Retain Repair Reinvest

Barak Beacon 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 and Miriam McGarry
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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.

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Executive Summary Retain, Repair, Reinvest

The proposed RRR refurbishment and infill development at Barak Beacon Estate. 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 has been developed in response to the Department of Families, Fairness and Housing approach to renewing public housing, delivered through Homes Victoria. The redevelopment of a number of estates, including Barak Beacon, is being financed through the Ground Lease Model (GLM) as a mechanism of the Big Housing Build (BHB). The Government's estate renewal process follows a tenant eviction, demolition, and rebuild approach that is based on the rationale that refurbishment is not a viable option[1] — despite no feasibility study for the renovation of the estates being available to the public.

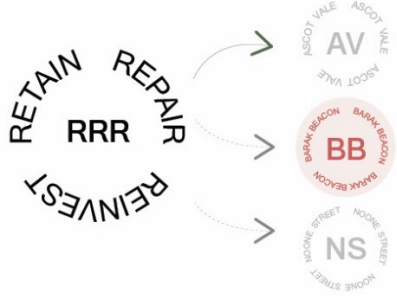
[1] Legislative Council Legal and Social Issues Committee (Vic), *Inquiry into the Public Housing Renewal Program: report* (Victoria, Parliament of Victoria, 2018). https://apo.org.au/node/175096.

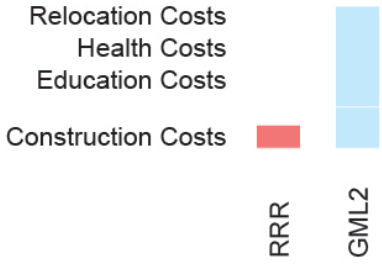
The proposed RRR internal refurbishment of the existing housing block at Barak Beacon Estate. Image by OFFICE

The objective of Retain, Repair, Reinvest is to demonstrate that it is both technically and economically feasible to retain the existing public housing, via refurbishment and infill to provide greater social and environmental benefit.

RRR identifies the uncaptured costs associated with the Ground Lease Model (GLM) approach at Barak Beacon 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.

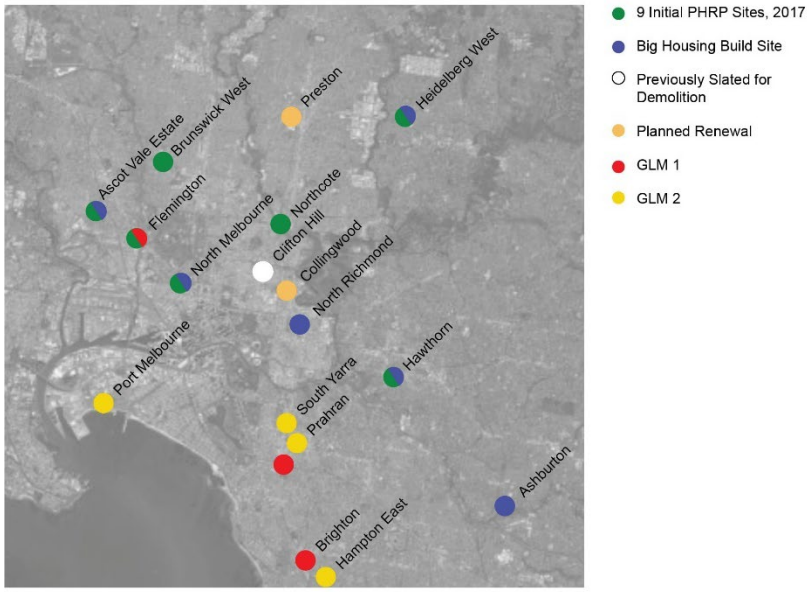
Retain, Repair, Reinvest addresses all of the criteria presented by the Department of Health and Human Services that justify estate demolition — including access, energy efficiency, dwelling types, liveability standards, additional housing capacity and financial investment.





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 the Big Housing Build (previously the Public Housing Renewal Program [PHRP]), through the Ground Lease Model. Both the PHRP and BHB approach to estate upgrades is through the relocation of existing tenants to other public housing estates (or private market rentals), demolition of existing buildings, and private-public-partnership rebuild. The Ground Lease Model offers a different approach from the PHRP delivery, via new land-ownership arrangements and financing structures. This report focuses on the second iteration of the Ground Lease Model (GLM2), with a comparison RRR case study on the Barak Beacon estate.



