at the SA2 statistical geography, the most comparable scale to defined suburb boundaries and compatible with mesh blocks. To visually

[3] A full demographic summary is available as an appendix to this section.

Sum of Oceania and Antarctica	116	35%	122	29%	190	41%	378328	61%
Sum of North-West Europe	0	0%	0	0%	0	0%	37836	6%
Sum of Southern and Eastern Europe	0	0%	5	1%	4	1%	28836	5%
Sum of North Africa and the Middle East	21	6%	27	6%	16	3%	11018	2%
Sum of South-East Asia	55	17%	50	12%	12	3%	36896	6%
Sum of North-East Asia	7	2%	3	1%	7	1%	36705	6%
Sum of Southern and Central Asia	9	3%	0	0%	0	0%	24985	4%
Sum of Sub-Saharan Africa	88	27%	131	31%	127	27%	9107	1%
Sum of Americas	0	0%	4	1%	8	2%	19900	3%
Sum of Other responses	32	10%	77	18%	103	22%	33399	5%
Sum of Total	328	100%	419	100%	467	100%	617010	100%

The demographic composition (according to country of birth and ancestry) of the Estates highlights the critical role of these spaces in enabling diasporic communities to regroup after episodes of migration (often forced) or to provide community support for the everyday challenge of multicultural non/belonging.

Demographic Mapping

The maps below visualize the geographical distribution of 'country of birth' responses for the suburbs of Flemington (Map 1) and North Melbourne (Map 2), as well as a map of both localities representing the geographical distribution and concentration of African populations (country of birth) (Map 3). Each individual marker represents an individual person and are colour coded randomly. Each parcel is equal to one mesh block, and markers (individuals) are randomly placed within their corresponding parcel. The density of markers in each parcel is indicative of population density of those parcels.

On all maps the Flemington and North Melbourne estates have been highlighted with a yellow circle.

Flemington, Map 1:

- Ascot Vale public housing estate located in the west on the map.
- Aged living area in northeast of map

North Melbourne, Map 2:

- Kensington Estate located in the west on the map.
- Dense apartment areas in the southeast of the map, high Asian and student population.

African population, Map 3:

- The Estates together are home to the most concentrated African diaspora in inner Melbourne.

Saharan African ancestral groupings. The Estates can also be thought of as the geographical conditions (resources, spaces, ecologies, domiciles, community infrastructure) that currently hold a set of social relations that make diasporic belonging possible[4].

Table 2 — declared ancestry (first response) by global regions, of Estates

	Holland - Flemington		Racecourse - Flemington		North Melbourne		Inner Melbourne	
Ancestry	#	%	#	%	Number #	%	#	%
Oceanian	24	7%	33	8%	35	8%	84410	14%
North-West European	12	4%	14	3%	15	3%	258761	42%
North African and Middle Eastern	30	9%	32	8%	11	2%	15822	3%
South-East Asian	35	11%	36	9%	10	2%	22136	4%
North-East Asian	35	11%	24	6%	21	5%	62689	10%
Southern and Central Asian	6	2%	0	0%	0	0%	29153	5%
Sub-Saharan African	123	38%	168	40%	245	53%	7471	1%
Peoples of the Americas	0	0%	4	1%	0	0%	10204	2%
Southern and Eastern European	6	2%	7	2%	0	0%	85555	14%
Other Responses	55	17%	98	24%	125	27%	40802	7%
Total	326	100%	416	100%	462	100%	617003	100%

Country of birth also presents challenges when discerning a *racialised non-white demographic* category. The ancestry of first-generation migrants and their descendants, for instance, are not captured in country of birth data. Country of birth does, however, indicate whether the Estates play a critical role in the settlement of poor, recently-arrived migrants or people seeking asylum. Oceania and Antarctica global regions include people born overseas in New Zealand, Melanesia, Micronesia, Polynesia and Antarctica, and people born in Australia. Inner Melbourne has a significantly higher total of people born in Oceania and Antarctica (61%), and a significantly lower number of people born in Sub-Saharan Africa (1%) and South-East Asia (6%) than the Estates (see Table 3). It is also significant to note that there is a significantly higher proportion of the population born in a place not captured neatly by these constructed geographic regions (contained in Sum of Other responses), than the inner Melbourne average (5%).

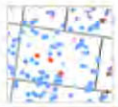
Table 3 — country of birth, by global regions, of Estates

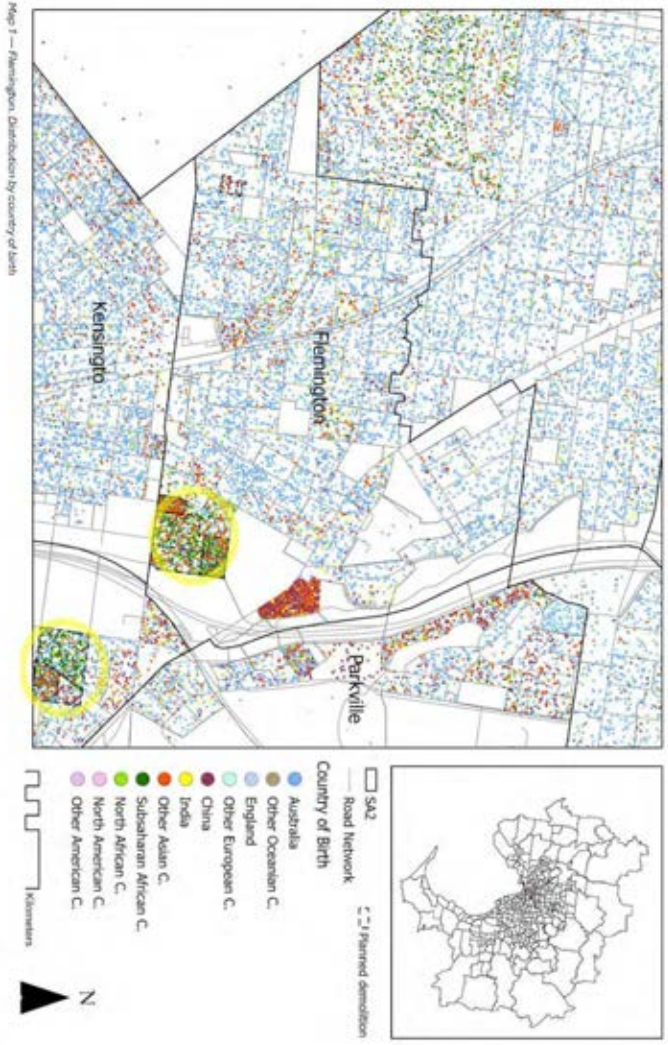
	Holland - Flemington		Racecourse - Flemington		North Melbourne		Inner Melbourne	
Country of Birth	#	%	#	%	#	%	#	%

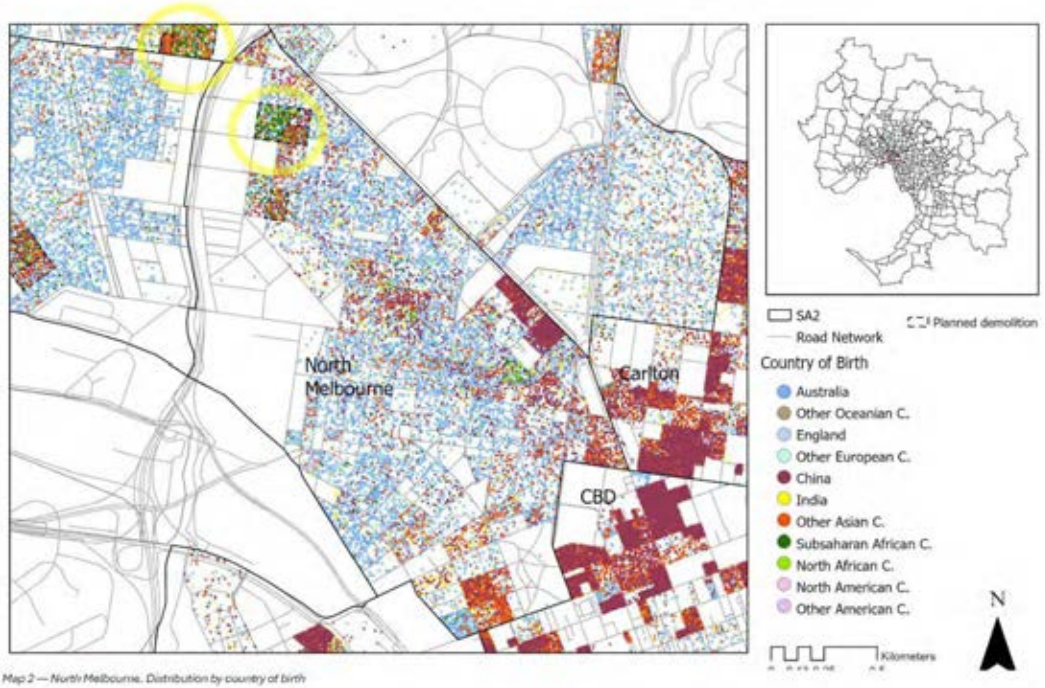
[4] This is necessary in the face of ongoing international and domestic systemic discrimination and everyday racism perpetrated against asylum seekers, Muslims, people of colour and the poor.

- The Estates are geographically central in a network of other African communities at other social housing estates and buildings in the surrounding neighbourhoods.

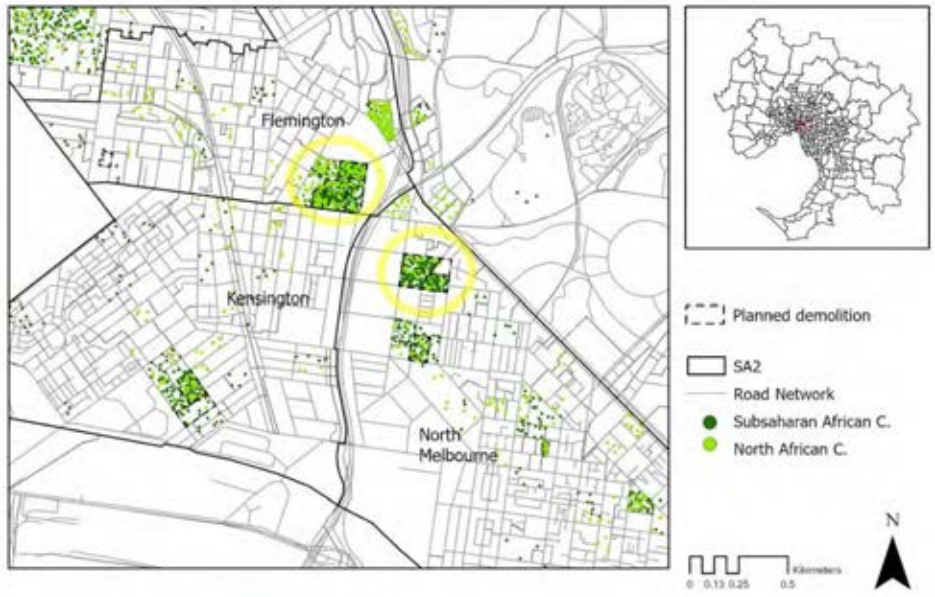
Parcel / mesh block





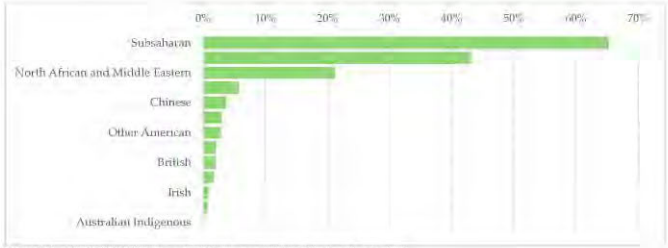


Map 2 — North Melbourne. Distribution by country of birth



Map 3 — African population, Flemington and North Melbourne. Distribution by country of birth

Graph 3 — North Melbourne, percentage removal per country of birth



Graph 4 — North Melbourne, percentage removal per declared ancestry

Note on Inner Melbourne

Th trend of highly-racialised displacement described in the data above, continues across Inner Melbourne. When the same parameters are applied to all 44 public housing towers in Melbourne, assuming all towers were to be demolished and a zero return rate, the following scenario should be anticipated. According to Census data, in 2016, 11,501 people lived in the public housing towers spread out across 11 suburbs. Across all towers in Melbourne, 62% of residents indicated Sub-Saharan ancestry, and 57% indicated Other African ancestry. High-rise public housing estates in Melbourne have majority racialized African population. The current policy of removing the towers and displacing its residents can be empirically characterised as a highly racialized urban policy.

Displacement impacts on neighborhood demographics

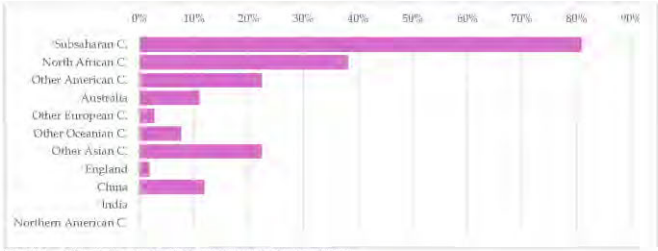
Assuming a zero percent return rate, if the Estate renewal were to go ahead as programmed, and the populations that live there were therefore displaced from the neighbourhood, the following scenarios will occur.

Flemington as a suburb will lose:

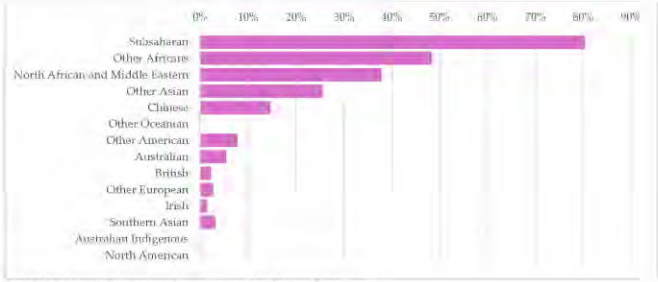
- 81% of people born in Sub-Saharan Africa and 80% of Sub-Saharan ancestry
- 38% of people born in North Africa and 48% of North African ancestry
- 38% of people of North African and Middle Eastern ancestry

North Melbourne as a suburb will lose:

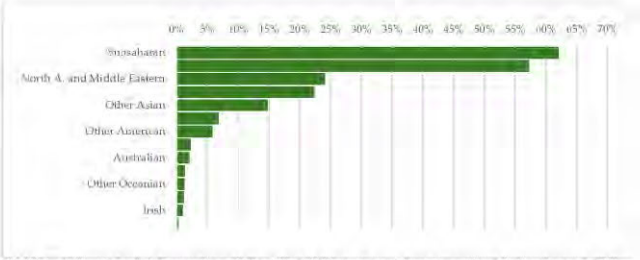
- 61% of people born in Sub-Saharan Africa and 65% of Sub-Saharan ancestry
- 24% of people born in North Africa and 33% of North African ancestry
- 21% of people of North African and Middle Eastern ancestry



Graph 1 — Flemington, percentage removal per country of birth



Graph 2 — Flemington, percentage removal per declared ancestry



Graph 5 — All housing estate towers, Inner Metropolitan Melbourne, percentage removal per declared ancestry (all responses)

Displacement impacts on Estate tenants

International studies over decades have demonstrated the harmful and negative impacts of displacement. The definition of displacement is forced relocation under conditions that a household did not choose or has not control over (Marcuse 1986). The impacts documented by previous research include negative outcomes in health, wellbeing, livelihood, education and social connection. These are especially and more deeply harmful for people experiencing intersecting forms of disadvantage and previous life trauma.

A primary impact of displacement is the grief experienced for the loss of home. This has been documented in studies since urban renewal became a dominant urban policy model adopted around the world (see for example Fried, 1966; Fullilove, 2004; Hartman and Robinson, 2003). One of the concepts, similar to 'communicide' (see above) used to explain the harm that results is 'domicide' (Porteous and Smith, 2001; Zhang, 2017) which explains how renewal kills a sense of home and place through experiences of intense 'placelessness' (Liu, 2013). These are experienced by people as grief, dislocation, loneliness, anxiety and depression. People impacted by displacement report emotional distress at watching one's home demolished, and from being dislocated from neighbours and community networks (Arthurson et al., 2016; Levin et al., 2018; Morris, 2017a; Porter et al., 2023; Wynne and Rogers, 2020).

The international research shows that people who have been displaced experience anxiety, depression, loneliness and intensified physical ill health (Ferreri, 2020; Morris, 2017b; Porter, 2009). Studies also provide documented evidence of death, suicide and self-harm as a direct result of displacement from urban renewal (Fried, 1966; Fullilove, 2004; Marris, 1961; Slater, 2013; Watt, 2021; Zhang, 2017). Linked to the impact on communities as described above, there are rippling harms from these outcomes onto wider families and communities.

In a recent study of the impacts and drivers of public housing relocation (Porter et al 2023) in Victoria, NSW and Tasmania, tenants reported the following experiences and outcomes from their displacement:

- Loss of sense of stability that had finally been achieved in getting access to public housing
- Worsening mental health
- Attempted suicide
- Inability to sleep
- Death of family members
- Poorer physical health or exacerbated health conditions
- Stress on families and particularly children

The demographic analysis of the Towers indicates that the people being displaced are already burdened by intersecting forms of disadvantage. Research evidence demonstrates that people who experience racialised disadvantage will bear a higher burden of the harms from displacement (Neary, 2011; Rodriguez, 2021). People who have previously experienced homelessness are much more likely to experience homelessness again as a direct result of being displaced by urban renewal (Burt, 2001; Curtis et al., 2013).

Negative impacts from displacement begin to occur well before the process of relocation actually commences (Porter et al., 2023; Watt, 2021; Wynne and Rogers, 2020). Uncertainty, shock, pressure and anxiety begin immediately. Residents report that this is exacerbated by previous negative interactions with housing authorities that breed distrust. Indeed, residents report a high level of cynicism about every step in the relocation process and widely report feeling that no-one cares, that they are overlooked, unseen or not deemed fully human and worthy of respect and care (see Porter et al 2023; Morris 2019). Some studies have shown how displacement impacts can be experienced even without any physical relocation occurring. This occurs where the neighbourhood change in an area is so pronounced that residents who managed to stay in place nonetheless come to feel out of place (Pull and Richard, 2021). Studies have also identified this occurring in Australian public housing renewal, described as 'emplaced displacement' (Wynne and Rogers 2020, see also Ruming and Melo Zurita 2020).

The process of displacement itself is also harmful. Residents often report feeling rushed, under pressure and duress, insecure and under threat, all of which is exacerbated by an overwhelming uncertainty (Porter et al 2023). This is especially pronounced for residents who have particular needs such as in relation to disability and family size. Residents are all too aware that they will only be offered a certain number of choices or options and the experience of what Smith (2002) termed the 'ticking clock' causes a very high level of stress. Often, tenants accept the first offer made to them in the relocation process, so high is the level of their fear and

uncertainty in the process (GoWell, 2011; Kleinhans, 2003; Posthumus and Kleinhans, 2014). For those whose relocation takes much longer, there are significant health impacts reported from living on a demolition site (Porter et al 2023).