A map of Melbourne highlighting the Estate's included in the PHRP, BHB, GLM and GLM2. Image by OFFICE

The Retain Repair Reinvest strategy proposes the retention of existing communities and buildings by accurately determining the viability of refurbishment. Through a case study of the Barak Beacon Estate, this document demonstrates the value of a refurbishment and infill approach by comparing the delivery of the GLM2 development with an RRR strategy.

RRR: Barak Beacon 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. These costs and disbenefits of the GLM2 model include:

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

- Tender process transaction costs including the project team and project advisers
- Contract management costs of administering the Project Deed and associated documents
- Costs pertaining to retained risks

The GLM2 is based on assumptions around the efficacy of private-public-community partnerships, and financial savings to the government through this model. This report highlights the economic, social, heritage and environmental benefits of refurbishing the Barak Beacon Estate. The RRR report demonstrates that through the staging of works and sequenced decanting of buildings, no residents will have to be relocated from the Estate.

This report and feasibility study establish the value of retaining and renovating the existing public housing buildings, as well as the opportunity to increase density and social housing through infill on the site. The GLM clearly states that its purpose is to ‘grow social housing’ and the call to tender details how this will be achieved via demolition and rebuild.

RRR: Barak Beacon proposes that it is possible to retain the existing buildings and still achieve this increased density through infill development. Through this alternative approach to renewal the report details how it is economically, environmentally, and socially more efficient to retain the existing buildings, when compared to the demolition approach of the GLM.

Key Findings

This study demonstrates how a Retain, Repair, Reinvest strategy can address all objectives of the PHRP/Big Housing Build and GLM component, and deliver improved living conditions for a significantly 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 (with 25% increase in occupancy) combined with the infill of 238 new social housing dwellings can be delivered for $97,897,000 while retaining the existing community on site and avoiding the social impact and economic costs of relocation.

This saves the government $16 million in direct relocation costs, and approximately $1 million in associated health and well-being costs. The RRR proposal also provides a 54% reduction of embodied energy, a 46% reduction of global warming potential with land use impacts reduced by 273%.

The RRR study proposes that it is possible for the $244.8 million of direct financial contributions the government will pay to the selected Project Consortium to deliver the Barak Beacon site, to be reinvested back into the refurbishment of the existing public housing and development of new social housing (Table 2). This report further suggests that the Ground Lease Model does not provide financial, social or environmental benefit, and improved outcomes could be delivered for significantly less government and private investment.

Site plan showing the retention of the existing housing blocks (E) with the proposed dwellings (P) to occupy the east of the site. Forming a built edge along Beacon Rd and retaining the northern aspect and open space of the existing Estate. Image by OFFICE

Table 1- Comparison between GLM2 model and RRR proposal for Barak Beacon.

	Ground Lease Model Barak Beacon Estate	Retain, Repair, Reinvest Barak Beacon Estate	Refer to Section
RETAIN			
Increasing existing social housing	+10% (9) dwellings 98 in total	+25% (+23) dwellings 112 in total	5.5
Increasing New Homes	+252 dwellings 350 in total	+238 dwellings 350 in total	5.5
External Relocation costs These expenses are paid by the Government.	-$16.193 million	$0*	4.2
Health and well-being costs These costs are based on SGS modelling of health and wellbeing impacts through relocation.	-$238,656	$0	4.2
Education costs These costs are based on SGS modelling of educational impacts through relocation.	-$674,800	$0	4.2
REPAIR			
Direct Refurbishment Costs (25% increase in public housing occupancy)	NA	-$19,654,000 (-$175,482 per dwelling)	5.10
Direct New Dwelling Construction Costs	-$105,006,150	-$78,243,000	5.10
Embodied Energy This saving is calculated against the demolition and rebuild proposal.	-	54% reduction	5.9
Global Warming Potential This saving is calculated against the demolition and rebuild proposal.	-	46% reduction	5.9
Land Use This saving is calculated against the demolition and rebuild proposal.	-	273% reduction	5.9
REINVEST			
Estate construction cost savings (refurbishment and infill)	-	+$7,109,150	5.10
Estate project cost savings	-	**+$24,215,606**	5.10

**Relocation fees for RRR are $0 due to the staging of works. There would be a budget for a small removalist fee from relocating residents within the Estate during the new build and refurbishment.*

Table 2- Direct Government investment at Barak Beacon

Direct Government investment at Barak Beacon	
Project development, market testing and procurement costs*	$64,750,000
Quarterly service payments to the Project Co to manage and maintain the properties over 40 years.**	$118, 658,499
Projected total government investment in Barak Beacon over 40 years	**$183,408,499**
Total required investment for RRR: Barak Beacon Construction Proposal	**$97,897,000**

**This value is one-quarter of the capital investment for GLM Project 2, as Barak Beacon is one of four estate renewal sites.*

***This value is based on the GLM Project 1 costs, as the GLM Project 2 contract has not yet been awarded. This cost has been calculated by dividing the budgeted Quarterly Service Payment (QSP) total government expenditure of 40 years by 4, to reflect that this cost pertains to one-quarter of the project sites (Port Melbourne). It is likely this QSP figure would be larger for GLM2, as the project is delivering more dwellings overall across more sites than GLM1.*

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Acronyms and Definitions

BHB	Big Housing Build
CRA	Commonwealth Rent Assistance
GLM	Ground Lease Model
GLM2	Ground Lease Model Project 2
PHRP	Public Housing Renewal Program
PPP	Public Private Partnership
QRS	Quarterly Service Payments
RRR	Retain, Repair, Reinvest
the Estate	Barak Beacon Estate
VAGO	Victoria Auditors General Office

1. Introduction

1.1 Overview

This report presents an alternative to the Victorian Government-adopted strategy for the renewal of public housing in Victoria, by questioning the procurement rationale of the Big Housing Build and the delivery of the program through the Ground Lease Model. Retain Repair Reinvest: Barak Beacon questions the assumed necessity of demolition and quantifies the uncaptured costs and value-loss of the BHB and GLM real estate-led model.

This report assesses whether a Retain Repair Reinvest refurbishment strategy can achieve the same objectives of the BHB without the relocation of existing communities and demolition of housing stock. The report demonstrates the economic, environmental and social value of the RRR approach.

The case study of Barak Beacon presented in this report is specific to the conditions and particularities of the housing's design, site condition and community values. However, due to the ubiquity of the walk-up housing typology and the unaccounted-for costs of resident relocation and demolition — the strategies employed in this proposal are replicable for other government owned sites throughout Victoria and Australia.

The feasibility study primarily focuses on how equivalent built outcomes — by both retaining the existing public housing and increasing dwellings though social housing infill — can meet the BHB objectives for lower environmental, social and economic costs. 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 the government, disproving the efficiencies of the current GLM approach.

The Barak Beacon Estate consist of 21 blocks of flats with 89 dwelings in total. The conrcete design is replicated throughout the Estate. Aerial image - Near Map (left), Photo by Ben Hosking (right)

1.2 Previous Iteration RRR: Ascot Vale

RRR Barak Beacon is the second iteration of the RRR strategy deployed to assess the feasibility of estate renovation in Victoria. 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. The design team 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 RRR: Ascot Vale 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 are currently underway with Homes Victoria confirming 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 currently underway, and the rendered proposal produced as part of RRR: Ascot Vale. Photo by Ben Hosking (left) Image by OFFICE (right)

Housing Infill/ Increasing Density

As a site-specific strategy RRR is not only a study into the Estate's building typology and site condition but also the residents' preferences for development. The Ascot Vale Estate feasibility study was to meet the key objective of the PHRP — to renew public housing — as well as reflect the values of the residents in retaining the existing landscape and mature trees of the site. The RRR: Barak Beacon study also responds to the existing buildings and residents' input, while using the government's approach or demolition and rebuild as a basis for the comparative study. The GLM clearly states that its purpose is to 'grow social housing' and the tender details how this will be achieved through the increase of density on the site via demolition and rebuild.

RRR: Barak Beacon proposes that it is possible to retain the existing buildings and still achieve the increased density through infill development. The report details how it is economically, environmentally, and socially more efficient to retain the existing buildings, when compared to the demolition and rebuild approach of the GLM.

1.3 Objectives and Scope

Objectives

This report presents the GLM model as a base case, alongside an alternative Retain Repair Renew proposal for the Barak Beacon Estate. The analysis compares how the GLM model and RRR proposal address the program objectives of the BHB. The key objectives of the GLM Project 2 are to deliver:

- Increased social housing supply by 10%
- Affordable housing
- Diverse housing supply
- Integrated communities
- Quality built form
- High quality and efficient operations, including 75% of new social housing to 'Priority Access' category applicants of the Victorian Housing Register
- Risk transfer and delivery certainty
- Innovation
- Value capture

The GLM project is delivered as part of a Public Private Partnership (PPP) between the Project Co. and the Department of Families, Fairness and Housing. The rationale for using the PPP is outlined in the Public Accounts and Estimates Committee, outlining the benefits of the GLM Model for the delivery of social, affordable and market rental housing in Flemington, Brighton and Prahran.[2] The PPP investment project is viewed as the preferred delivery/funding model due to:

[2] Public Accounts and Estimates Committee, *Financial and Performance Outcomes, General Questionnaire.* 2020-21. Department of Families, Fairness and Housing.