Even when a better housing outcome is achieved for a tenant, studies show that the displacement itself has lasting and negative impacts. This can manifest in a great variety of ways. For example, one tenant impacted by renewal in NSW reported that their displacement would undermine the ability to be reunited with estranged family because they would be harder to find. People who have experienced displacement maintain a negative view of their experience long after they have moved (Goetz, 2013), particularly the sense of losing community. This demonstrates the long-term impact of displacement.

Displacement inevitably impacts particular population groups differently. Of special note is the harms experienced by children who are forced to move and are experiencing housing stress. A leading global authority on the impact on children is Sheridan Bartlett who states that the impact of eviction on children's well-being "can be devastating" with significant developmental consequences (Bartlett, 2022). A recent US study found clear evidence that very young children (0-4 years) who experience forced removal from their home, even when that home is in poor condition, have poor health and greater developmental risk than children who do not experience displacement (Cutts et al., 2022). In studies and other advocacy work in which I have been engaged, families reported high levels of anxiety from their children and teens who were impacted by the uncertainty about when and where they would be moved (Porter et al 2023). This has immediate flow-on effects. A systematic review conducted into the impacts on children of housing insecurity found that children experience harms including school-related, psychological, financial and family well-being impacts (Hock et al., 2023).

Such conditions often trigger other cascading effects. The Centre on Housing Rights and Evictions conducted a landmark study (2006) which found that the family stress caused by displacement can increase the experience of family violence and potential abuse. Other impacts ripple into damage to educational engagement and performance as well as poorer mental health and associated outcomes such as bed-wetting and truancy (Hock et al 2023). Often the displacement requires longer distances to attend school and see friends, magnifying the experience of dislocation even when staying at the same school might be a protective factor put in place to ease the burden of relocation. In public housing renewal, the process of displacement is often very lengthy.

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3. Education and health impact costs

The Education and Health impact costs of relocation have been calculated with the assistance of SGS Economics and Planning, based on their previous economic modelling of the identified benefits of increasing the supply of beds. This work was published in *The Case for Investing in Last Resort Housing* for the University of Melbourne's Sustainable Society Institute.[98] SGS Economics and Planning quantified the economic, social and cultural benefits of addressing the failing supply of last resort housing, with significant positive impacts on both government administration and the community.

While this study aimed to qualitatively assess the value of a businesses case for reducing homelessness via a cost benefit analysis, a workshop with SGS Economics and Planning suggested this report take a 50% approach, through considering how temporary relocation would impact residents' health and education outcomes.

Health cost savings were calculated by SGS Economics and Planning based on The Cost of Youth Homelessness in Australia by MacKenzie et al.[99]

The education figures presented by SGS reflect findings from The drivers of high health and justice costs among a cohort young homeless people in Australia[100] and The Social Value of Community Housing in Australia.[101]

The breakdown of costs can be seen in Figure 7, as provided by SGS Economics and Planning. Figure 8 shows how this model has been applied to the specific conditions of Barak Beacon Estate, including inflation and education impacts based on demographic knowledge of families having 1.6 children across the Estate.

Figure 27:SGS Analysis of household types and benefit categories

HOUSEHOLD TYPE	BENEFIT CATEGORIES						
	Health cost savings	Reduced domestic violence	Reduced costs of crime	Enhanced human capital	Enhanced labour market productivity	Education benefits	Improved community diversity
Homeless	$8,429	$19,000	$6,182	$4,236	Not relevant	Not relevant	No data found to support monetisation
	MSSI (2017)	Flatau (2020)	MSSI (2017)	ABS (2016)			
Very low income household	$640	$47,220	No data found to support monetisation	Not relevant	Not relevant	Not relevant	No data found to support monetisation
	Net Balance (2010)	Flatau (2020)					
Low income household	$1,872	$19,000	No data found to support monetisation	$17,784	$8,199	$3,016	No data found to support monetisation
	Net Balance (2018)	Flatau (2020)		Ravi and Reinharr (2010)	SGS (2021)	Ravi and Reinharr (2010)	

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Figure 28: SGS Analysis applied to Flemington Estate residents

Flemington Redevelopment	*Relocation period 3 years						
		Qty	Rate	Impact	Years	Total	Notes
FLEM Displacment Health Costs							
	Health Cost-Saving Loss for 1500 People on very low income	1500	640	0.5	3	$1,440,000	
	Inflation 45% from 2010					$648,000	Inflation Calculator	RBA
	Total					$2,088,000	
		Qty	Rate	Impact	Years	Total	Notes
FLEM Displacment Education Costs							
	Education Cost-Saving Loss for 380 children. Around 33% of all hoseholds on the estate have children This is calculated on demographic studies of 1.6 children per family	380	3016	0.5	3	$1,719,120	
	Inflation 45% from 2010					$773,604	Inflation Calculator	RBA
	Total					$2,492,724	

4. Total building costs of demolition and rebuild of Flemington Estate under the High-rise Redevelopment Plan

The total construction costs for HRRP have been calculated using area calculations from the Hayball Yield and Massing Study as well as a $5000/m2 construction estimates. The breakdown of costs can be found below in Figure 29 and 30

Figure 29:. Total building costs of demolition and rebuild of HRRP Flemington Estate.

High-rise Redvelopment Program		
Demolition	$80,000,000	-
New Build (1,297 dwellings)	$456,582,910	$352,030
Carparks	$23,774,010	-
Commercial	$31,161,700	-
10% Contingency	$59,151,862	-
Total Construction Costs	$650,670,482	$501,673

Figure 30. Total building project costs of demolition and rebuild of HRRP Flemington Estate.

High-rise Redvelopment Program		
Demolition	$80,000,000	-
New Build (1,297 dwellings)	$456,582,910	$352,030
Carparks	$23,774,010	-
Commercial	$31,161,700	-
10% Contingency	$59,151,862	-
Total Construction Costs	$650,670,482	$501,673
Health Costs	$2,088,000	-
Education Costs	$2,492,724	-
Relocation Costs	$227,743,629	-
Total Uncaptured Costs	$232,324,353	-
Total Project Cost	$882,994,835	$680,798

5. Resident relocation costs

The relocation costs for the previous tenants at Flemington Estate have been calculated using daily rates per dwelling of $150 as provided in the Supreme Court hearing NO. SCI 2020 02563 by Jamin Ben Crawley government representative as well as managerial fees of 1.5% of the construction cost also provided in the Supreme Court Hearing.[102]

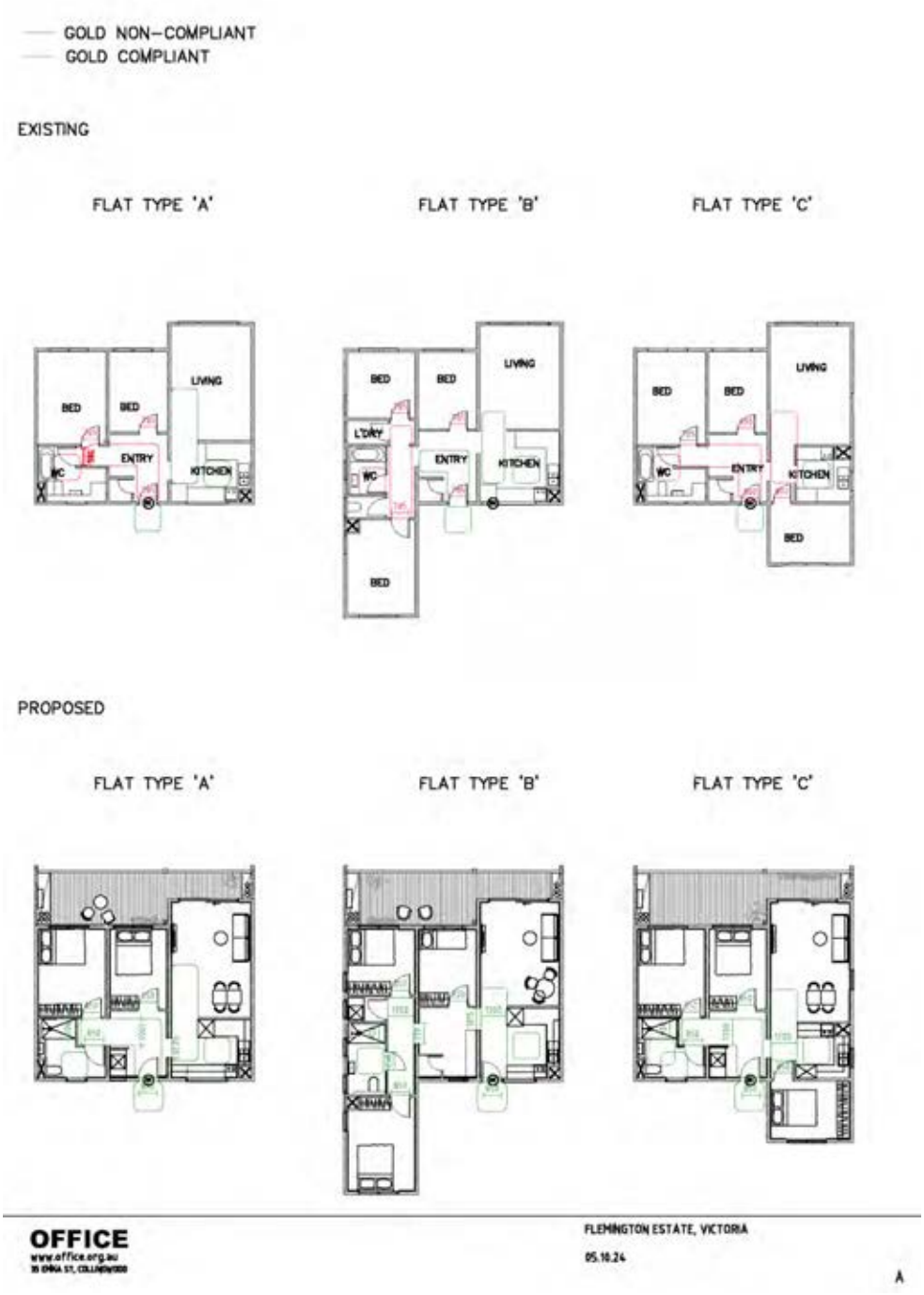
Figure 31: Total relocation cost associated with the HRRP project.

FLEM Relocation Costs		Qty	Rate	Total	
				Relocation for period Sep 2025 - Jan 2031 = 1945 days	
*We have accounted for 100 dwellings to be relocated in newly finished community housing developments	Relocation fee per dwelling @ $150/day * The proposed construction period will last for 1945 days, with 620 existing flats requiring relocation.	1945 days x 620 dwellings = 1,205,900	$150	$180,885,000	Supreme Court Affidavit pg 24 states the $150/day relocation costs
	Inflation 21% from 2020			$37,985,850	Inflation Calculator | RBA
	Relocation Managerial Costs			$8,872,779	Supreme Court Affidavit pg 25 states the Relocation Managerial Fee as 1.5% of the construction costs.
	Total Relocation Costs			$227,743,629	

[102] Supreme Court of Victoria, 'Affidavit of Jamin Ben Crawly' in Case NO. SCI 2020 02563 between Timothy Hames Sowden and the Director of Housing.

6. Liveable Housing Design Guidelines

The Liveable Housing Guidelines have been assessed by the design team with all dwellings meeting all applicable areas as shown in the attachments.



Standard			TYPE A	TYPE B	TYPE C
1	Dwelling access				
	Silver Level				
a.	Provide a safe, continuous step-free pathway from the front boundary of the property to an entry door to the dwelling. This provision does not apply where the average slope of the ground where the path would feature is steeper than 1:14.		Y	Y	Y
b.	The path of travel referred to in (a) should have a minimum clear width of 1000mm and have: i. no steps; ii. an even, firm, slip resistant surface; iii. a crossfall of not more than 1:40; iv. a maximum pathway slope of 1:14. Where ramps are required they should have landings provided at no greater than 9m for a 1:14 ramp and no greater than 15m for ramps steeper than 1:20. Landings should be no less than 1200mm in length.		Y	Y	Y
c.	The path of travel referred to in (a) may be provided via an associated car parking space for the dwelling. Where a car parking space is relied upon as the safe and continuous pathway to the dwelling entrance, the space should incorporate: i. minimum dimensions of at least 3200mm (width) x 5400mm (length); ii. an even, firm and slip resistant surface; and iii. a level surface (1:40 maximum gradient, 1:33 maximum gradient for bitumen)		N/A	N/A	N/A
d.	A step ramp may be incorporated at an entrance doorway where there is a change in height of 190mm or less. The step ramp should provide: i. a maximum gradient of 1:10 ii. a minimum clear width of 1000mm (please note: width should reflect the pathway width) iii. a maximum length of 1900mm		N/A	N/A	N/A
e.	Where a ramp is part of the pathway, level landings no less than 1200mm in length, exclusive of the swing of the door or gate than opens onto them, must be provided at the head and foot of the ramp. Note: The width of the landing will be determined by the adjoining pathway. If the landing directly adjoins the doorway please refer to Element 2 for dimensional requirements.		N/A	N/A	N/A
	Gold Level				
	As for silver level except:				
b.	i. replace in (b) the minimum clear pathway width of 1000mm with 1200mm, and		Y	Y	Y
c.	ii. insert in (c) the following additional features: a. a vertical clearance over the parking space of at least 2500mm; and b. a covered parking space to ensure protection from the weather.		N/A	N/A	N/A
2	Dwelling entrance				
	Silver Level				
a.	The dwelling should provide an entrance door with - i. a minimum clear opening width of 820mm (see Figure 2(a)); ii. a level (step-free) transition and threshold (maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or beveled); and iii. reasonable shelter from the weather.		Y	Y	Y
b	A level landing area of at least 1200mm x 1200mm should be provided at the level (step free) entrance door. A level landing area at the entrance door should be provided on the arrival side of the door (i.e. the external side of the door) to allow a person to safely stand and then open the door.		Y	Y	Y
c.	Where the threshold at the entrance exceeds 5mm and is less than 56mm, a ramped threshold may be provided (see Figure 1(b)).		N/A	N/A	N/A
d.	The level (step-free) entrance should be connected to the safe and continuous pathway as specified in Element 1.		Y	Y	Y
	Note The entrance must incorporate waterproofing and termite management requirements as specified in the NCC.				
	Gold Level				
	As for silver level except replace:				
a.	(i) with minimum clear door opening width of 850mm (see Figure 2(b)), and		Y	Y	Y
b.	with a level landing area of at least 1350mm x 1350mm		Y	Y	Y
3	Internal doors & corridors				
	Silver Level				
a.	Doorways to rooms on the entry level used for living, dining, bedroom, bathroom, kitchen, laundry and sanitary compartment purposes should provide: i. a minimum clear opening width of 820mm (see Figure 2(a)); and ii. a level transition and threshold (maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or beveled)		Y	Y	Y
b.	Internal corridors/passageways to the doorways referred to in (a) should provide a minimum clear width of 1000mm		Y	Y	Y
	Gold Level				
	As for the silver level except replace:				
a.	/(i) with a minimum clear opening width of 850mm (see Figure 2(b)), and		Y	Y	Y
b.	with a minimum corridor/passageway width of 1200mm.		Y	Y	Y
4	Toilet				
	Silver Level				
a	Dwellings should have a toilet on the ground (or entry) level that provides: i. a minimum clear width of 900mm between the walls of the bathroom if located in a separate room; and ii. a minimum 1200mm clear circulation space forward of the toilet pan exclusive of the swing of the door in accordance with Figure 3(a). iii. The toilet pan should be located in the corner of the room (if the toilet is located in a combined toilet / bathroom) to enable installation of grabrails at a future date. Reinforcement guidelines for walls in bathrooms and toilets are found in element 8.		Y	Y	Y
	Gold Level				
	As for silver level except replace				
a.	/(i) with a minimum clear width of 1200mm between the walls of the bathroom if located in a separate room, or between amenities if located in a combined bathroom.		Y	Y	Y
5	Shower				
	Silver Level				
a.	One bathroom should feature a slip resistant, hobless shower recess. Shower screens are permitted provided they can be easily removed at a later date.		Y	Y	Y
b.	The shower recess should be located in the corner of the room to enable the installation of grabrails at a future date.		Y	Y	Y
	Gold Level				

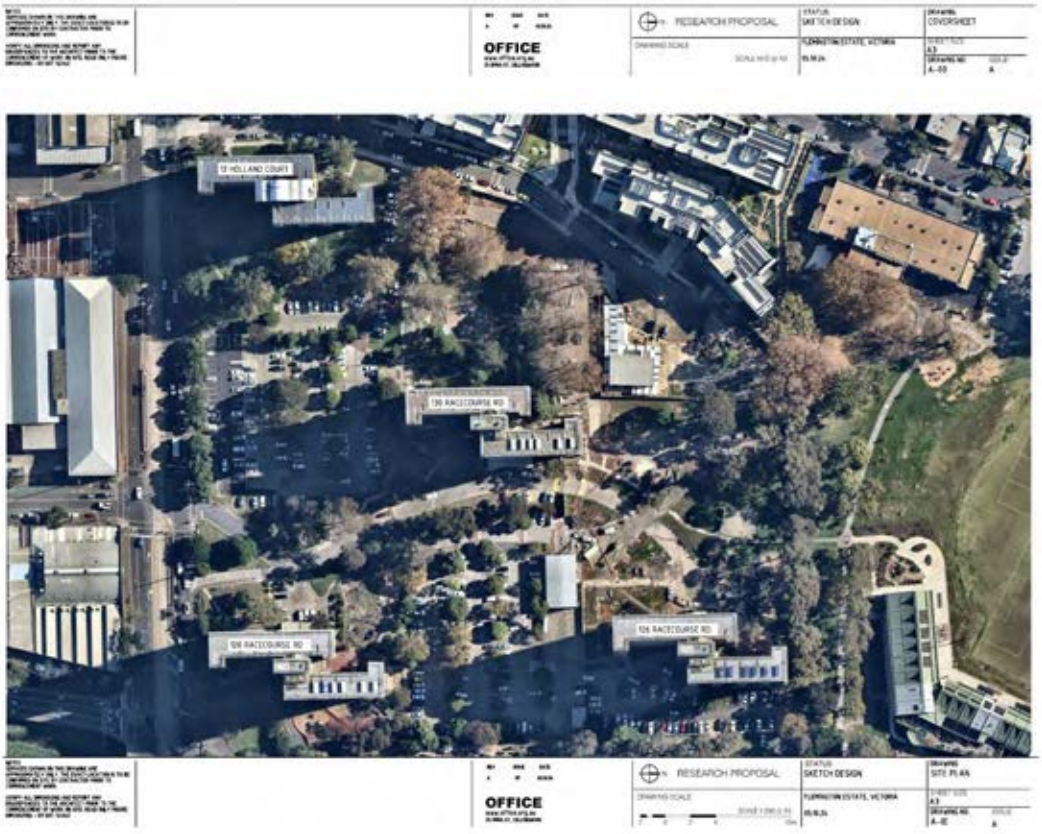
	As for silver level except				
a.	The hobless shower recess described in (a) should: i. be located in a bathroom on the ground (or entry) level; ii. provide minimum dimensions of 900mm (width) x 900mm (length); and iii. provide a clear space of at least 1200mm (width) x 1200mm (length) forward of the shower recess entry as detailed in Figure 5(a).		Y	Y	Y
6	Reinforcement of bathroom & toilet walls				
	Silver Level				
a.	Except for walls constructed of solid masonry or concrete, the walls around the shower, bath (if provided) and toilet should be reinforced to provide a fixing surface for the safe installation of grabrails.		Y	Y	Y
b.	The walls around the toilet are to be reinforced by installing: i. noggings with a thickness of at least 25mm in accordance with Figure 6(a); or ii. sheeting with a thickness of at least 12mm in accordance with Figure 6(b).		Y	Y	Y
c.	The walls around the bath are to be reinforced by installing: i. noggings with a thickness of at least 25mm in accordance with Figure 7(a); or ii. sheeting with a thickness of at least 12mm in accordance with Figure 7(b).		Y	Y	Y
d.	The walls around the hobless shower recess are to be reinforced by installing: i. noggings with a thickness of at least 25mm in accordance with Figure 8(a); or ii. sheeting with a thickness of at least 12mm in accordance with Figure 8(b).		Y	Y	Y
	Gold Level				
	Silver level requirements apply.		Y	Y	Y
7	Internal stairways				
	Silver Level				
a.	Stairways in dwellings must feature: i. a continuous handrail on one side of the stairway where there is a rise of more than 1m.		N/A	N/A	N/A
	Note This is a requirement for all new homes under the NCC. Homes built prior to 2014 may benefit from this element.				
	Gold Level				
	As for the silver level with the following additional features:				
a.	ii. a minimum clear width of 1000mm; iii. be straight in design; and iv. be positioned adjoining a load bearing wall.		N/A	N/A	N/A
8	Kitchen space				
	Silver Level				
	No requirements.				
	Gold Level				
a.	The kitchen space should be designed to support ease of movement and adaptation with: i. at least 1200mm clearance in front of fixed benches and appliances (excluding handles); and ii. slip resistant flooring.6		Y	Y	Y
b.	Floor finishes should extend under kitchen cabinetry to enable cupboards to be removed without affecting the flooring. Where fixtures cannot be easily removed (eg. ovens which are built in) the floor finishes should not be continued. If relying on advice from a third party, Assessors are advised to provide a note in the notes column of the Assessment.		Y	Y	Y
9	Laundry space				
	Silver Level				
	No requirements.				
	Gold Level				
a.	The laundry space should be designed to support ease of movement and adaptation with: i. At least 1200mm clear width provided in front of fixed benches and appliances (excluding handles). Where the appliances are not installed then the recessed area provision for an appliance shall be a minimum of 600mm in depth; and ii. Slip resistant flooring.6		Y	Y	Y
b.	Floor finishes should extend under Laundry cabinetry to enable cupboards to be removed without affecting the flooring. Where fixtures cannot be easily removed the floor finishes should not be continued. If relying on advice from a third party, Assessors are advised to provide a note in the notes column of the Assessment		Y	Y	Y
10	Ground (or entry level) bedroom space				
	Silver Level				
	No requirements.				
	Gold Level				
a.	The dwelling should feature a space (or room) on the ground (or entry) level that: i. is of at least 10m2 clearance exclusive of wardrobes; skirtings and wall lining; ii. provides for a minimum path of travel of at least 1000mm on at least one side of the bed.		Y	Y	Y
11	Switches and powerpoints				
	Silver Level				
	No requirements.		N/A	N/A	N/A
	Gold Level				
a.	Light switches should be positioned in a consistent location: i. between 900mm – 1100mm above the finished floor level; and ii. horizontally aligned with the door handle at the entrance to a room.		Y	Y	Y
b.	Powerpoints should be installed not lower than 300mm above the finished floor level		Y	Y	Y
12	Door and tap hardware				
	Silver Level				
	No requirements.				
	Gold Level				
a.	Doorways should feature door hardware installed at between 900mm – 1100mm above the finished floor.		Y	Y	Y
13	Family/living room space				
	Silver Level				
	No requirements.		N/A	N/A	N/A
	Gold Level				
	No requirements.		N/A	N/A	N/A
14	Window sills				
	Silver Level				
	No requirements.		N/A	N/A	N/A
	Gold Level				
	No requirements.		N/A	N/A	N/A
15	Flooring				
	Silver Level				
	No requirements.		N/A	N/A	N/A
	Gold Level				
	No requirements.		N/A	N/A	N/A

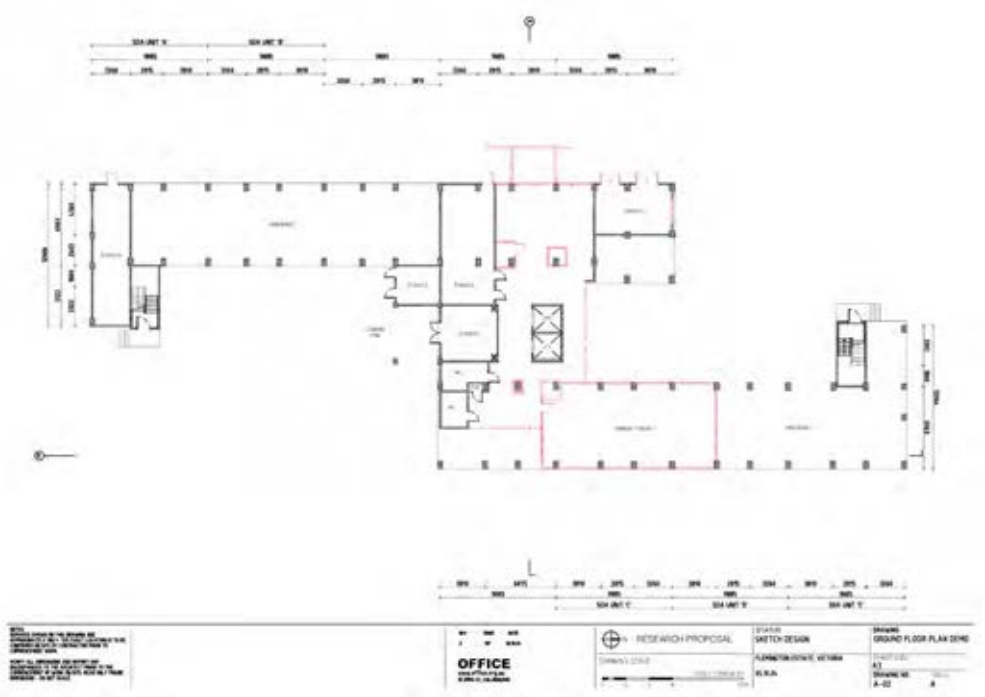
7. Better Apartment Design Standards

The Better Apartment Design Guidelines for Victoria have been assessed by the design team with the proposal meeting all applicable areas as shown in the attachments except for minimum secondary bedroom size.

Standard		TYPE A	TYPE B	TYPE C
D24	Minimum Internal Room Dimensions			
	Bedroom			
	Main bedroom (3x3.4m 10.2sqm)	Y	Y	Y
	All other bedrooms (3x3m 9sqm)	N	N	N
	Living Area			
	Studio and 1B (3.3m wide 10sqm)	NA	NA	NA
	2 or more bedrooms (3.6m wide 12sqm)	Y	Y	Y
D25	Habitable Room Depth			
	Where habitable rooms have a ceiling height of 2.4m the maximum room depth is 6m (2.5 x 2.4m).	Y	Y	Y
	Habitable rooms should have a window in an external wall of the building.	Y	Y	Y
D28	Storage			
	Studio 5 cubic metres			
	1B 6 cubic metres	NA	NA	NA
	2B 9 cubic metres	Y	NA	NA
	3B 12 cubic metres	NA	Y	Y
D27	Ventilation			
	At least 40 per cent of dwellings should provide effective cross ventilation that has: • A maximum breeze path through the dwelling of 18 metres. • A minimum breeze path through the dwelling of 5 metres. • Ventilation openings with approximately the same area.	Y	Y	Y
D19	Private open space			
	A balcony with at least the area and dimension			
	Studio or 1B (8sqm 1.8m wide)	NA	NA	NA
	2B (8spm 2m wide)	Y	Y	Y
	3B (12sqm 2.4m wide)	Y	Y	Y
D17	Accessibility to atleast 50% of apartments			
	• A clear opening width of at least 850mm at the entrance to the dwelling and main bedroom.	Y	Y	Y
	• A clear path with a minimum width of 1.2 metres that connects the dwelling entrance to the main bedroom, an adaptable bathroom and the living area.	Y	Y	Y
	• At least one adaptable bathroom that meets all of the requirements of either Design A or Design B	Y	Y	Y

8. Architectural Drawings

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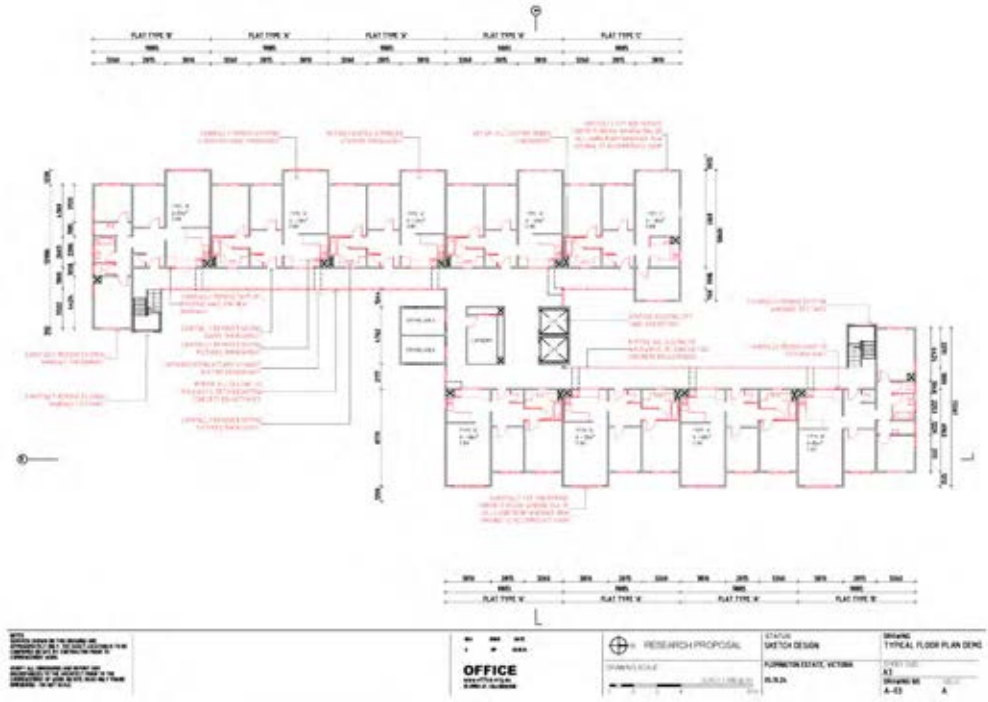
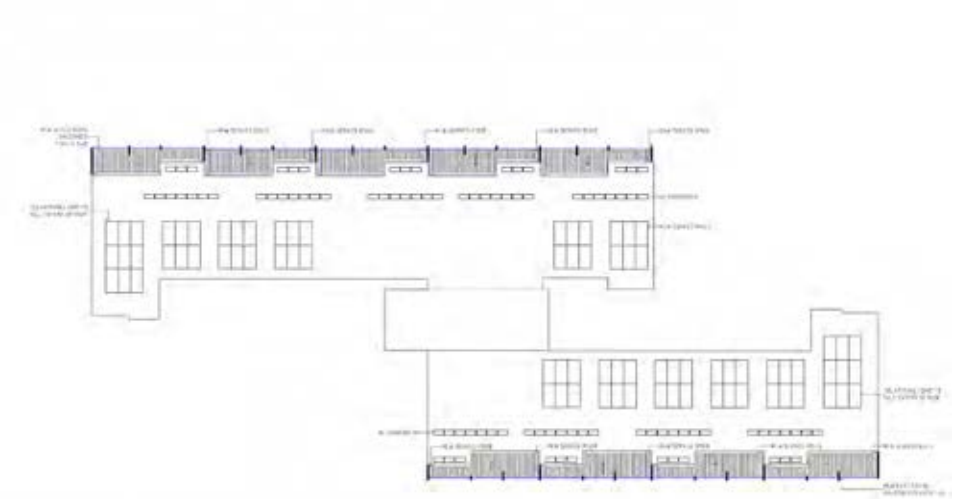
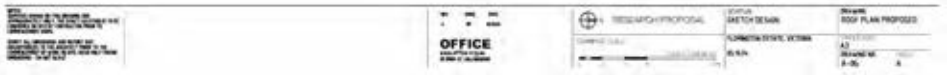
SKETCH DESIGN
OFFICE


RESEARCH PROPOSAL
SKETCH DESIGN
OFFICE


OFFICE
RESEARCH PROPOSAL
SKETCH DESIGN
GROUND FLOOR PLAN
PROPOSED


OFFICE
RESEARCH PROPOSAL
SKETCH DESIGN
TYPICAL FLOOR PLAN
PROPOSED



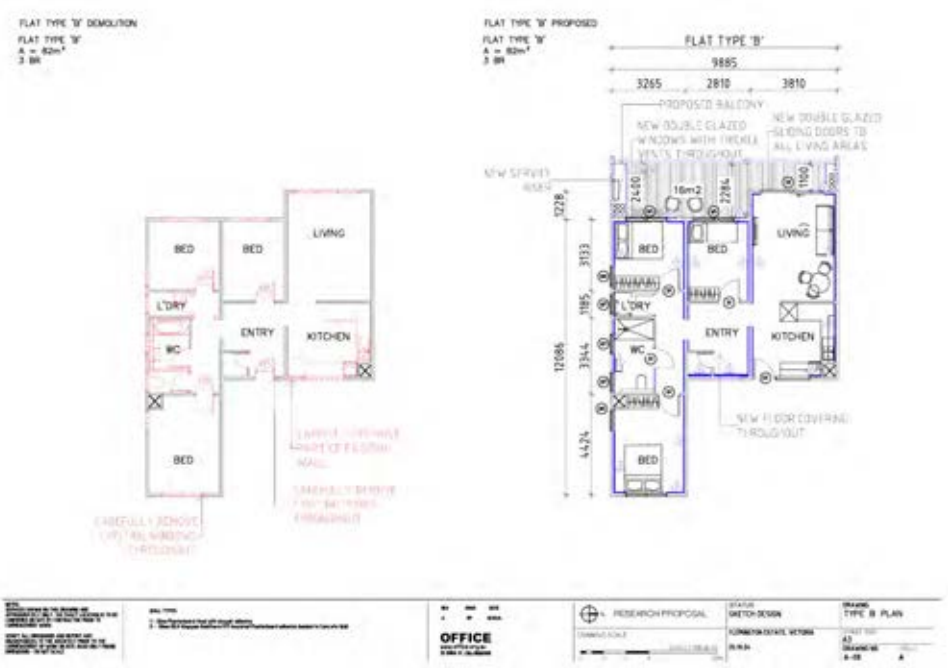


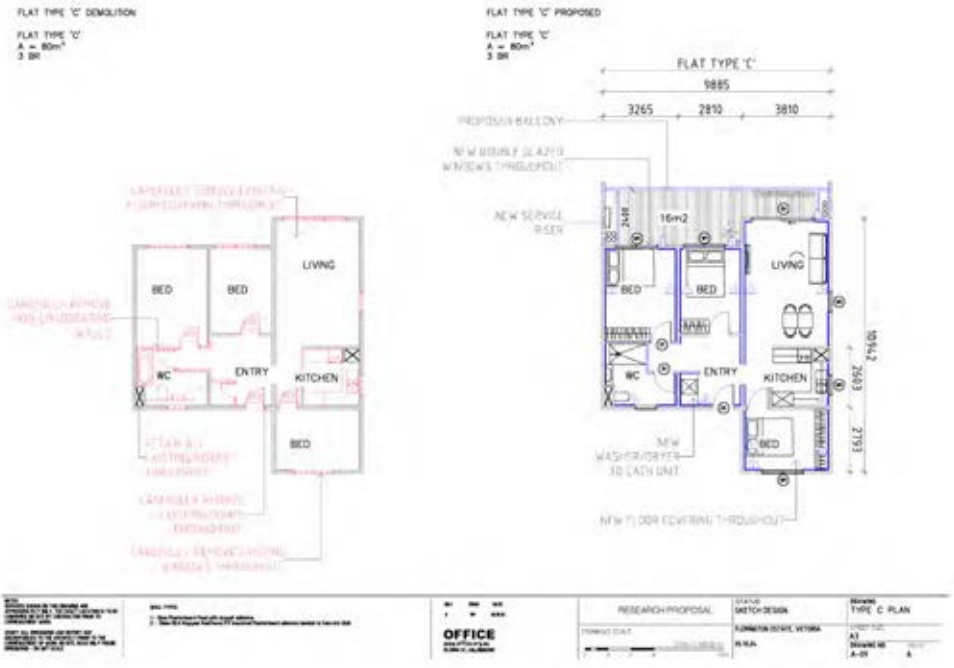
FLAT TYPE 'A' DEMOLITION

FLAT TYPE 'A'
A = 68m²
2 BR

FLAT TYPE 'A' PROPOSED

FLAT TYPE 'A'
A = 68m²
2 BR


FLAT TYPE 'B' DEMOLITION
FLAT TYPE 'B'
A = 82m²
3 BR
BED
BED
LIVING
L'DRY
ENTRY
KITCHEN
WC
BED
FLAT TYPE 'B' PROPOSED
FLAT TYPE 'B'
A = 82m²
3 BR
FLAT TYPE 'B'
9885
3265
2810
3810
PROPOSED BALCONY
NEW DOUBLE GLAZED WINDOWS WITH FRESHLE VENTS THROUGHOUT
NEW DOUBLE GLAZED SLIDING DOORS TO ALL LIVING AREAS
NEW SERVICE RISER
16m2
2400
2284
1150
3228
3133
1185
3944
12086
4474
BED
BED
LIVING
L'DRY
ENTRY
KITCHEN
WC
BED
NEW FLOOR COVERING THROUGHOUT
OFFICE
RESEARCH PROPOSAL
SKETCH DESIGN
TYPE B PLAN
A3
A-08
A