- Retention of government land for integrational benefit:
- Provides fixed price certainty over both capital and operating costs for 40 years
- Provide a (now) proven platform to effectively leverage large scale institution investment and low-cost financing into social housing
- Private rents subsidise the cost of delivering social housing
- Asset management including lifecycle asset replacement works, tenancy management and social landlord services must be delivered up to a prescribed standard. If they are not met, service payments will be abated.
- Higher level of social-private integration
- Builds capacity in the community housing sector

Report Scope

The RRR refurbishment and infill proposal for Barak Beacon Estate responds to the stated objectives of the GLM, as well as the specific rationale for the Estate's demolition and rebuild. It is also informed by resident enthusiasm to retain their homes and existing communities.

In response to the GLM rationale, this RRR proposal focuses on how to best meet the objective of Estate renewal with minimal financial, economic, and social costs. The findings from this feasibility study demonstrate the value of refurbishing the Estate, and as such advocates for retaining the existing buildings on Barak Beacon Estate as public housing with the proposed infill supplied as community housing, acknowledging the role of CHPs and other social housing models in the provision of homes for Victorians.

The report identifies how the RRR approach can address the key objectives of the GLM and PHRP/BHB rationale, but does not include how a refurbishment and infill strategy can address the PPP objectives. The report findings question the necessity of the PPP model, and as such, do not address the associated outcomes of this approach. However, as outlined in Section 2.3, the RRR approach does significantly address key aspects of Victoria's Value Capture Framework; chiefly in regard to public housing, environmental improvement, and social outcomes.

The scope of the project is also informed by the architectural particularities of the site, and the heritage value of the Estate, as discussed in Section 3.1.

While the RRR approach does not include financial modelling for subsidising the renewal of public and social housing, the findings highlight huge cost savings to the government through disproving the assumed efficiencies of the current GLM approach. 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: Barak Beacon demonstrates that other approaches are both possible and cost effective, while have a lower impact on the environment and health and wellbeing of current residents. And should be considered in any future renewal of public housing estates.

1.3 Refurbishment Precedents

The potential of refurbishment as an alternative to demolition for improved social, environmental and economic outcomes is well established internationally in both estate renewal projects and other infrastructure upgrades.

One highly celebrated and pioneering example of social housing refurbishment is by French architects Anne Lacaton and Jean-Phillipe Vassal. In 2021 the pair were awarded the Pritzker Prize, the most prestigious award in architecture. They were particularly celebrated for their *'never demolish'* approach and refurbishment of the Cite du Grand Parc social housing towers in Bordeaux, which occurred without displacing any residents and retained the community who lived in the buildings.

The environmental impact of demolition and rebuild is also well documented. 40% of the world's extracted materials are used in the built environment, with waste from demolition and construction representing the largest waste stream in many countries.[3] The building and construction industry is accountable for 39% of the world's carbon emissions — 28% relating to the operation of the buildings and the remaining 11% resulting from the manufacturing of new materials such as steel, cement and glass.[4]

The Victorian Climate Change Act 2017 sets out a long-term state government strategy of reaching net zero emissions by 2050. This commitment by the government includes five yearly interim emission reduction targets, each of which improves on the previous targets.[5] To meet these ambitious net zero emission targets, it will be essential that construction practices change and buildings reduce their environmental impact.

This RRR: Barak Beacon feasibility study provides evidence for the value of retaining and upgrading the existing buildings to meet higher environmental ratings, as well as the embodied savings of avoiding the demolition of well-designed, structurally robust and historically significant buildings.

[3] 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/

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

[5] 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

1.4 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 GLM approach under the Big Housing Build.

2. The Barak Beacon Case Study
   The report introduces Retain, Repair, Reinvest: Barak Beacon — a specific feasibility case study of the Barak Beacon Estate. Through a comparative analysis of the GLM2 and a proposed Retain, Repair, Reinvest approach; the feasibility of the alternative model is demonstrated.

3. Barak Beacon Estate Design Proposal
   The final section of the report presents a detailed design proposal for Barak Beacon, demonstrating the technical and financial success of the refurbishment and proposed infill.