FLAT TYPE 'C' DEMOLITION
FLAT TYPE 'C'
A = 80m²
3 BR
BED
BED
LIVING
WC
ENTRY
KITCHEN
BED
FLAT TYPE 'C' PROPOSED
FLAT TYPE 'C'
A = 80m²
3 BR
FLAT TYPE 'C'
9885
3265
2810
3810
PROPOSED BALCONY
NEW DOUBLE GLAZED WINDOWS THROUGHOUT
NEW SERVICE RISER
2400
16m2
BED
BED
LIVING
WC
ENTRY
KITCHEN
BED
10942
2563
2793
NEW WASHER/DRYER/S TO EACH UNIT
NEW FLOOR COVERING THROUGHOUT
OFFICE
RESEARCH PROPOSAL
SKETCH DESIGN
TYPE C PLAN
A3
A-09
A

OFFICE

RESEARCH PROPOSAL

STATUS
SKETCH DESIGN

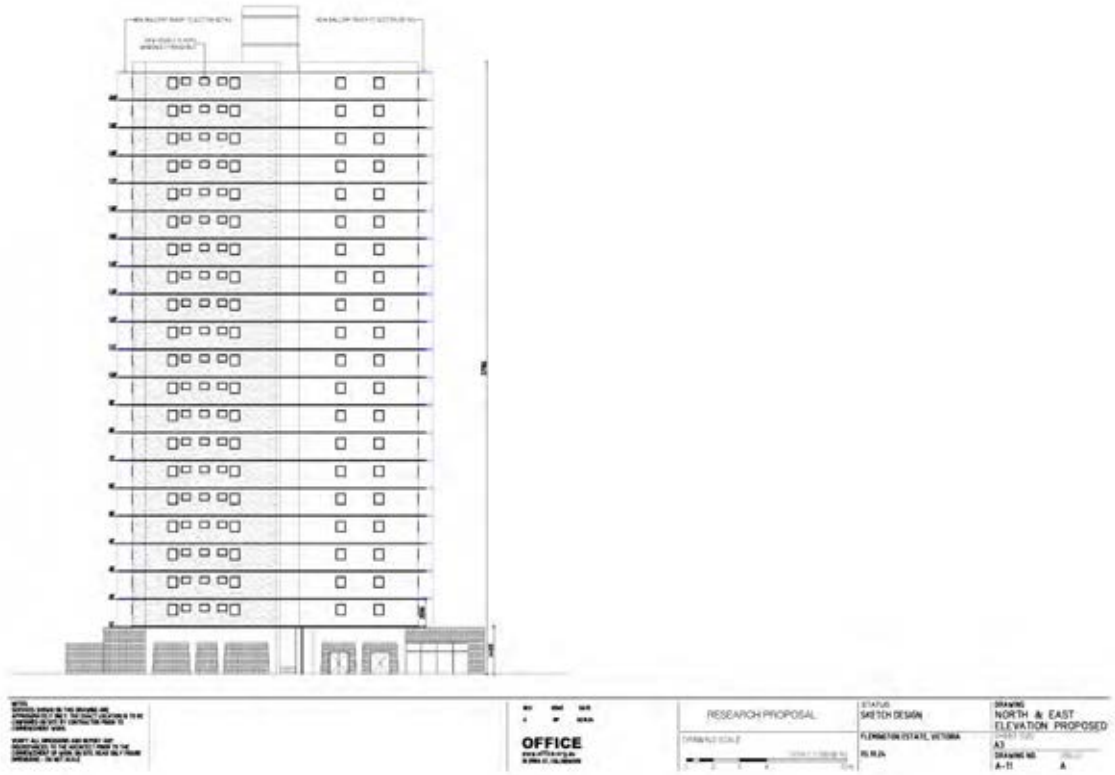
FLEMINGTON ESTATE, VICTORIA

DRAWING
NORTH & EAST
ELEVATION DEMO

A3

DRAWING NO.
A-10

A



OFFICE

RESEARCH PROPOSAL

STATUS
SKETCH DESIGN

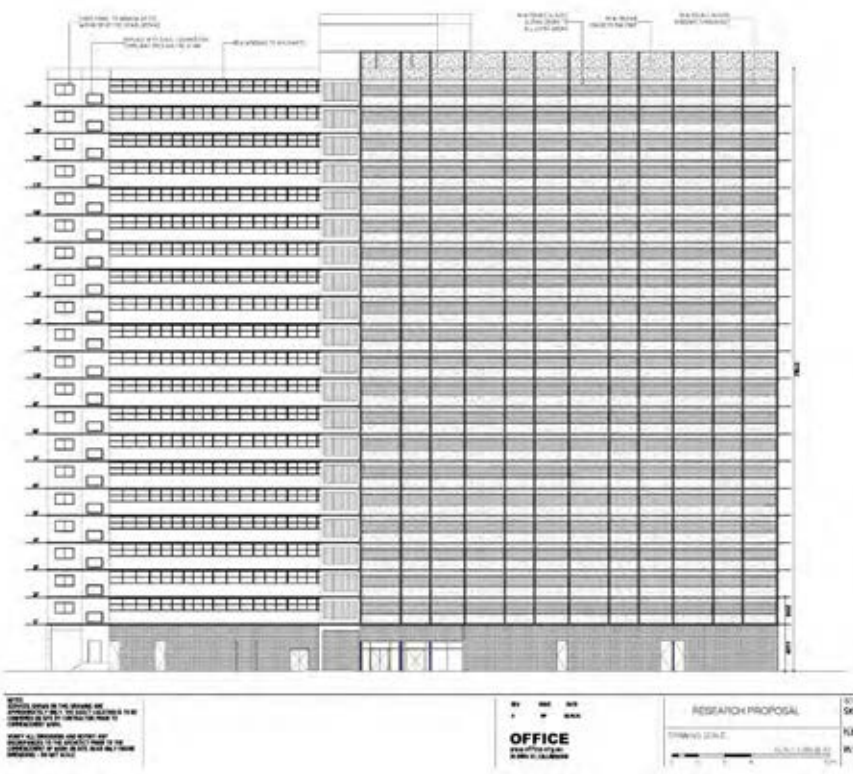
FLEMINGTON ESTATE, VICTORIA

DRAWING
NORTH & EAST
ELEVATION PROPOSED

A3

DRAWING NO.
A-11

A



OFFICE

RESEARCH PROPOSAL

SKETCH DESIGN

FLEMINGTON ESTATE, VICTORIA

NORTH & EAST ELEVATION PROPOSED

A3

A-12

A

OFFICE

RESEARCH PROPOSAL

SKETCH DESIGN

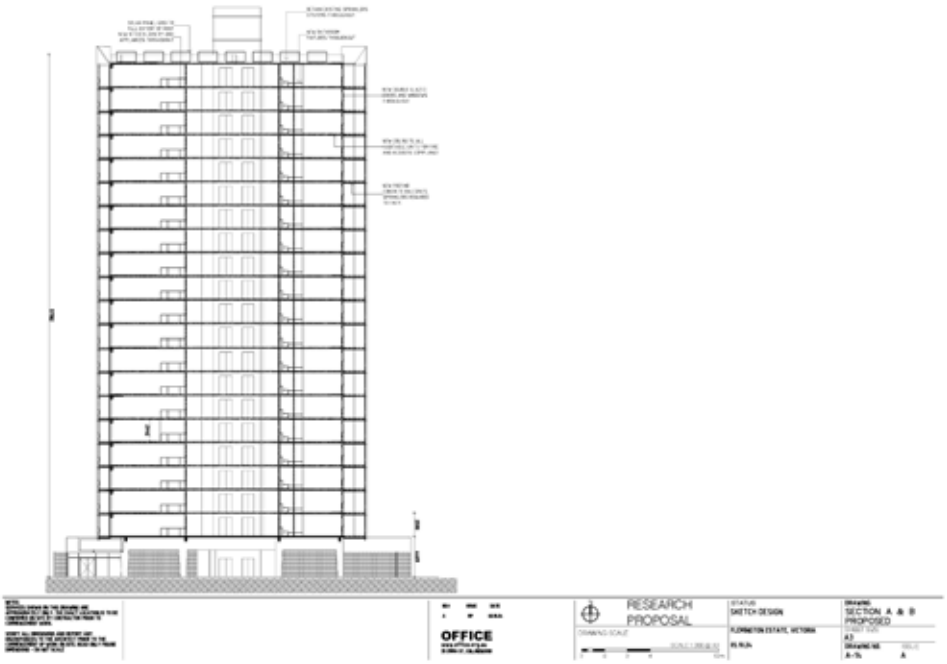
FLEMINGTON ESTATE, VICTORIA

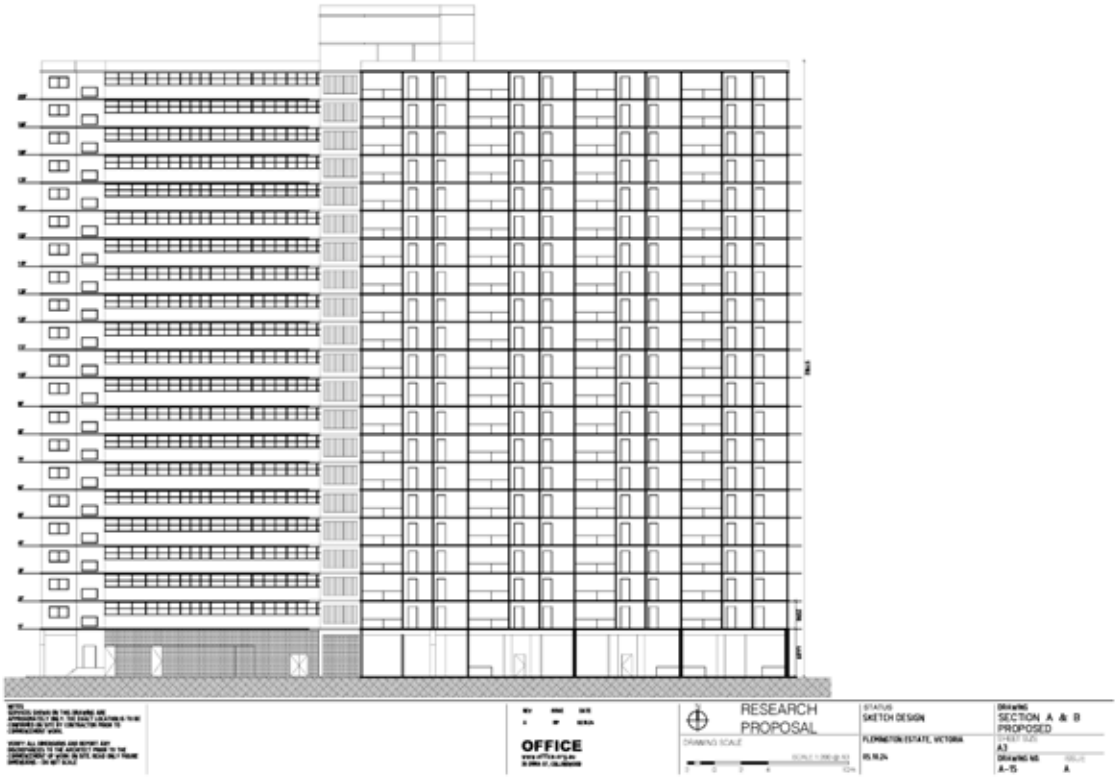
SECTION A & B DEMO

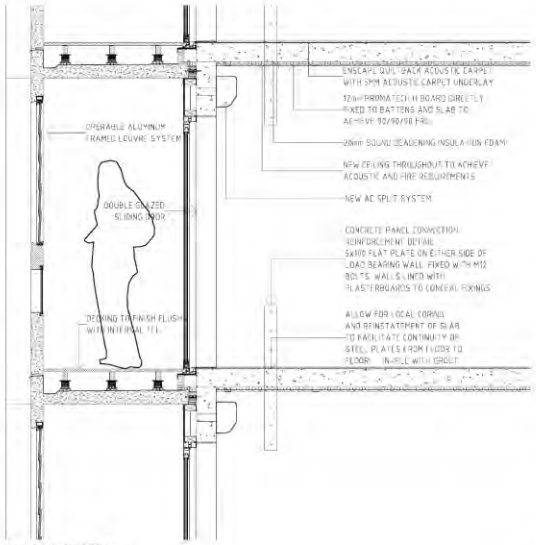
A3

A-13

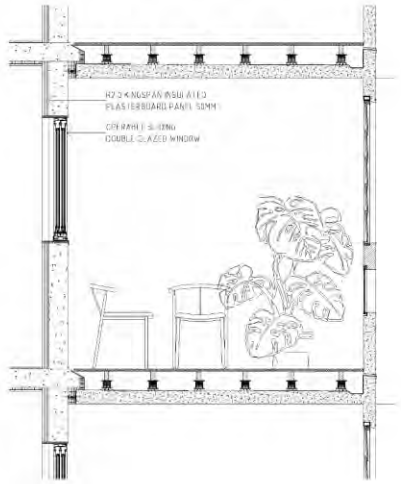
A


OFFICE
RESEARCH
PROPOSAL
SKETCH DESIGN
FLEMINGTON ESTATE, VICTORIA
SECTION A & B
PROPOSED
A3
A-15
A

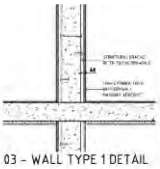

OFFICE
RESEARCH
PROPOSAL
SKETCH DESIGN
FLEMINGTON ESTATE, VICTORIA
SECTION A & B
PROPOSED
A3
A-15
A



01 - SECTION DETAIL



02 - SECTION DETAIL



03 - WALL TYPE 1 DETAIL

NOTES
SERVICES SHOWN ON THIS DRAWING ARE APPROXIMATELY ONLY. THE EXACT LOCATION IS TO BE CONFIRMED ON SITE BY CONTRACTOR PRIOR TO COMMENCEMENT WORK.

VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT PRIOR TO THE COMMENCEMENT OF WORK ON SITE. READ ONLY FIGURE DIMENSIONS - DO NOT SCALE

REV	DESC	DATE
A	SP	05.10.24

OFFICE
www.office.org.au
70 ERNEST STREET, COLLINGWOOD

RESEARCH PROPOSAL

STATUS
SKETCH DESIGN

DRAWING
DETAILS

DRAWING SCALE
SCALE 1:20 @ A3
200 0 200 400 1000mm

FLEMINGTON ESTATE, VICTORIA

05.10.24

SHEET SIZE
A3

DRAWING NO.
A-16

ISSUE
A

9. Environmentally Sustainable Design (ESD) Statment

The energy report was calculated by Makao Sustainability and ESD engineering and is provided below. This document shows the proposed design meeting the required 7 Star NatHers requirements achieving an average 7.5 stars.

1.0 Introduction

1.1 SUMMARY

OFFICE engaged Makao to prepare a Sustainable Management Plan report for the proposed development at Flemington Public Housing Estate, 120 Racecourse Road, Flemington, VIC 3031. This project adopts the retain, repair, and reinvest model, with the intent to preserve as much of the existing form as possible whilst making the necessary upgrades to bring the project in line with the latest standards and meet statutory and building code requirements.

This report demonstrates how this development incorporates sustainability initiatives into the proposed build, balancing the retention of existing structures with essential improvements. It outlines how the project meets the objectives set out in the following clauses of the City of Moonee Valley's Policies:

— *Integrated Water Management Policy* — Planning Scheme Clause 19.03-3L

— *Environmentally Sustainable Development Policy* — Planning Scheme Clause 15.01-2L-03

Additionally, the report addresses how the development complies with current National Construction Code (NCC) requirements, Better Apartment Design Standards, energy efficiency standards, and Water Sensitive Urban Design (WSUD). This holistic approach ensures that while preserving the building's character, the project also achieves modern standards of sustainability and liveability.

Makao has gathered the information for this report through active communication and collaboration with relevant stakeholders:

TABLE 1. KEY STAKEHOLDERS

Key Contact	Description / Role	Company/Entity
Simon Robinson	Project Architect	OFFICE

The ESD assessment and results presented herein are based on:

- Architectural Drawings **prepared by OFFICE** Pty Ltd **dated 06/05/2024**.
- Preliminary NatHERS ratings prepared by **Makao**
- Internal project documentation and specification documents

1.2 TOOLS AND GUIDELINES

To benchmark and assess the project's sustainability performance, the following tools and guidelines have been utilised:

1. Green Star: A self-assessment has been conducted using Green Star criteria, providing a comprehensive evaluation of the project's environmental impact and sustainability features. While certification is not currently being pursued, this option remains open should the project receive the green light for further development.
2. NatHERS (Nationwide House Energy Rating Scheme): Energy efficiency ratings have been calculated to ensure the development meets or exceeds the required thermal performance standards.
3. SDAPP (Sustainable Design Assessment in the Planning Process): This framework has been employed to integrate key environmental performance considerations into the planning process, ensuring sustainability is addressed from the earliest stages of design.

makao

3.0 Sustainability Initiatives

3.1 PROJECT HIGHLIGHTS

The proposed development has been assessed and designed to align with the sustainability goals of the City of **Moonee Valley** and the Green Building Council of Australia (GBCA) Green Star Buildings rating tool. The development is committed to ensuring that the sustainability objectives of relevant environmental policies are fully integrated into all aspects of the works.

In summary, the sustainability initiatives integrated into the development aim to:

- Reduce embodied emissions through Retaining a significant portion of the existing structure, minimising the need for new materials and associated emissions.
- Help the development transition to low or zero carbon operations, support the shift to renewable energy, promote responsible resource use, and reduce contributions to climate change.
- Reduce emissions as a result of building operations and refrigerant use.
- Specify and install responsible and sustainable building finishes.
- Improve the indoor environment quality for the building occupants by maximising artificial and natural light quality, acoustic comfort, and reduced exposure to toxins.
- Provide cyclist facilities and end of trip measures.
- Reduce stormwater pollution by ensuring the runoff leaving the site during construction and operation phase meets best practice urban stormwater quality targets.
- Divert 90% of construction and demolition waste from landfill.

The assessment herein shows the proposed development attains these objectives by incorporating the following measures:

- ✓ Source 100% of energy from renewable sources (both on- site and offsite).
- ✓ NCC thermal performance and energy efficiency requirements for residential dwellings.
- ✓ Build a fossil fuel free development (replace all major gas connection system for spaces heating, hot water heating and cooking).
- ✓ Install a 16kW roof mounted solar photo voltaic system for onsite renewable energy generation.
- ✓ Attain a 5 Star 'Australian Excellence' rating under the Green Star Buildings Rating.
- ✓ Provide building users with cyclist facilities on each level.

3.2 URBAN STORMWATER QUALITY

To demonstrate compliance with minimum Water Sensitive Urban Design (WSUD)minimum requirements, developments need to attain Best-Practice Environmental Guidelines for Urban Stormwater, CSIRO 1999 as outlined below (post-construction phase):

- 80% reduction in the mean annual load of Total Suspended Solids (TSS)
- 45% reduction in the mean annual load of Total Phosphorus (TP)
- 45% reduction in the mean annual load of Total Nitrogen (TN)
- 70% reduction in the mean annual load of Gross Pollutants or Litter (GP) – where litter is defined as anthropogenic material larger than 5mm.

Preliminary compliance with the above targets can be demonstrated using either of the following tools:

These tools and guidelines provide a robust framework for assessing and enhancing the project's sustainability credentials, aligning with best practices in sustainable development and the principles of the retain, repair and reinvest model.

1.3 PERFORMANCE SUMMARY

The proposed development shall:

- **Achieve a NatHERS development average of 7.5-stars** (exceeding the 7.0-star NCC 2022 requirement) by introducing building fabric upgrades.
- **Achieve a 5 Star 'Australian Excellence' rating** under the Green Building Council of Australia (GBCA) Green Star Buildings framework, a distinction requiring a score of at least **35 points**. Please note that this Green Star is a *self-assessment* process facilitated by an accredited GSAP and the project will not be pursuing certification from GBCA. As such, the rating will not be used as part of the promotional materials as per GBCA guidelines. Compliance with the targeted rating will nonetheless be verified during the construction phase and within six months of occupancy.

This project surpasses the minimum points required threshold, **achieving a score of 38 points.** This score demonstrates an ongoing commitment to sustainability and is based on:

- A comprehensive evaluation of existing, current, and in-progress design and construction documents.
- Ongoing liaison and discussions with key stakeholders (project design team members, key suppliers, and contractors).
- Participation in scheduled consultation meetings and project site visits with the construction team to discuss Green Star Buildings pathway, initiatives and address emerging issues throughout the construction phase.

1.4 GREEN STAR BUILDINGS

The proposed development embodies a strong commitment to sustainable design and construction. A range of initiatives, tailored to the project's scale and type, have been incorporated. These initiatives align with the Green Star Buildings framework, ensuring maximum effectiveness where it's most needed.

This report serves as a tracking tool for the project's alignment with the individual credits outlined in the Green Star Buildings framework.

In essence, the project will exceed the minimum 35 points for 5 Star rating under the Green Star Buildings framework. This strategic approach not only maximises the implementation of sustainability initiatives but also provides a buffer to safeguard the 5 Star 'Australian Excellence' rating. This score achieved demonstrates the project's commitment to environmental stewardship and social responsibility, ensuring the most effective initiatives are integrated at every project stage.

Please refer to the figure below for an overview of the different rating bands (ranging from Legal Compliance to 6 Star World Leadership) under the Green Star Buildings guidelines. The project score of achieved is within the ≥35 to <70 points which translates to a 5 Star 'Australian Excellence' rating. Details of the targeted initiatives are presented in subsequent sections of this report.

- Melbourne Water's online STORM rating tool (proposed development required to attain a minimum score of 100%) – ideal for small developments.
- Model for Urban Stormwater Improvement Conceptualisation (MUSIC) – ideal for larger developments or where treatment trains are required.
- Stormwater Management assessment has been undertaken using the MUSIC Pathway.

These outcomes are in line with the discharge credits. The project incorporates a mixture of the following strategies to manage stormwater during rain events:

- **Attenuation:** rainwater harvesting system (capturing runoff from roofs and tank connected toilets for flushing); onsite stormwater detention
- **Treatment:** Spel Hydrosystem (or similar) to capture pollutants prior to discharging into the legal point of discharge.

10. Life Cycle Assessment

Cerclos

Improved Design Performance

(Characterised Impacts for Absolute (No Functional Unit) No Time Scale)

eTool

Cerclos

Executive Summary

This Life Cycle Assessment has been completed for the Whole Building, located at 120 Race Course Road. The lead author is Steve Hinton of OFFICE AU Limited and an independent review has not yet been conducted. The goal of this study is to profile and improve the environmental performance of the construction works. The study has been conducted in accordance with ISO 14044 and EN15978.

About the Design

The focus design of the study is named Improved Design through the report and is an aspirational design including improvement strategies for consideration of the design team and other stakeholders.

Results

The results of the study are shown in the table below. The most significant life cycle stage for each environmental indicator is highlighted.

Characterised Impacts, Absolute (No Functional Unit), No Time Scale		Construction Phases	Use Phases	End of Life Phases	Benefits and Loads Beyond the System Boundary	Life Cycle
		A	B	C	D	A - D
Environmental Impacts						
Global Warming Potential Total, GWP	kg CO_2 eq	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ozone Depletion Potential, ODP	kg CFC-11 eq	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Acidification Potential for Soil and Water, AP	kg SO_2 eq	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Eutrophication potential, EP	kg PO_4 eq	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Photochemical Ozone Creation Potential, POCP	kg ethylene	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Abiotic Depletion Potential - Elements, ADPE	kg antimony	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Abiotic Depletion Potential - Fossil Fuels, ADPF	MJ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Financial						
Australian Dollars	AUD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Additional Indicators						
Land Use	m^2.year arable	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Resource Use						
Net use of fresh water, FW	kg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Analysis

The report shows that the **Improved Design** has a total Global Warming Potential Total, GWP impact of **[illegible] kg CO_2 eq overall**. The **Integrated Operational Energy (B6)** GWP impacts are the most dominant life cycle module in the Improved Design Design followed by the **Integrated Operational Energy and Other Operational Energy (B6+)** and then **Product Stage (A1A3)**.

Further analysis reveals:

- The **Super structure** is the highest impact construction category,
- **Domestic Water Heating** is the highest operational impact by demand category,
- The **Electricity** is the highest impact operational impact by supply source,
- **Ferrous Metals | Steel | Reinforcement bar | Unspecified** is the highest impact material category,
- **Electrical Equipment, Small with transport and tradestaff, Electricity** is the highest people and equipment impact

eTool

Issue And Revisions Record

Revision	Date	Originator	Checker	Approver	Description
A	02/09/2024	Q. Suckling	Q. Suckling	Q. Suckling	DRAFT
B	16/09/2024	Q. Suckling	Q. Suckling	Q. Suckling	FINAL

Disclaimer:

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Structural assessment report

Project: Housing Commission S-Type Tower

Project Number: 324049

Report Number: 324049-R01

Date: 16/09/24

Executive Summary

A structural assessment has been undertaken to the housing commission flats which were constructed during the 1960's and 1970's. The housing commission flats were erected at various locations across Victoria and adopted several different standardised geometries and configurations. This report specifically studies the "S-Type" tower, so named given its shape in plan.

As part of the structural assessment, three different scenarios were explored:

- **Assessment of the building under earthquake loading equivalent to that of 33% of current design standards**
- **Assessment of the building under earthquake loading requirements as outlined in current design standards (100% of design seismic load)**
- **Assessment of the building under earthquake loading requirements as outlined in current design standards however with the north and south façade concrete pre-cast panels removed to allow installation of an apartment "extension" to facilitate increase in floor area per apartment.**

The floor structure (pre-cast concrete one-way spanning slabs) were assessed and found to generally be code compliant.

However, with respect to the lateral load resisting system for seismic conditions, design deficiencies were found to exist within the building. These deficiencies were found to be a combination of structural elements having insufficient strength compared to the expected applied design loading and inadequate minimum structural requirements for reinforcing and connection detailing of the pre-cast concrete walls.

It was found that the building satisfies current design standards for wind loading.

With respect to the design deficiencies identified as part of the analysis, rectification of these deficiencies is proposed to generally be achieved through installation of steel plate reinforcing retrofitted to the faces of the concrete shear walls. The quantity and extent of the plate reinforcing varies dependant upon the level in question and wall in question. Varying degrees of reinforcing is also required across all three of the assessments which have been undertaken within this report. A theoretical solution to strengthen the building to achieve 100% code compliance was achieved.

It has also been noted that further studies and strengthening measures may be explored as possible refinements to the current proposal dependant upon the location of the building and subsequent cost-benefit analysis (which are outside of the scope of the investigation outlined in this report):

- Replacing steel flat plate reinforcing with carbon fibre reinforcing
- Introducing additional shear walls and/or core walls adjacent to the building and nominally increasing the buildings footprint. Introduction of these additional elements may relieve the existing walls of loading and reduce the strengthening required within the existing building envelope.

Contents:

1.2 Documentation

SFE have been provided with existing structural drawings for the S-Type building. It is not clear if said drawings are "as-built" drawings, however they appear to be provided with appropriate detail representative of documentation which may have been referenced during the construction of the S-Type buildings. It is considered that minor modifications and changes may exist from site to site subject to specific site requirements and coordination with other engineering disciplines for each site.

The drawings have been produced by W. P. Brown & Associates and are generally dated 1963.

SFE have also been provided with an article extract from a publication called "Australian Civil Engineering and Construction" which references the buildings in question and the general type of construction techniques adopted.

2.0 Building Summary

2.1 General Building Form

The S-Type building comprises 20 suspended habitable floors and a suspended roof (total ground to roof height of building is circa 61.5m). With reference to the typical plan arrangement presented in Figure 1, notable elements of the typical floor include:

- Access corridor
- Centralised dual lift core
- Fire stairs near the extremity of each wing
- Centralised general amenity and service riser zones (including garbage chutes etc.)
- Habitable apartments

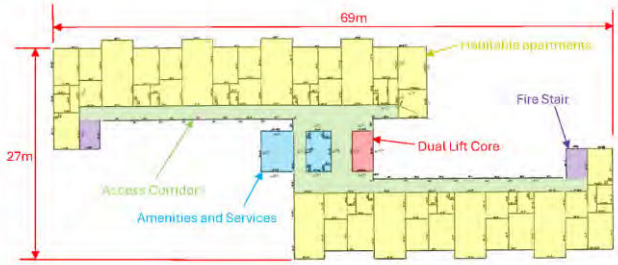

Figure 1 – Plan view, typical floor, of the S-Type Housing Commission Building.

1.0 Introduction

1.1 General Project Details

Sheer Force Engineering (SFE) have been engaged to undertake a conceptual study on the housing commission high-rise flats which were constructed by the government between 1960-1970s.

The buildings adopted predominantly prefabricated (pre-cast) concrete construction techniques including most of the floors and load-bearing walls. At the time of construction, the techniques and detailing adopted were at the cutting edge of pre-cast concrete construction in Australia and represents the beginnings of a typology of construction which would continue to evolve and advance to become the contemporary form of pre-cast construction used in the industry today.

The housing commission flats adopted standardised building forms and geometry which were replicated across multiple sites. The housing commission flats can be identified in the following suburbs throughout Melbourne:

- Brunswick
- Collingwood
- Prahran
- Northcote
- St. Kilda
- Carlton
- Flemington
- Richmond
- South Melbourne
- Fitzroy
- Kensington
- North Melbourne
- Williamstown

The study undertaken in this report focuses on the typical building form identified as the "S-Type" building, so called due to its apparent shape when viewed in plan. The S-Type building has been adopted at the locations highlighted in green in the location list above.

The scope of this study is to assess the S-Type building against current code requirements which include:

- **NCC 2022 Volume 1** (for structural related elements)
- **AS1170.0 :2002** – Structural Design Actions – General Principles
- **AS1170.1 :2002** – Structural Design Actions – Permanent, Imposed and other Actions
- **AS1170.2 :2021** – Structural Design Actions – Wind
- **AS1170.4 :2007** – Earthquake Actions in Australia
- **AS3600 :2018** – Concrete Structures
- **AS3826 :1998** – Strengthening Existing Buildings for Earthquake *

** AS3826 is not referenced in the NCC as it is not applicable to new buildings, but is a good basis for an assessment procedure which specifically deals with earthquake actions with respect to existing buildings.*

Based on the information provided within the structural documentation, details of the pre-cast slab panels are presented below in Table 1:

Table 1 – Typical Pre-cast slab panel details adopted within the S-Type Building

Element	Imperial Value	Metric Equivalent
Slab Thickness	5"	127mm
Top Reinforcement	605 Mesh (No. 5 Bar at 6" Pich)	5.385 DIA. Bar @ 152mm
Bottom Reinforcement	306 Mesh (No. 6 Bar at 3" Pich)	4.877 DIA. Bar @ 76mm

Figure 3 shows an isolated view of a single slab panel with further detailed elements identified, which include:

- **Cast-in Steel angles:** The slab panel-to-panel connection typically comprises a lose flat plate being welded to a corresponding cast-in angle plate to each adjacent panel. The cast-in angle plates are welded to cogged tail bars which are embedded in each panel. Refer to Figure 4 for a cross-section showing details of the panel-to-panel joint.
- **Top Hairpin Bars:** Top hairpin bars are cast-in to the slab panels and protrude out the ends (in the direction of the slab span, see cross-section at edge of panel identifying this in Figure 5). The detailing of the top hairpin bars indicates that the intention is to provide connection from panel-to-panel as well as provide continuity of top reinforcement (and therefore span) over each principal load-bearing wall. The aim of which appears to be allowing the pre-cast panel to behave as a continuous in-situ type slab over each wall support location.
- **Panel Edge Rebate:** A rebate is provided at the end of each panel (generally the east and west ends) where the panels sit above load-bearing walls. This appears to allow the introduction of a grouted connection (wet stitch) to further assist the floor in behaving as a continuous in-situ floor and also allows a grouted base connection to the load-bearing wall above each respective floor. Figure 5 shows a cross-sectional view of a typical slab panel with the rebate identified.
- **Lifting Points:** Each of the slab panels has been provided with 4x lifting points to allow for lifting out of the casting bed and craning the panels into position.

To allow continuity of reinforcement (and therefore span), a lose flat plate is welded to the protruding top hairpin bars of each panel. The junction of load-bearing wall to slab panel specifies 2x stages of grouting. With reference to the cross-section presented in Figure 6, The floor panel erection/construction sequence appears to comprise the following steps:

1. Load-bearing wall under is installed
2. Packers are provided at the top of the load-bearing wall to allow future grouted joint and provide tolerance
3. The pre-cast slab panels are then lowered into position
4. The first stage of grouting is completed with includes the area between the underside of the slab panel and load-bearing wall under and the gap between the slab panel ends
5. The lose flat plates are welded to each top hairpin bar allowing continuity of reinforcement to be established
6. The pre-cast panel above is installed and temporarily propped.
7. The second stage grouting is completed which includes the area to the underside of the load-bearing wall above.

For reference purposes, the orientation of the building plan in Figure 1 will assume north to be towards the top of the page. It is noted that given that the S-Type building is located at each respective site in different plan orientations, reference to north may change from site to site.

As indicated in Figure 1 the building is 69m wide in the east-west direction and 27m long in the north-south direction.

2.2 Structural Details

2.2.1 Typical Floor Slab Structure

The structural floor of the typical apartment floor adopts pre-cast concrete slab panels placed in a checkerboard type fashion.

The slab panels generally span in the east-west direction between "principal load-bearing walls" which run in the north-south direction. Figure 2 presents an isolated plan view of the eastern wing of the building which identifies the principal load-bearing walls as well as the pre-cast slab panel break-up.

Figure 2 – Isolated plan view of east-wing identifying principal load-bearing walls and pre-cast slab segments

As indicated in Figure 2, the slab panels span between pre-cast concrete cantilevered beams over the access corridor extent.

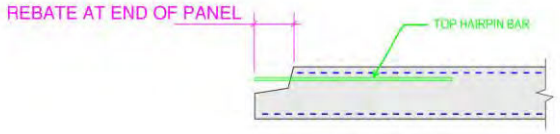

Figure 5 – Typical cross-section at end of pre-cast slab panel. Indicating protruding top hairpin bar and rebate at and of panel.

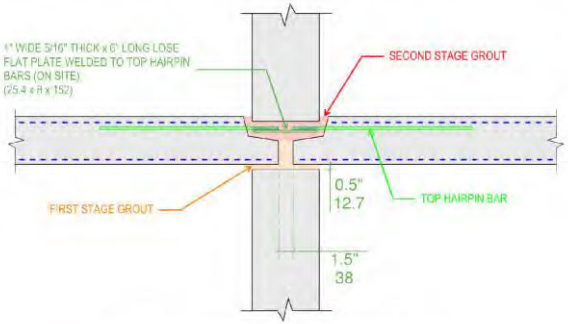

Figure 6 – Typical Panel to load-bearing wall junction cross-section.

2.2.2 Typical Load-Bearing Wall Structure

Pre-cast concrete detailing has also been adopted for the load-bearing walls. The wall panel break-up appears to have been made based upon crane lifting capacity, transportation considerations and the layouts of each apartment.

The wall panels are a single height lift and stop-start to the underside and topside of each slab (as indicated in previous Figure 6).

Figure 7 shows a typical example of an apartment pre-cast concrete party wall. This indicates the general approach to the size and break-up of each wall panel with respect to the layout of the building.

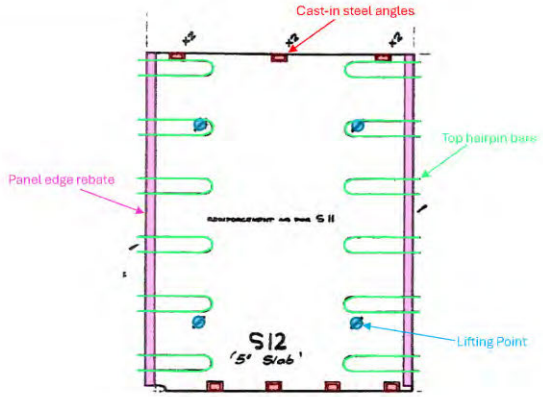

Figure 3 – Isolated plan view of a single pre-cast slab panel

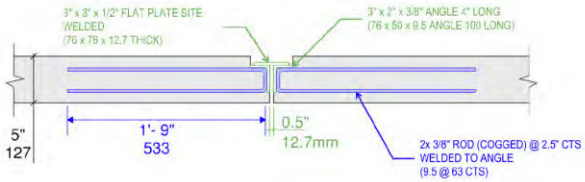

Figure 4 – Typical pre-cast panel-to-panel joint connection detail (joint parallel to direction of span)

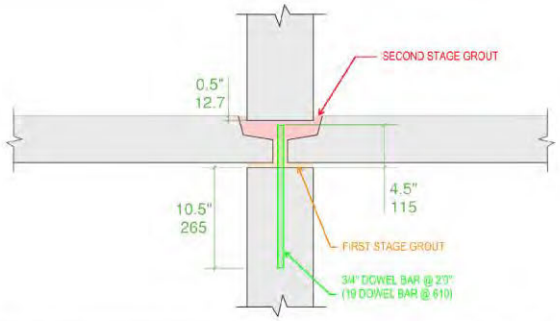

Figure 9 – Typical load-bearing wall Panel to slab panel connection detail (dowel terminates within slab depth). This detail occurs in the majority of the wall panels.

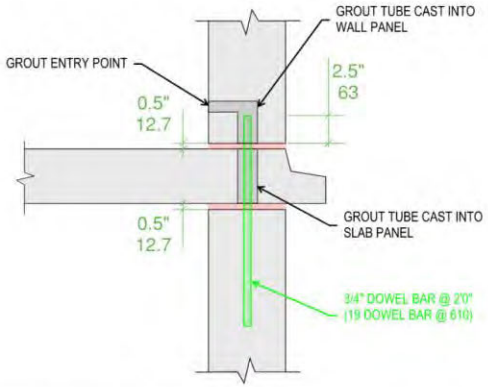

Figure 10 – Typical load-bearing wall panel to slab panel connection (with dowel continuing into panel above). This detail occurs at some select wall panel locations within the building.