The existing homes at Barak Beacon are in good condition with no visible sign of structural damage. Photo by Ben Hosking

1.5 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 Barak Beacon Estate residents
- Analysis of public housing resident feedback
- Commissioned reports from a Quantity Surveyor and Environmental Consultant
- Consultation with housing researchers, academics and economists
- Presentation of preliminary designs to Barak Beacon residents
- Revision of design based on feedback
- Final report (this document)

The existing homes at Barak Beacon, construstuded from precast concrete, were built in 1982 by the Ministry of Housing. Photos by Ben Hosking

1.6 Limitations

This report is based on data, budgets, reports and findings that are publicly available. To OFFICE's knowledge, there has been no refurbishment study conducted on the Barak Beacon site to date.

Additionally, due to the Ground Lease Model Project 2 currently under the contracting process, the specific details of the project delivery are not yet established. Where specific financing details or dwelling type information is not available, OFFICE have based their calculations on the Ground Lease Model Project 1 program delivery plans and the *Ground Lease Model: South Yarra, Prahran, Hampton East and Port Melbourne Expression of Interest* released in June 2022. The report clearly identifies where comparative data is being drawn from throughout the report.

In instances where economic modelling has been undertaken, we identify from where the data was drawn, and acknowledge the limitations of the data available. We have sought expert advice in establishing our modelling tools, as developed with SGS Economics and Planning as part of the RRR: Ascot Vale report and applied here as part of the RRR approach.

2. Ground Lease Model

2.1 From Public Housing Renewal to the Ground Lease Model

Public Housing Renewal Program (Stage 1)
The Public Housing Renewal Program (PHRP) was introduced in December 2016 as part of a suite of commitments under the Victorian Government's *Homes for Victorians* strategy; a cross-government response to housing affordability and homelessness. The PHRP included $185 million of investment in initial seed funding and is expected to deliver 1750 new social housing dwellings.

The key outcomes of the PHRP are focused on improving dwellings for resident comfort, access, and increasing the number of social homes on each site by at least 10%. Under the PHRP, the housing that replaces existing public housing will be community housing, and will be managed by community housing providers (CHP).[6] This approach is retained in the GLM and Big Housing Build strategies.

The Public Housing Renewal Program (PHRP) follows an eviction, demolition, and rebuild approach that is based on the rationale that refurbishment is not a viable option. This rationale also informs the approach of the BHB, and delivery of the GLM projects. For full analysis and discussion of the limitations and critiques of the Public Housing Renewal Program, see the *RRR: Ascot Vale Feasibility Study and Design Proposal*.[7]

Big Housing Build
In November 2020 the Victorian State Government announced the Big Housing Build, a $5.3 billion investment into housing and job creation.[8] Within this suite of programs, the Ground Lease Model is a new Public-Private Partnership (PPP) based approach for financing, designing, constructing, maintaining and operating social housing, affordable rentals, disability housing and private market rentals. Several of the sites being developed under the GLM were originally identified for demolition under the PHRP.

[6] Public housing tenants pay a maximum 25% of their income in rent, are provided perpetual tenure, and housing is provided to those with the greatest priority of need. Community housing residents pay 30% of their income in rent, the tenure is less secure, and only 75% of the available housing is allocated to those with greatest need.

[7] RRR:Ascot Vale Feasibility Study and Design Proposal, available: https://office.org.au/api/wp-content/uploads/2022/05/RRR_Ascot-Vale-Estate-Feasibility-Study.pdf, p.5

[8] The Homes Victoria Big Housing Build website describes 'We're building thousands of new homes for Victorians in need and creating tens of thousand of jobs to support Victoria's recovery.'https://www.vic.gov.au/homes-victoria-big-housing-build

Ground Lease Model

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

This process is detailed in a short graphic video, captured in Figure 1.

Figure 1: Ground Lease Model process, as detailed on the Homes Victoria website.

However, the estate renewal sites, which were previously identified under the Public Housing Renewal Program, are not 'vacant land.' The GLM does not include the initial step of demolishing existing public housing to create the vacant land for Step 1 of the process.

The GLM is designed to allow for the land and assets to revert to public ownership at the end of the 40 year agreement between the state and the PPP consortium. At the end of this period, the model sees the private rentals managed by the government. The nature of this transition is not fully described, but will render the government as landlords to private renters when the lease period concludes. The program design frames this private rental approach as allowing for 'rental income from these properties will offset the cost of building social housing.'