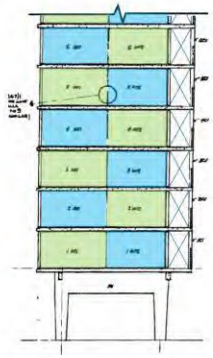

Figure 7 – Typical elevation of apartment party wall (section taken in the west wing of the building looking towards the east). Note this is a partial elevation which terminates at level 7, detailing indicated here continues to roof level)

The thickness and reinforcement for the wall panels varies depending upon the location of the wall (both in plan and elevation). Based on the information provided within the structural documentation, Table 2 provides a general summary of the wall details dependent upon the location of each wall...

Table 2 – Typical Pre-cast wall panel details adopted within the S-Type Building based on location

Plan Location	Level	Thickness (inch)	Thickness (mm)	Vertical Reinf. INCH (mm)	Vertical Reinf. Spacing (mm)[1]	Horizontal Reinf. INCH (mm)	Horizontal Reinf. Spacing (mm)[1]
Principal Load-bearing walls (running north-south) within each wing	1-5	7"	178	1/2"(12.7)	304	3/8"(9.5)	304
	6-12	6"	152	1/2"(12.7)	304	3/8"(9.5)	304
	13-20	4"	100	1/2"(12.7)	457	3/8"(9.5)	304
End walls of each wing	1-5	7"	178	1/2"(12.7)	304	3/8"(9.5)	304
	6-20	6"	152	1/2"(12.7)	304	3/8"(9.5)	304
North and South façade panels	1-20	4"	100	3/8"(9.5)	130	1/2"(12.7)	450
General interior walls to apartments	1/20	4"	100	3/8"(9.5)	530	3/8"(9.5)	605

1 Generally, the bar spacing identified in this table is an average spacing across the wall panel as the spacing varies across each panel and is generally not called up as a consistent spacing

Figure 12 – Plan view of typical floor identifying location of full building height tension rods embedded within wall panels (not to scale)

Figure 13 – Elevation view of westernmost wall of west wing indicating full height tension rods within wall panels.

The detail presented in Figure 10 (where the connecting dowel continues through to the panel above), generally occurs at:

- The end walls of each wing at the east and west extremities
- The lift core walls
- Most of the walls which house the Amenities and services areas
- 2x discrete dowels at each long façade wall panel on the north and south sides of the habitable apartment areas of the building.

Figure 11 illustrates the locations identified above in plan view for clarity.

Figure 11 – Plan view of typical floor highlighting where pre-cast wall panel dowel continues from panel below and into panel above (green)

Full building height tension rods are also provided in the outermost east/west wing walls and second to last walls. These rods are embedded in their respective panels and have a lapped/splice connection at each floor level.

The documentation refers to a welded plate type arrangement (similar to that of the top reinforcement of the slab panels presented in Figure 6 although with reinforcement orientated in the vertical direction as opposed to the horizontal direction). However, the documentation marks these details are "superseded" and references an "approved C.H.P. alternative bolted connection" detail. This alternative bolted connection does not appear to be included in the documentation we have been provided with. Nevertheless, it is assumed that such an alternate detail seeks to achieve the same desired Structural Engineering objective, i.e. allow full continuity of the tension rods to be maintained for the full height of the building.

2x tension rods are provided at each end of the previously identified wall locations, each being 7/8" dia. (or circa 22mm). Figure 12 shows a plan of the typical floor identifying the location of the full height tension rods.

2.3 Level 1 Transfer Structure

The majority of the primary and secondary load-bearing pre-cast walls terminate above the level 1 floor level.

This necessitates a transfer structure across much of the extent of level 1. A series of in-situ post-tensioned concrete beams span in the north-south and east-west directions.

- North-South Beams generally 1400 deep and 600 wide
- East-west Beams generally 460 deep and 300 wide

Pre-cast panels sit directly above the transfer beams to complete the floor structure (the pattern and detailing being much the same as the typica floor above as identified in Section 2.2.1 of this report).

Figure 14 presents an isometric view of the beam and wall arrangement in isolation between ground floor and level 1 (slab panels have been hidden from view for clarity).

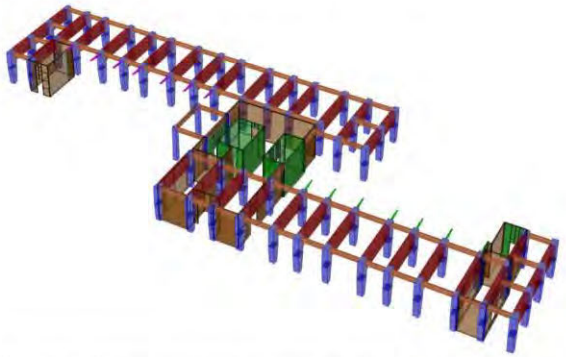

Figure 14 – Isometric view of level 1 (concrete floor panels hidden from view for clarity) indicating walls which continue through to foundation level and transfer beams spanning in the north-south and east-west directions.

2.4 Concrete Properties

The documentation we have at hand for the concrete specification of the building indicates that a light-weight concrete mix was used throughout the entire super-structure. Table 4 provides a summary of the concrete properties which have been specified for the building:

Table 4 – Concrete property specification for the S-Type tower super structure

Concrete Property	Value (Imperial)	Value (Metric)
28 Day Compressive Strength	3,000-lb/in^2	20MPa
Density	115-lb/ft^3	18kN/m^3

The concrete density adopted represents almost 30% weight reduction when compared with standard weight concrete mixes generally used today. The concrete 28-day compressive strength of 20MPa is significantly less than standard concrete mixes used today which are generally around 40MPa on average.

3.0 General Non-Compliances with Current Code

Design standards constantly evolve as technology advances and more research is conducted into different fields of engineering.

Prior to undertaking our analysis on the S-Type tower structure, a general review of code compliance is necessary. This review identifies detailing and minimum reinforcement requirements which need to be adhered to for new structures built to comply with current design standards.

These detailing and minimum reinforcement requirements are generally required irrespective of the applied load on the structure.

3.1 Wall Reinforcement spacing

The concrete design code (AS3600) outlines the maximum allowable spacing of vertical and horizontal reinforcement within structural walls.

An extract of AS3600-2018 identifying this requirement is presented in Figure 15 below...

11.7.3 Spacing of reinforcement

The minimum clear distance between parallel bars, ducts and tendons shall be sufficient to ensure the concrete can be placed and compacted to conform with Clause 17.1.3 but shall be not less than $3d_b$.

The maximum centre-to-centre spacing of parallel bars shall be the lesser of $2.5t_w$ and 350 mm.

Figure 15 – Extract of AS3600-2018 specifying maximum and minimum reinforcement spacing requirements for structural walls (highlights added by SFE).

As highlighted in the extract above, the maximum reinforcement spacing is the lesser of 350mm or $2.5t_w$ with t_w being the thickness of the wall in question.

11.7 REINFORCEMENT REQUIREMENTS FOR WALLS

11.7.1 Minimum reinforcement

Walls shall have a reinforcement ratio (p_w)—

(a) in the vertical direction, of not less than the larger of 0.0025 and the value required for strength unless the design axial compressive force does not exceed the lesser of $0.03\ f'_c$ and 2 MPa where the limit may be reduced to 0.0015; and

(b) in the horizontal direction, of not less than 0.0025, except that for a wall designed for one-way buckling [using Clause 11.4(a)] and where there is no restraint against horizontal shrinkage or thermal movements, this may be reduced to zero if the wall is less than 2.5 m wide, or to 0.0015 otherwise.

Figure 16 – Extract of AS3600-2018 specifying minimum reinforcement requirements for structural walls

The extract above identifies that the minimum reinforcement requirements for the vertical and horizontal reinforcement of walls is 0.0025 (or 0.25% of the walls concrete cross-section) which can be reduced to 0.0015 (or 0.15% of the walls concrete cross-section) based on the vertical stress in the wall for the case of vertical reinforcement and walls with length less than 2.5m which are unrestrained for the case of horizontal reinforcement.

The reinforcement ratios for each wall type in the vertical and horizontal direction is also presented in Appendix A of this report (see the second last and fourth last columns). Walls which pass the criteria are highlighted in green, while walls which fail this criterion are highlighted in red. It is evident that the majority of the walls throughout the building satisfy the minimum reinforcement requirements specified in AS3600-2018.

It is further note that the walls which do not satisfy the minimum reinforcement requirements are the lesser load-bearing walls, as opposed to the principal load-bearing walls (those identified in Figure 2).

3.3 Minimum Dowel Bar Requirements

AS3600-2018 specifies the minimum requirements for dowel connection of pre-fabricated structural walls. An extract of this requirement is presented below in Figure 17.

17.7.3 Vertical integrity ties

All vertical structural members except for non-loadbearing elements shall have connections at horizontal joints in accordance with the following requirements:

(a) Connections between prefabricated columns shall have a designed strength in tension not less than $f_{ct} \times A_{jc}$, where f_{ct} is taken as 1.4 MPa and A_{jc} is in mm^2. For columns with a larger cross sections than required for strength, a reduced effective area A_g may be used based on the cross section required but shall be not less than one-half the total area.

(b) Prefabricated wall panels shall have a minimum of two ties per panel, with a designed strength not less than 45 kN per tie.

and

(c) When design forces result in no tension at the base, the ties required by Clause 17.7.3(b) shall be anchored into a reinforced concrete floor slab-on-ground or footing.

Connection details that rely solely on friction caused by gravity loads shall not be permitted.

Figure 17 – Extract of AS3600-2018 identifying minimum dowel/tie requirements for pre-fabricated structural walls

Table 5 therefore provides a summary of the maximum reinforcement spacing for the typical 4", 6" and 7" walls which have been used throughout the building. Given the small dimension of the 4" thick wall, the reinforcement spacing requirements for this wall is controlled by the $2.5t_w$ requirement, whereas the 6" and 7" thick walls are governed by the 350mm maximum spacing requirement.

Table 5 – Maximum reinforcement spacing requirements based on AS3600-2018 requirements for each wall thickness adopted in the S-Type building.

Wall Thickness INCH (mm)	Maximum Reinforcement Spacing (mm)
4" (100)	250
6" (150)	350
7" (175)	350

A summary of the wall thicknesses and reinforcement sizes and spacings used within each wall is provided within Appendix A of this report.

Cells highlighted in **red** for the vertical and horizontal reinforcement spacing identifies non-compliance with the maximum spacing requirements specified in AS3600-2018.

It is noted that the majority of the non-compliances exist with the "lesser" load-bearing pre-cast walls within the building and not the "principal" load-bearing walls (see previous Figure 2 identifying general location of principal load-bearing walls.

The spacing limitations outlined in AS3600-2018 are generally intended to control cracking within concrete walls and is therefore not strictly speaking a strength requirement. In some instances, the bar spacing requirement may be waved when assessing existing/older structures. Arguably, a more important metric to satisfy is the minimum reinforcement quantity requirements within the walls for the vertical and horizontal directions. This then leads to the next area of assessment...

3.2 Minimum Wall Reinforcement Requirements

The previous section explored the maximum reinforcement spacing requirements in accordance with AS2600-2018. There is also specification with respect to the minimum quantity of reinforcement required within structural walls.

While the spacing of reinforcement is a simple measurement of the distance between reinforcing bars, the reinforcement quantity is a combination of the spacing as well as the diameter of the reinforcement. It is a measure of how much reinforcement is provided, as a percentage factor, within the wall.

It may be considered as a more important requirement compared to simply spacing alone as the overall minimum reinforcement quantity requirements ensures a minimum level of robustness which needs to be maintained within the structure.

that the embedment which has been specified on the structural documentation is around 30% of that which is required as per the provisions of AS3600-2018.

This means that the effectiveness of these dowel bars for shear (and tension) is reduced from that which may be calculated using the guidelines within AS3600-2018. The effectiveness, particularly during earthquake shaking, is difficult to quantify as it falls outside of the guidelines of the concrete design code. Therefore, a prudent approach would be to assume their effectiveness as being negligible for the purposes of assessing the overall buildings performance considering such a reduced embedment.

According to the extract above, a minimum of 2x ties per panel is required, each of which requiring a design capacity of 45kN. Further, there is a specification that connection details that rely solely on friction caused by gravity loads shall not be permitted.

As identified in Section 2.2.2 and illustrated in Figure 9, the base connection for the majority of the pre-cast panels (both the principal load-bearing panels and the secondary load-bearing panels) relies on a half inch embedment (12.7mm) of the base of the panel into the wet-stich grout connection of the pre-fabricated wall panels, without the inclusion of reinforcement ties/dowels.

This does not satisfy the requirements of item (b) highlighted in Figure 17. In the event of an earthquake and the resultant rigorous building shaking, it is also plausible that the 12.7mm notch within the wet-stitch which holds the base of the panels in place may spall, crack and no longer become effective, thus relying predominantly on friction to hold the base in place from moving laterally. Therefore, strictly speaking the final paragraph highlighted in Figure 17 is not satisfied given the detailing which has been provide in the structural documentation for the S-Type building.

This would be considered a major breach and significantly reduce the overall robustness requirements of the building compared to that required in AS3600-2018. Therefore, to achieve a bass level of code-compliance, this item would require structural intervention in order to meet code requirements. Refer to Section 5.0 for proposed strengthening and structural interventions which have been developed as part of our study.

3.4 Embedment and Development of Dowel Bars

As identified in Section 2.2.2, there are select locations where dowels/ties are provided at the base of the wall panels (see Figure 10 for the detail at these locations and Figure 11 for the locations on plan where they occur).

It has been noted that the dowel bar projects into the base of the pre-cast panels only a short distance (2.5" or circa 63mm). AS3600-2018 specifies the minimum development length requirement for reinforcing bars. An extract of this requirement is presented in Figure 18 below

13.1.2.4 *Development length to develop less than the yield strength*

Where the full yield strength of the bar is not required, the development length (L_{sd}) to develop a tensile stress (σ_{sd}), less than the yield strength (f_{sy}), shall be calculated from—

$$L_{sd} = L_{sy,t}\frac{\sigma_{sd}}{f_{sy}} \quad \ldots 13.1.2.4$$

but shall be not less than—

(a) $12d_b$; or

(b) for slabs, as permitted by Clause 9.1.3.1(a)(ii).

Figure 18 – Extract of AS3600-2018 specifying the minimum development (embedment) requirements for reinforcing bar.

The minimum development (or embedment) of reinforcing bar as per the extract above is $12d_b$ with d_b being the diameter of the reinforcing bar in question. As per the detail presented in Figure 10, the dowel bar diameter is ¾" (circa 19mm) meaning that the minimum development/embedment is 12 x ¾" which is 9 inches (or 12 x 19 which is 228mm). This means

4.2 Desing Assumptions and Parameters

The following sections provides a summary of design parameters which have been adopted as part of our study. Table 6 provides a summary of the wind and seismic factors which have been adopted as part of our assessment of the S-Type tower.

Table 6 – Earthquake and Wind Factors adopted as part of the Assessment of the S-Type tower

Factor	Value
Importance Level	3
Return Period (Ultimate Wind)	1/1000
Return Period (Serviceability Wind)	1/25
Return Period (Seismic)	1/1000
Wind Region	A5
Terrain Category	3
Combination Factor k_c	0.9
Ductility (μ)	1.0
S_p	0.77
k_p	1.3
Z	0.09

4.3 Typical Slab Assessment

The typical slab structure has been assessed given the required design loading and proportions which have been provided within the structural documentation and summarised within this report.

The typical slab/floor arrangement was generally found to be adequate and code compliant with current design standards.

This includes the assessment for removal of the north and south façade pre-cast panels and installation of the apartment extension.

4.4 Earthquake and Wind Assessment

Our assessment indicates that the building is structurally adequate under wind loading conditions when assessed based on current code requirements.

However, design deficiencies were observed with wall strength in both tension and shear action for seismic loading conditions. This was the case for both the 30% load application and 100% load application.

Figure 19 shows an example elevation of the westernmost primary load-bearing wall of the building as well as the next wall adjacent in the east direction. Regions shaded in blue represent locations within the wall which are over-stressed and require additional strengthening, while the magenta shading represents locations where the walls are structurally sufficient based on the design wall stresses.

4.0 Analysis

4.1 Assessments Undertaken

The structural analysis performed on the building explores 3x possible separate scenarios with respect to the strengthening and improvements to be made to the structure. These include:

- **33% Seismic Load Assessment (no other modifications made to the building):** The structure has been assessed under a seismic load equivalent in magnitude to 33% of the code required seismic load on the building. It has been widely accepted that strengthening of existing buildings to satisfy current code requirements may become cost prohibitive, particularly when assessing the seismic compliance of older buildings which pre-date 1993 (which saw the first major revisions of the Australian Seismic design code developed). Previous studies have been undertaken which have determined that a minimum compliance of 33% may result in significant damage to the building in question, however, provides sufficient robustness to ensure life-safety to the building's occupants. This was the approach proposed in the now expired design standard AS3826 (Strengthening Existing Buildings for Earthquake). It was also the approach mandated in the Christchurch region of New Zealand following the significant earthquake event they experienced in February 2011.
- **100% Seismic Load Assessment (no other modifications made to the building):** The structure has been assessed under current seismic load requirements (100% of that specified within the Australian Seismic Design Code).
- **100% Seismic Load Assessment with modifications to the structure to allow installation of apartment extension:** A further study has been undertaken to determine the adequacy of the structure under the hypothetical scenario that an apartment extension system be installed at each apartment across the full height of the building. The extension is to provide a circa 1.0m increase in length to each apartment . The extension will provide both an increase to the usable floor area of each apartment and also enhances the thermal and climate performance of the dwellings due to the sun shading.

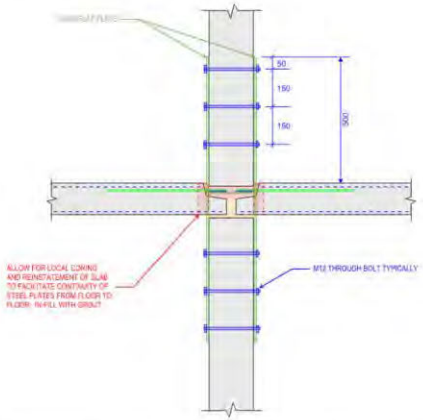

Figure 20 – Cross-section view of typical wall-to-wall connection detail with strengthening plate.

The proposed strengthening indicated within Figure 20 is required at all panel locations and one connection point is to be provided at each base corner of each panel, making 2x connection points per panel as per code requirements.

Where insufficient strength is found within the wall, the strengthening plates are to continue through the height of the wall and terminate at the required location (beyond which point the

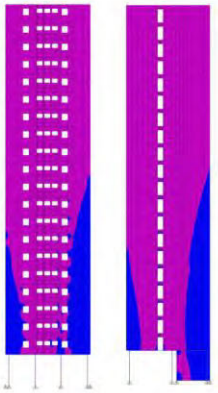

Figure 19 – Elevation of the westernmost primary load-bearing wall (left) and the next internal wall immediately to the east (right) indicating locations where the walls are overstressed based on seismic loading conditions (blue shaded areas).

wall stresses become structurally acceptable). There are also a number of locations where horizontal plate strengthening is required due to insufficient shear capacity of the walls themselves. The typical arrangement where vertical and horizontal strengthening plates are required within the wall is presented in the cross section at Figure 21.