The first GLM Program was announced in May 2021 for the build of community and affordable rental properties on sites of demolished public housing in Brighton, Flemington and Prahran. This second iteration of the Ground Lease Model (GLM2) concerns public housing estates in South Yarra, Prahran, Port Melbourne (location of Barak Beacon Estate) and Hampton East.

Ground Lease Model 1

While there are not yet any built outcomes of the GLM1, the Private-Public Partnership model between the Director and Building Communities Ltd (Vic) consortium (BCVL) has won multiple awards for their partnership. The PPP consortium is a special purpose vehicle, as a legal entity established to undertake a specific business activity.

The BCVL consortium consists of

- Community Housing Limited as the investor, operator, service provider and owner
    - Horizon Housing Realty as Built to Rent market housing and affordable housing operator/service provider (a subsidiary of CHL)
- Tetris capital as bid leader and finance advisor
- NHFIC as finance partner
- Citta property group as development and property advisor
- Icon Kajima as builder

We understand that the GLM2 Project contract would be awarded to a similarly structured consortium.

The GLM project design is facilitated through a PPP commitment, and a service concession arrangement, as defined under the AASB 1059 Service Concession. The contract between the Director of Housing and Building Communities BCLV for the 'design, contraction, financing and management of residential dwellings' accounted for under AASB 1059.[9]

Across the three sites of the GLM1 Project, BCLV will deliver and operate 619 social housing dwellings, 126 affordable homes and 365 market rental homes, including 52 Specialist Disability Accommodation dwellings.

The GLM sees the BCLV finance the build via a build-to-rent structure, where the consortium will be responsible for 'asset management, community engagement, maintenance and lifecycle replacement, tenancy management and residential lease management.'[10] BCLV will be entitled to the net rent from the social, affordable and market rental dwellings.

The EOI document details that 'The Director anticipates to make a capital contribution during the Development Phase and provide Quarterly Service Payments to Project Co during the Operational Phase, however, these payments are intended to be minimised.'[11] The Operating Phase is projected to commence in January 2024 and will continue for a 40 year period.

[9] As detailed in the document 'FINAL DHHF Annual Report 2021-22 ACCESSIBLE', p.161.
[10] Ibid, p. 162.
[11] GLM2_EOI page 19.

The DFFH Annual Report 2020-21 identifies the combined value of these quarterly service payments over the 40 year operating period and 'total estimated investment' (TEI).

Overall, the 'total commitments payable' by the government for the GLM1 are $738,634,000. (See Figure 2).

Uncommissioned 2022	Note	Classification of Arrangement	Carrying amount of asset as at 30 June $000	Carrying amount of liability as at 30 June $000	Capital Contribution Nominal Value $000	Commit-ments (i)(ii) Nominal Value $000
Ground Lease Model 1 – PHRP	7.5.3.1	Hybrid (GORTO & Financial Liability)	152,290	146,421	50,000	738,634

Notes:

(i) Total commitments represent the nominal value of the total service payments to be incurred during the Project's 40-year operations phase and includes the capital contribution component.

(ii) The total nominal value of the commitments includes GST.

Figure 2: Service Concession Arrangements for GLM1 Project, detailing the Director's total financial commitments.

For the GLM1, the TEI is reported as $264,000,000 and includes:

> a capital contribution, State costs, development costs covered by the Service Payment exclusive of GST and retained risk during the delivery phase. The capital expenditure is higher than the reported TEI due to an offset from rental income.[12]

This $264,000,000 government investment included a payment of $1 million each to three proponent consortium groups submitting round 2 quotes in response to the Homes Victoria tender. This contribution is in-line with Partnerships Victoria Requirements to 'maximise competition by incentivising stronger market responses and attracting better quality Proposals.'[13]

As outlined in Table 1 this RRR: Barak Beacon feasibility study demonstrates how 'high-quality, sustainable communities with modern and energy efficient homes' can be delivered without the need for demolition and resident relocation, PPP procurement structure and for a lower cost.

Ground Lease Model 2

The contract from the GLM2 project is currently out to tender, and as such, the specifics of the project delivery, financing, number of new dwellings, and quarterly service payments are not yet defined.

[12] As detailed in the *2022-23 State Capital Program - Capital Investment Dashboard dataset*.
[13] Homes Victoria, *Ground Lease Model Project: Project Summary*. p.23. Available https://www.parliament.vic.gov.au/file_uploads/Ground_Lease_Model_Project_Summary_PjKPZVhZ.pdf

Current budget details of the TEI for GLM2 are reported in the 2022-23 State Capital Budget as $259,802,000. In addition to the capital contribution included in the GLM1 TEI, the GLM2 budget includes 'project development, market testing and procurement costs', but does not include the quarterly service payments to the selected Project Co.[14] (See Figure 3).