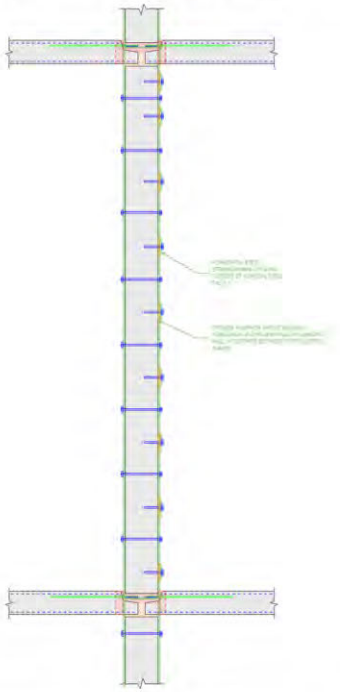

Figure 21 – Cross-section view of wall indicating arrangement where vertical and horizontal strengthening plates are required.

6.0 Possible Future Studies

The strengthening options for the housing commission tower are not restricted by the confines of the recommendations which are provided within this report and accompanying drawings.

Other studies may be undertaken with respect to achieving code compliance within the tower. This section briefly explores two possible such options which may be further investigated via separate studies.

6.1 Carbon Fibre Strengthening

Carbon fibre strengthening has become more and more popular over the last few decades. It can offer a comparable, and in some cases, superior outcome to conventional steel plate strengthening.

The location and orientation of the reinforcing requirement remains the same for the currently proposed steel plates, however the installation time may see a reduction due to the wide-spread bolting to the concrete walls not being required. Figure 22 shows an example strengthening arrangement to the base of a shear wall/column structure. The carbon fibre strands are orientated in both directions at regular intervals to achieve vertical tension capacity as well as horizontal shear capacity.

Figure 22 – Example image of a concrete shear wall strengthened through the introduction of carbon fibre reinforcing in both vertical and horizontal directions.

It is noted that design and installation of such strengthening systems are quite specialised in nature and should be assessed by a qualified and experienced operator who is familiar with carbon fibre strengthening when applied to concrete shear wall enhancement.

6.2 Introduction of Additional Shear Walls

Another option which may be explored is the introduction of additional shear walls and/or core walls to the building. It is understood that the current vertical transport solution for the building may provide insufficient quantities of lifts and unacceptable wait times. This is particularly the case when factoring in lifts which are not providing service from time-to-time due to break-down and maintenance requirements. This may be alleviated through the introduction of additional lifts and lift shaft structures.

The introduction of additional lift shafts would also provide the structural benefit of providing additional strengthening and rigidity to the building. Dependant upon the proportioning and location of the additional lift cores, their introduction may relieve the stress burden during seismic conditions on the existing shear walls which have largely been found to have insufficient reinforcement and connection detailing.

Further lateral stiffening elements may be introduced through the introduction of additional apartments to the building. The party walls to such additional apartments may act in the same manner as the aforementioned lift cores.

Introduction of any new core or shear wall element would require adequate structural connection between the new built portion and the existing building to ensure that adequate load transfer can be achieved through the two elements. A logical location for those potential new elements are at the extreme western and easter portions of the building. These locations are best suited from a planning and layout perspective and also are the locations where the wall stresses within the existing shear walls of the building were found to be the highest due to torsional effects from earthquake shaking. Figure 23 presents an indicative plan arrangement at the western wing of the building illustrating how this new extension may be achieved.

Figure 23 – Hypothetical plan arrangement at western wing of building indicating possible new dwellings and lift shaft and associated new additional structural shear wall elements.

13. Costings of refurbishment proposal for Flemington Estate

The estimated cost plan for the refurbishment of Barak Beacon Estate t was calculated by Melbourne Quantity Surveyors. An executive summary of the cost plan can be found in the extract of the report below. The Cost Plan includes allowances for the following:

- · Preliminaries
- · Overheads and Profit
- · Building works
- · External works
- · External Services
- · Demolition
- · Hard Landscaping
- · Soft Landscaping
- · GST
- · Design contingencies
- · Construction contingencies
- · Cost escalation up to completion of construction April, 2027
- · Competitive Tendering
- · Security and intercom system
- · Solar PV System
- · Asbestos removal

The Cost Plan excludes the following: ·

- · Design Consultants' fees
- · Site and services infrastructure upgrades
- · Automation, IT, AV and communications equipment
- · Supply authority and headworks charges
- · FF&E including furniture, window dressings & equipment etc
- · Cost escalation after April, 2027
- · Project management fees
- · Building Permit, Council and sundry fees
- · Staging costs
- · Disbursements
- · Management support costs
- · Rainwater harvesting
- · Rock excavation
- · Site decontamination
- · Adverse ground conditions
- · Out of hours works

Melbourne Quantity Surveyors

Flemington Towers
Flemington, VIC 3031

3 October 2024

Cost Plan No.1
Revision B
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	19417 m²
Unenclosed Covered Areas (UCA)	3792 m²
Gross Floor Areas (GFA) (FECA + UCA)	23209 m²

INTRODUCTION

The Cost Plan is based on Feasibility documents from Office.

DOCUMENTS

This Cost Plan is based on the following documents provided by Office.

Architectural drawings dated XXX (16 pages)
Seismic Load Assessment dated 16/09/24 (23 Pages)

TOTAL CONSTRUCTION COST ESTIMATE

The current anticipated Total End Cost is:

Building Works	$68,016,000
External Works and Services	$1,269,000
Contingencies and Allowances	$11,858,000
Fees, FFE, ITC and Other Client items	$0
Escalation	$4,375,000
Sub-Total (ex GST)	**$75,518,000**
GST	$7,551,800
Total End Cost	**$83,069,800**

Note:

The Cost Plan is based on preliminary information and therefore should be regarded as indicative only of the possible order of cost.
The cost of various components of the Cost Plan could vary significantly depending on the final design, materials selection and quality of the proposed building works.

We recommend that a detailed Cost Plan be prepared at Schematic Design stage to verify the anticipated total cost.

Refer to the attached Cost Plan No.1 for details

Thursday, 3 October 2024

Melbourne Quantity Surveyors

Flemington Towers
Flemington, VIC 3031

Cost Plan No.1
Revision B
Feasibility

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Melbourne Quantity Surveyors

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INCLUSIONS

The Cost Plan includes allowances for the following:

- Preliminaries
- Overheads and Profit
- Building works
- External works
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- Demolition
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- Soft Landscaping
- GST
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- Cost escalation up to completion of construction April, 2027
- Competitive Tendering
- Security and intercom system
- Solar PV System
- Asbestos removal

EXCLUSIONS

The Cost Plan excludes the following:

- Design Consultants' fees
- Site and services infrastructure upgrades
- Automation, IT, AV and communications equipment
- Supply authority and headworks charges
- FF&E including furniture, window dressings & equipment etc
- Cost escalation after April, 2027
- Project management fees
- Building Permit, Council and sundry fees
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- Adverse ground conditions
- Out of hours works

EXECUTIVE SUMMARY

Melbourne Quantity Surveyors

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Flemington, VIC 3031

3 October 2024

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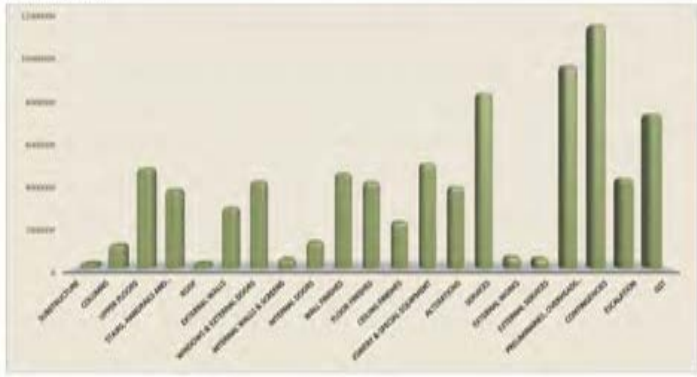
COST SUMMARY

	$/m² FECA	$/m² GFA	
TOTAL BUILDING COST (TBC) (October, 2024)	$7,988	$6,690	$154,516,000
TOTAL CONSTRUCTION COST (TCC) (October, 2024)	$8,884	$7,440	$171,840,000
TOTAL PROJECT COST (TPC) (October, 2024)	$9,564	$8,010	$185,000,000
TOTAL - END COST (TEC) (April, 2027)	$9,776	$8,188	$189,090,000

COST DISTRIBUTION



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DETAILED COST PLAN

Melbourne Quantity Surveyors

Flemington Towers
Flemington, VIC 3031

3 October 2024

Cost Plan No.1
Revision B
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	Quantity		Rate	Total	
SUPERSTRUCTURE					
SB SUBSTRUCTURE					TB
Patch and repair existing substructure in preparation for new floor finishes	741	m²	30	22,230	ff
130 RC concrete slab on ground including waterproof membrane and sand base	658	m²	167	109,886	co
400x500d edge beams (assumed)	205	m	172	35,465	co
400x500d internal beams (assumed)	388	m	137	53,156	co
450x500 strip footing (assumed)	116	m	205	23,780	co
Sundry pad footings, ground beams and the like		Provisional		30,000	co
Blinding concrete		Excluded		0	co
Under floor insulation		Excluded		0	in
Termite treatment		Excluded		0	pi
Total SUBSTRUCTURE			**$14.14/m²FECA**	**274,517**	
CL COLUMNS					
Seismic load works		Provisional		1,170,000	ss
Total COLUMNS			**$60.26/m²FECA**	**1,170,000**	
UF UPPER FLOORS					
Patch and repair existing upper floors in preparation for new floor finishes	18,080	m²	30	542,400	co
Precast concrete balcony floor system including screed to falls	3,454	m²	750	2,590,500	co
Seismic load works		Provisional		1,725,000	ss
R2.0 rigid board insulation under floor insulation	930	m²	48	44,640	in
Total UPPER FLOORS			**$252.48/m²FECA**	**4,902,540**	
SC STAIRS AND BALUSTRADES					
Profab concrete balustrade and beam fixed to concrete columns	1,890	m	950	1,710,000	mw
Operable aluminium framed louvre system	1,890	m	1,100	1,980,000	mw
Minor modifications and make good of existing stairs including handrails (provisional)	40	No	5,000	200,000	sc
Total STAIRS AND BALUSTRADES			**$200.34/m²FECA**	**3,890,000**	

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COST PLAN SUMMARY

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	Quantity	$/m2	Total
COST PLAN SUMMARY			
CONSTRUCTION AREA SUMMARY			
Fully Enclosed Covered Area (FECA)	**19417 m²**		
Existing Ground Floor	741 m²		
New Ground Floor	596 m²		
Existing Upper Floors	18080 m²		
Unenclosed Covered Area (UCA)	**3792 m²**		
New Balconies	3792 m²		
Gross Floor Area (GFA = FECA + UCA)	**23209 m²**		
CONSTRUCTION COST SUMMARY			
Total Building Cost	23209 m²	$2500/m²	58,016,000
External Works and Services	23209 m²	$55/m²	1,269,000
NET CONSTRUCTION COST (NCC) (ex GST) (Oct, 2024)		**$2554.40/m²GFA**	**59,285,000**
CONTINGENCIES			
Design contingency	10.00%		5,929,000
Construction contingency	10.00%		5,929,000
TOTAL CONSTRUCTION COST (TCC) (ex GST) (Oct, 2024)		**$3065.32/m²GFA**	**71,143,000**
FEES, FFE, IT AND OTHER CLIENT ITEMS			
Building Permit, Council and sundry fees			excluded
Design Consultants' fees			excluded
Project Management fees			excluded
FF&E including furniture, window dressings & equipment etc			excluded
Automation, IT, AV and communications equipment			excluded
Supply authority and headworks charges			excluded
Disbursements			excluded
Management support costs			excluded
TOTAL PROJECT COST (TPC) (ex GST) (Oct, 2024)		**$3065.32/m²GFA**	**71,143,000**
ESCALATION AND GST			
Cost Escalation			

Escalation rate:	3.00%	Market conditions:		0.00%		
Up To	Date	Months	%/Year	Weighting	Total %	
Tender	Oct, 25	12	5.00%	100%	3.00%	2,134,000
Completion	Apr, 27	18	5.00%	70%	3.15%	2,241,000
Goods and services tax					10.00%	7,551,800
NET CONSTRUCTION COST (NCC) (Inc GST) (Oct, 2024)					**$3579.21/m²GFA**	**83,069,800**
TOTAL END COST (TEC) (Apr, 2027)					**23209 m²**	**$3579/m²**	**83,069,800**

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DETAILED COST PLAN

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		Quantity		Rate	Total	
ED	**EXTERNAL DOORS**					
Aluminium framed double glazed doors including hardware		Item			incl in WW	ww
Fly doors		Item			incl in WW	
Solid core entry doors including new hardware (PC Sum $800 supply)		13	No	1,750	22,750	do
Solid core double-entry doors including new hardware (PC Sum $900 supply)		6	No	3,500	21,000	do
	Total EXTERNAL DOORS			**$2.25/m²FECA**	**43,750**	
Sub-total SUPERSTRUCTURE				**$913.32/m²FECA**	**17,733,996**	
FITOUT						
NW	**INTERNAL WALLS**					
190mm R.C filled blockwork internal walls		282	m²	255	71,910	bk
90mm steel/timber stud internal walls		981	m²	95	93,195	pa
Additional for double studs		41	m²	75	3,075	pa
R2.0 wall insulation		981	m²	15	14,715	in
	Total INTERNAL WALLS			**$9.42/m²FECA**	**182,895**	
NS	**INTERNAL SCREENS**					
Glazed shower screens		195	No	1,600	296,000	ww
	Total INTERNAL SCREENS			**$15.24/m²FECA**	**296,000**	
ND	**INTERNAL DOORS**					
Single internal door including hardware and paint (PC Sum $350 supply)		723	No	980	708,540	do
Solid core fire doors including new hardware (PC Sum $1200 supply)		223	No	2,450	546,350	do
Cavity sliding internal door including hardware and paint (PC Sum $400 supply)		40	No	1,130	45,200	do
Double internal door including hardware and paint (PC Sum $700 per door supply)		1	No	2,090	2,090	do
	Total INTERNAL DOORS			**$67.06/m²FECA**	**1,302,180**	

DETAILED COST PLAN

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		Quantity		Rate	Total	
RF	**ROOF AND ROOF PLUMBING**					
Suspended concrete slab roof		Existing			0	cu
R4.0 insulation to existing roof		930	m²	35	32,550	in
Timber/steel roof framing including associated connections and bracing		483	m²	190	91,770	os
Structural timber and steel		Provisional			43,500	ss
Standard Colorbond roofing including flashing and capping		483	m²	145	70,035	rf
Colorbond gutters, valleys, sumps, rain heads and downpipes and the like		Provisional			29,000	rf
Roof foil insulation blanket		483	m²	18	8,694	in
	Total ROOF AND ROOF PLUMBING			**$14.19/m²FECA**	**275,549**	
EW	**EXTERNAL WALLS**					
190mm R.C filled blockwork external walls		758	m²	255	193,290	bk
150 thick RC precast concrete walls		1,718	m²	550	944,900	ew
90mm steel/timber stud external walls		686	m²	95	86,120	os
Render (assumed)		821	m²	90	73,890	ew
Bulk wall insulation and lanking		636	m²	25	17,400	in
Scaffolding and access		18,638	m²	90	1,677,420	pr
	Total EXTERNAL WALLS			**$153.11/m²FECA**	**2,973,020**	
WW	**WINDOWS**					
Aluminium framed double glazed windows and doors		3,948	m²	1,050	4,145,400	ww
Fly screens and doors (assumed 25% of window area)		987	m²	60	59,220	mw
Curtains and blinds		Excluded			0	se
	Total WINDOWS			**$216.54/m²FECA**	**4,204,620**	

DETAILED COST PLAN

Melbourne Quantity Surveyors

Flemington Towers
Flemington, VIC 3031

3 October 2024

Cost Plan No.1
Revision B
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	19417 m²
Unenclosed Covered Areas (UCA)	3792 m²
Gross Floor Areas (GFA) (FECA + UCA)	23209 m²

	Quantity		Rate	Total	
FITTINGS					
JO JOINERY					
Ground Floor Type 1 Joinery	1	No.	17,388	17,388	jo
Ground Floor Type 2 Joinery	2	No.	28,116	56,232	jo
Ground Floor Type 3 Joinery	1	No.	24,276	24,276	jo
Ground Floor Type 4 Joinery	1	No.	27,516	27,516	jo
Type A Joinery	120	No.	20,728	2,487,360	jo
Type B Joinery	40	No.	23,588	943,520	jo
Type C Joinery	20	No.	19,668	393,360	jo
Total JOINERY			**$203.41/m²FECA**	**3,949,652**	
SE SPECIAL EQUIPMENT					
Kitchen appliances - Oven, cooktop, rangehood only (supply only)	185	No.	3,800	703,000	se
Laundry appliances - Washing machine, dryer only (supply only)	185	No.	2,000	370,000	se
Installation of appliances	185	No.	500	92,500	la
FF&E including furniture, window dressings & equipment etc	Excluded			0	
Total SPECIAL EQUIPMENT			**$60.02/m²FECA**	**1,165,500**	
Sub-total FITTINGS			**$263.44/m²FECA**	**5,115,152**	

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	Quantity		Rate	Total	
WE WALL FINISHES					
PZ 0 Kingspan insulated plasterboard panel 50mm including paint	9,652	m²	141	1,386,312	pl
12mm plasterboard, Villaboard or FC sheet lining and paint	24,593	m²	95	2,336,335	pl
Wall tiles including waterproofing and caulking (PC Sum $50/m2 supply)	1,979	m²	270	534,330	ti
Standard skirtings and architraves including paint	Item			389,500	ca
Total WALL FINISHES			**$239.30/m²FECA**	**4,646,477**	
FF FLOOR FINISHES					
Selected floor finishes (PC Sum $120/m2 supply)	15,638	m²	120	1,876,320	ff
Concrete sealer	871	m²	30	26,130	ff
Selected floor tiles including waterproofing and caulking (PC Sum $50/m2 supply)	2,844	m²	270	767,880	ti
Selected external stone tiles/pavers including pods, waterproofing and caulking (PC Sum $50/m2 supply)	3,454	m²	380	1,312,520	ti
Levelling screed to wet areas	6,298	m²	40	251,920	ca
Total FLOOR FINISHES			**$218.10/m²FECA**	**4,234,770**	
CF CEILING FINISHES					
12mm Promatech board including rondo furring channel and paint	13,526	m²	132	1,785,432	pl
20mm insulation foam insulation	13,526	m²	21	284,046	in
Bulkheads, access panels and other sundry ceiling work	Item			207,000	pl
Total CEILING FINISHES			**$117.24/m²FECA**	**2,276,478**	
Sub-total FITOUT			**$666.36/m²FECA**	**12,938,800**	