This quarterly service payment has not yet been determined, however we assume the GLM Project 2 budget will be comparable to that of the GLM Project 1, as they are both informed by the same financing model.

The budget also details that 'it is expected that the Government investment will be matched by an equivalent contribution by the private sector for the Build to Rent element of the project.' This financing is detailed in Section 2.2 **.**

	Total estimated investment	*Estimated expenditure to 30 Jun 2022*	*Estimated expenditure 2022-23*	*Remaining expenditure*	*Estimated completion date*
Acquisition general construction 2022-23 (statewide)	76 700	..	76 700	..	qtr 4 2022-23
Acquisition general spot purchase 2022-23 (statewide)	34 320	..	34 320	..	qtr 4 2022-23
High rise upgrades 2022-23 (metropolitan various)	22 000	..	22 000	..	qtr 4 2022-23
Homes Victoria Ground Lease Model Project 2 (metropolitan)	259 802	5 162	14 505	240 135	tbc

The TEI includes project development, market testing, procurement costs and the Government's capital contribution to the project. It is expected that the Government investment will be matched by an equivalent contribution by the private sector for the Build to Rent element of the project, being an integral part of the delivery model. The TEI excludes the service payment to be made by Homes Victoria to Project Co during the Operational Phase.

Figure 3: GLM2 Total Estimated Investment in millions (Image taken from 2022-23 State Capital Budget, Budget Paper No. 4, p.130).

2.2 Financing and the Private Public Partnership Model

Commercial Principles and NHFIC Investment

As outlined on the Homes Victoria website, the GLM model objective is to 'grow social housing, tackle the growing problem of housing affordability and address the lack of secure, longer-term rentals in well-located areas.'[15]

In the GML Project 1 financing structure, the community housing provider invested $500 million to construct the new housing. This was a combination of debt and equity, enabled by affordable lending rates through the National Housing Finance and Investment Corporation (NHFIC) and a Homes Victoria service payment ($264,000,000).[16]

[14] *2022-23 State Capital Budget, Budget Paper No. 4*. Department of Treasury and Finance.
[15] Frequently Asked Questions. Available: https://chl.org.au/wp-content/uploads/FAQ_Ground-Lease-Model-1.pdf
[16] https://chl.org.au/about/where-we-work/victoria-2/ground-lease-model-project-in-victoria/

The NHFIC are the key financier and are 'committed to providing the senior debt financing required for the project'[17] and this contribution to Victorian social and affordable housing is NHFIC's 'largest transaction to date.'[18] The low interest rates available through the NHFIC loan is expected to contribute more than $50 million in savings over the life of the project to the community housing provider.[19]

Additional Homes Victoria Costs

As outlined in the Ground Lease Model Project Summary, Homes Victoria has or will meet a range of costs in addition to the $258 million capital contribution and projected $474million in quarterly service payments under the GLM2 including:

- Tenant relocation costs
- Site demolition costs
- Tender process transaction costs including the project team and project advisers
- Contract management costs of administering the Project Deed and associated documents
- Costs pertaining to retained risks[20]

RRR have calculated the tenant relocation costs as $16,193,000 for Barak Beacon (see Appendix 2), and understand the value of the demolition contract for the GLM2 Project as over $1 million.[21]

Rental Income

The Ground Lease Model relies on rental value capture from the rental revenue streams (social, affordable, disability and market rentals) which are understood in the EOI as a 'significant source of funding.' The rental income assists the Project Co to pay back the NHFIC loans that helped to finance the project delivery.

Rental income from social housing residents will be a combination of 25% of residents income, 15% of Family Tax Benefits and 100% of Commonwealth Rent Assistance (for eligible residents).

The affordable housing is defined in the GLM Project Design document as 'targeted at very low to moderate income households as determined in accordance with the Planning and Environment Act 1987 (Vic) at 75% of market rent.'

According to the most recent data collected by the government on 'Affordable Lettings by Local Government Area', Port Phillip currently has 19 affordable bedrooms (0.9% affordability in the LGA). Port Melbourne is particularly highlighted as one of the least affordable rental areas, with median rents for a two-bedroom flat the equal highest in metropolitan Melbourne (along with Fitzroy) at $575 per week. One bedroom flats in Port Melbourne have a median weekly rental payment of $420.