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	Quantity		Rate	Total	
ME MECHANICAL SERVICES					
Exhaust fan including grill, ducting, associated wiring and connections	373	No	1,100	410,300	me
Split system including rooftop condenser (assumed 1 per dwelling)	185	No	5,400	999,000	me
Total MECHANICAL SERVICES			**$72.58/m²FECA**	**1,409,300**	
FP FIRE PROTECTION					
Fire Services	Provisional			390,000	lp
Total FIRE PROTECTION			**$20.09/m²FECA**	**390,000**	
LP ELECTRICAL AND COMMUNICATIONS					
Modifications and extension to existing electrical services including all associated wiring and connections	Provisional			1,945,000	lp
Light fittings and fan supply	Provisional			390,000	lp
Communications, T.V. and data cabling including all wiring, connections and fittings	Provisional			195,000	lp
Security and intercom system	Provisional			195,000	lp
Automation, IT, AV and communications equipment	Excluded			0	lp
Total ELECTRICAL AND COMMUNICATIONS			**$140.34/m²FECA**	**2,725,000**	
SS SPECIAL SERVICES					
Attendance and sundry builder's work on engineering services	Item			199,500	ea
Upgrade existing lifts	2	No	200,000	400,000	li
Total SPECIAL SERVICES			**$30.88/m²FECA**	**599,500**	
Sub-total SERVICES			**$441.53/m²FECA**	**8,573,270**	

DETAILED COST PLAN

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	Quantity		Rate	Total	
SERVICES					
SF SANITARY FIXTURES					
WC suite including top mounted cistern	198	No	1,000	206,800	sf
Hand basin	189	No	700	131,600	sf
Sink and drainer	186	No	900	167,400	sf
Laundry trough/sink	185	No	700	129,500	sf
Bath	0	No	3,000	0	sf
Shower base and set down	185	No	1,000	185,000	sf
Tapware	1,114	No	400	445,600	sf
Washing machine/Dishwasher stop taps	370	No	175	64,750	sf
Shower set	185	No	500	92,500	sf
Sundry fixtures (towel rails, toilet roll holders and the like)	185	No	500	92,500	sf
Total SANITARY FIXTURES			**$78.06/m²FECA**	**1,515,650**	
HY PLUMBING AND WATER SUPPLY					
Soil waste and vent piping	2,978	fu	310	923,180	hy
Rectification of sewer stacks	Provisional			95,000	hy
Floor waste	186	No	370	68,820	hy
Rain water reticulation	188	pt	230	43,240	hy
Cold water reticulation	1,114	pt	220	245,080	hy
Hot water reticulation	1,114	pt	250	278,500	hy
Heat pump hot water system including fittings and connections	Provisional			280,000	hy
Total PLUMBING AND WATER SUPPLY			**$99.98/m²FECA**	**1,933,820**	
GS GAS SUPPLY					
Gas connections	Excluded			0	hy
Total GAS SUPPLY			**$0.00/m²FECA**	**0**	

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	Quantity	Rate	Total	
EXTERNAL WORKS				
XP SITE PREPARATION				
Demolition works to existing buildings and external areas	Provisional		201,000	de
Asbestos removal and site decontamination	Provisional		130,000	de
Excavation and levelling for building areas	Item		28,000	sw
Disposal of excavated soil	Provisional		25,000	sw
Total SITE PREPARATION		**$19.78/m²FECA**	**384,000**	
XR ROADS AND PAVING				
Concrete paving slab	76 m²	110	8,360	co
Selected external stone pavers including waterproofing and caulking (PC Sum $90/m2 supply)	76 m²	270	20,520	cl
External concrete steps	1Item		4,500	co
Gravel path	45 m²	85	3,825	cl
Crossover	Existing		0	co
Driveway and carparking	Existing		0	co
Total ROADS AND PAVING		**$1.92/m²FECA**	**37,205**	
XN FENCES AND GATES				
190mm RC filled blockwork fencing	171 m²	328	56,088	bk
Pedestrian gate	10 No	1,200	12,000	cl
Total FENCES AND GATES		**$3.51/m²FECA**	**68,088**	
XB EXTERNAL BUILDINGS				
External Buildings	Nil		0	
Total EXTERNAL BUILDINGS		**$0.00/m²FECA**	**0**	
XL LANDSCAPING				
Soft landscaping including garden bed establishment and planting	Provisional		75,000	sl
Total LANDSCAPING		**$3.86/m²FECA**	**75,000**	
Sub-total EXTERNAL WORKS		**$29.06/m²FECA**	**564,293**	
EXTERNAL SERVICES				

DETAILED COST PLAN

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3 October 2024

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	Quantity	Rate	Total	
ALTERATIONS				
Patch, repair and seal existing roof including make good	Excluded		0	rf
Patch, repair and paint existing façade	Provisional		19,000	ew
Patch, repair and paint existing concrete walls	690 m²	40	27,600	pa
Patch, repair and paint existing exposed concrete ceilings	5,891 m²	40	235,640	pa
Carefully remove existing plasterboard to external walls and dispose	9,832 m²	15	147,480	de
Carefully remove existing windows and glazed doors	3,948 m²	150	592,200	de
Carefully remove existing floor coverings	18,821 m²	30	564,630	de
Carefully remove existing doors	3143 No	80	651,440	de
Internal demolition, cut/fill openings, minor alterations and make good to existing building	Item		1,748,000	de
Total ALTERATIONS		**$205.18/m²FECA**	**3,984,070**	
PRELIMINARIES, OVERHEADS AND PROFIT	**20.00%**		**9,670,000**	pf
TOTAL BUILDING COST (TBC)			**58,016,000**	

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Unenclosed Covered Areas (UCA)	3788 m²
Gross Floor Areas (GFA) (FECA + UCA)	23205 m²

	Quantity	Rate	Total	
XS EXTERNAL SPECIAL SERVICES				
External Special Services	Nil		0	lm
Total EXTERNAL SPECIAL SERVICES		$0.00/m²FECA	0	
Sub-total EXTERNAL SERVICES		$25.34/m²FECA	492,000	
PRELIMINARIES, OVERHEADS AND PROFIT	20.00%		212,000	p
TOTAL SITEWORKS COST (TSC)			1,269,000	
TOTAL END COST (TEC) (Refer Cost Plan Summary)			$1,069,800	

DETAILED COST PLAN

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Gross Floor Areas (GFA) (FECA + UCA)	23205 m²

	Quantity	Rate	Total	
XK EXTERNAL STORMWATER				
Modifications to existing stormwater drainage including pipes, pits drainage and the like	Provisional		66,000	sk
Rainwater tanks including base, pumps, filters and connections	3 No	27,000	81,000	rt
Total EXTERNAL STORMWATER		$7.57/m²FECA	147,000	
XD EXTERNAL SEWER AND WATER				
Modifications to existing connection to sewer mains	Provisional		25,000	sw
Modifications to existing connection to water mains	Provisional		15,000	sw
Total EXTERNAL SEWER AND WATER		$2.06/m²FECA	40,000	
XF EXTERNAL FIRE				
Modifications to existing external fire services	Provisional		50,000	
Total EXTERNAL FIRE		$2.58/m²FECA	50,000	
XG EXTERNAL GAS				
Modifications to existing connection to gas mains	Excluded		0	x
Total EXTERNAL GAS		$0.00/m²FECA	0	
XE EXTERNAL ELECTRICAL AND COMMUNICATIONS				
Modifications to existing external light and power supply	Provisional		50,000	le
Modifications to existing communications/NBN connections	Provisional		15,000	le
External lighting	Provisional		30,000	le
Solar PV system including batteries	Provisional		150,000	le
Total EXTERNAL ELECTRICAL AND COMMUNICATIONS		$11.13/m²FECA	255,000	

TRADE SUMMARY

Melbourne Quantity Surveyors

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Flemington, VIC 3031

3 October 2024

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Unenclosed Covered Areas (UCA)	1792 m²
Gross Floor Area (GFA) (FECA + UCA)	21209 m²

Cost Plan No.1
Revision B
Feasibility

Trade (TR)	Trade	% of Total	$/m2 of FECA	Cost Plan Incl GST	Builder 1	Builder 2	Variance
PM	Preliminaries, Overheads & Margin	16.7%	$716/m²	13,996,967			
DE	Demolition including alterations	5.6%	$250/m²	4,850,657			
SW	Site preparation & excavation	0.1%	$3/m²	43,716			
CO	Concrete and footings	4.5%	$192/m²	3,736,979			
SS	Structural steel	4.3%	$182/m²	3,532,724			
MK	Masonry and blockwork	0.5%	$20/m²	386,259			
EW	External walls and cladding	1.5%	$64/m²	1,245,248			
WW	Windows and glazed screens	6.4%	$275/m²	5,339,640			
RF	Roofing inc roof plumbing	0.1%	$6/m²	119,062			
IN	Insulation & lining	0.6%	$26/m²	483,347			
CA	Carpentry including framing	2.0%	$86/m²	1,669,748			
SC	Stairs including balustrades and handrails (ex glass)	0.3%	$12/m²	240,444			
PL	Plastering & internal wall finishes	6.5%	$280/m²	5,429,538			
JO	Doors including hardware	1.7%	$71/m²	1,373,977			
PA	Painting	2.4%	$103/m²	1,999,807			
FF	Floor finishes	2.8%	$119/m²	2,313,869			
TI	Tiling including waterproofing and caulking	3.8%	$162/m²	3,143,481			
JO	Joinery including stoneworks	5.7%	$246/m²	4,748,351			
SE	Special fittings including Appliances & Fireplaces	1.6%	$66/m²	1,289,982			
MW	Metalwork	5.4%	$232/m²	4,507,388			
SF	Sanitary fixtures	1.6%	$66/m²	1,287,758			
HY	Hydraulics & drainage	3.5%	$150/m²	2,907,363			
MS	Mechanical & ventilation services	2.0%	$87/m²	1,694,289			
EP	Electrical, communications, security, data and fire	5.0%	$214/m²	4,162,687			
DS	Stormwater and drainage	0.2%	$9/m²	176,726			
EI	External Works including paving and fencing	0.1%	$2/m²	43,695			
PL	Landscaping	0.1%	$4/m²	90,367			
LI	Lift	0.7%	$28/m²	560,964			
CS	Contingency sum	14.3%	$613/m²	11,888,000			
	Total		**$4278/m²**	**83,069,000**			

Note: This trade breakdown is indicative only. As elements of works could be allocated to multiple trades, this breakdown is intended to be used as a guide only.

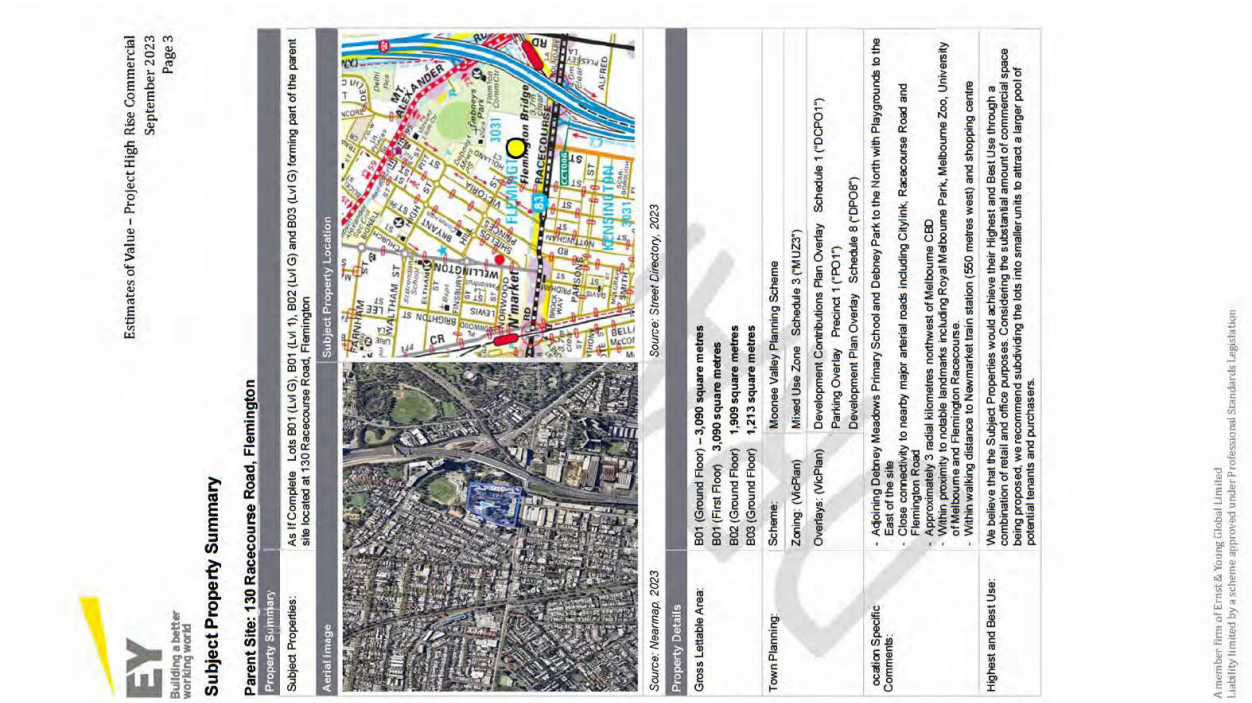
14. Costings of refurbishment and infill proposal for Barak Beacon Estate

Figure 32: RRR refurbishment and infill costings for all four towers.

	Total	Average Per Dwelling
Retain, Repair, Reinvest: FLEM		
Refubishment (720 + 20 dwellings)	$237,140,000	$320,459
Infill (557 dwellings)	$196,080,710	$352,030
Carparks	$38,948,910	-
10% Contingency	$47,216,962	-
Total Construction Cost	$519,386,582	$400,452

15. Excerpt from Ernst and Young – Estimates of Value (Commercial) – Project High Rise

The following pages, from the 15-page document, show the future plans for the Flemington site with floor areas and dwelling numbers captured in the table.



Estimates of Value – Project High Rise Commercial
September 2023
Page 3

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Subject Property Summary

Parent Site: 130 Racecourse Road, Flemington

Property Summary	
Subject Properties:	As If Complete Lots B01 (Lvl G), B01 (Lvl 1), B02 (Lvl G) and B03 (Lvl G) forming part of the parent site located at 130 Racecourse Road, Flemington
Aerial Image	Subject Property Location

Source: Nearmap, 2023 *Source: Street Directory, 2023*

Property Details	
Gross Lettable Area:	B01 (Ground Floor) – 3,090 square metres B01 (First Floor) 3,090 square metres B02 (Ground Floor) 1,909 square metres B03 (Ground Floor) 1,213 square metres
Town Planning:	Scheme: Moonee Valley Planning Scheme Zoning: (VicPlan) Mixed Use Zone Schedule 3 ("MUZ3") Overlays: (VicPlan) Development Contributions Plan Overlay Schedule 1 ("DCPO1") Parking Overlay Precinct 1 ("PO1") Development Plan Overlay Schedule 8 ("DPO8")
ocation Specific Comments:	- Adjoining Debney Meadows Primary School and Debney Park to the North with Playgrounds to the East of the site - Close connectivity to nearby major arterial roads including Citylink, Racecourse Road and Flemington Road - Approximately 3 radial kilometres northwest of Melbourne CBD - Within proximity to notable landmarks including Royal Melbourne Park, Melbourne Zoo, University of Melbourne and Melbourne Showgrounds - Within walking distance to Newmarket train station (550 metres west) and shopping centre
Highest and Best Use:	We believe that the Subject Properties would achieve their Highest and Best Use through a combination of retail and office purposes. Considering the substantial amount of commercial space being proposed, we recommend subdividing the lots into smaller units to attract a larger pool of potential tenants and purchasers.

Estimates of Value – Project High Rise Commercial
September 2023
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EY
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Proposed Flemington Commercial Tenancies

Ground Level

First Level

Development Summary

Source: Massing and Yield Assessment, Hayball Architects, Reference 2586, dated July 2023

We have been provided with a Massing and Yield Study Prepared by Hayball Architects dated July 2023 provided by HV that has been critically relied on to assist us with our Estimates of Value for each tenancy. The plan effectively illustrates the proposed lots and their corresponding tenancy sizes. We have summarized the following lots and their respective gross floor areas in the table below.

Lot Summary

Retail Tenancy	Level	Street Frontage	Approximate GLAR Size (sqm)
B01 (Retail)	Ground	Racecourse Road	3,090
B01 (Office)	First Level	Racecourse Road	3,090
B02 (Retail)	Ground Level	Racecourse Road	1,909*
B03 (Retail)	Ground Level	Racecourse Road	1,213
Total Commercial Area			**9,302**

*Note: We have been advised that there is a size discrepancy between Lot B02 of the Massing & Yield Study Plans and our Estimates of Value Report. We have been advised by HV that Lot B02 comprises a GLA of 1,909 sqm instead of 2,203 sqm as per the development summary within the Yield and Massing Study.
Source: Hayball, Architects, July 2023

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Appendix C: HV Site Schedule & Tenancy Plans

02 **Preferred Option**
02 Ground Level Plan

02 **Preferred Option**
02 Summary

Site Area m² 38339

Option 4

			APARTMENTS			RESIDENTIAL PARKING			MIXED USE PARKING				OUTDOOR	
Building	Levels	GBA Total m²	Residential GBA Total m²	NSA**	TOTAL DWELLINGS*	Car spaces Required	GBA Parking	Carparks***	Mixed Use Car Spaces Required	GBA Parking	Carparks***	Mixed Use	COS (Communal Open Space)	Open Space Total m²
B01	5/6/20	37547	33407	10655	129	192	8528	313	243	9435	238	8193	250	
B02	2/5/10	34915	33606	24755	317							1006	350	
B03	4/5/20	32072	22058	16552	212	164	6786	170	38	2304	60	1293	600	
B04	4/5/15	17580	17588	13185	159									
B05	2/3/6/10	18427	14278	10708	137	69	2162	84					250	
B06	2/12	18811	15135	11351	148	79	3776	94					500	
B07	3	4043	4040	3034	38									
B08	3/5/12	6962	16839	12629	162	78	7862	75					250	
TOTAL		18 818	136356	102267	1319	504	24251	603	279	11439	298	9322	2000	0
				Dw/Ha	361	0.43	Ratio m2	40	3/100m2	Ratio	40	1.13% % of GBA		0% % of site

* Calculation based on brief mix (55% 1 Bed: 30% 2 Bed: 15% 3 Bed) average 104m² GBA assumed
** NSA is 75 per cent efficiency of Gross Building Area (GBA) for residential uses
*** Based on efficiency ratio in table
** Accounts for blended parking ratio with 5% 1:1 ratio for accessible units

Note:

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