[17] *Ground Lease Model Project, Project Summary,* p.24.
[18] NHFIC, *Media Release.* Available https://www.nhfic.gov.au/media-resources/media-releases/400m-to-deliver-more-social-and-affordable-housing-in-vic/
[19] Ibid.
[20] *Ground Lease Model Project Summary.* p.22
[21] Tender number ATNPFT303055DEM2DS

In the last year, this median cost has increased by 5%. 1.8% more than the average increase across Metropolitan Melbourne.

There is a clear and demonstrable need for affordable housing across Victoria, and in Port Melbourne in particular. However, the proposed GLM approach of providing affordable housing at 75% of market value would see a two-bedroom flat in Port Melbourne as costing renters $431.25 per week.

As the Homes Victoria June 2022 rental report captures, $431.25 (75% of market rent in Port Melbourne, as defined in the GLM Project Plan) for a two-bedroom unit would be unaffordable for a single person, parent and child, or couple on Centrelink. (Figure 4).

Household Type	Singles on Jobseeker	Single Parent with 1 Child	Couple on Jobseeker with 2 children
Assumed property size	1 bedroom	2 bedroom	3 bedroom
Weekly income (net of Rent Assistance)	$321	$627	$895
Affordable weekly rent	$170	$275	$355

Figure 4: Rental affordability by indicative households on Centrelink incomes[22]

The Victorian Government defines the affordability benchmark as 'no more than 30 per cent of gross income is spent on rent.' Based on the median market rental costs for one and two bedroom flats in Port Melbourne, there is limited opportunity for very low and low income earners to afford the 75% market rental options at Barak Beacon under the GML model. (Table 3).

Table 3: Required weekly income for affordable GLM housing in Port Melbourne

	One-bedroom flat	Two-bedroom flat
Median market rate in Port Melbourne (July 2022)	$420	$575
Ground Lease Model 75% market rate	$315	$431
Required weekly income for 30% of income to cover GLM affordable rental fees	**$1050**	**$1437**

[22] Ibid, p.19.

Given the significant need for affordable housing in Melbourne, and Port Melbourne in particular; coupled with the growing market rates - it appears unlikely that the approach of providing rentals at 75% of market rate will be able to meet the needs of the ‘very low’ or ‘low’ income earners that are a target group of the GLM program.

2.3 Private Public Partnerships and the Value Capture Framework

Public Private Partnership

As outlined in Section 2.2 GLM projects are delivered as part of a Public-Private Partnership between the Project Co. and the Department. The PPP investment project is viewed as the preferred delivery/funding model due to:

- Retention of government land for integrational benefit
- Provides fixed price certainty over both capital and operating costs for 40 years
- Provide a (now) proven platform to effectively leverage large scale institution investment and low-cost financing into social housing
- Private rents subsidise the cost of delivering social housing
- Asset management including lifecycle asset replacement works, tenancy management and social landlord services must be delivered up to a prescribed standard. If there are not met, service payments will be abated.
- Higher level of social-private integration
- Builds capacity in the community housing sector

This report questions the necessity of the PPP model, by illustrating the cost-saving potential through direct Government investment, and the disbenefits of the current approach. However, one element of the PPP that the RRR proposal addresses, is the Partnership Victoria requirement for meeting Victoria’s Value Creation and Capture Framework.[23]

[23] Victorian Government, *Victoria’s value creation and capture framework.* Available: https://www.vic.gov.au/value-creation-and-capture-framework

Table 4 below demonstrates how retaining and renovating the existing public housing at Barak Beacon estate, and introducing new social housing to the site - directly aligns with the three key areas of value creation. This is particularly evident in regards to 'social benefits' where the Value Creation and Capture Framework specifically cites 'public housing' as an example outcome.

Table 4: RRR:Barak Beacon and Victoria's Value Creation Framework Benefits

Value Creation Framework Benefits[24]	RRR Strategy	RRR: Barak Beacon proposal
Social Benefits	Retain existing communities by not relocating residents	The value creation framework directly cites 'public housing' as an example of a social benefit. The RRR:BB proposal retains the existing social housing and increases occupancy by 25%, in addition to proposing 238 new social housing dwellings.
Environmental Benefits	Repair existing buildings to reduce carbon emissions	Retaining the existing buildings would save 54% of embodied energy and 46% global warming potential, compared with demolition and rebuild. The report highlights how existing new buildings can deliver 5 star Green Star rating and 8 Star NatHERS average rating.
Economic Benefits	Reinvest savings to improve comfort and upgrade public housing	The RRR:BB proposal stimulates local job opportunities through renovation and construction, while minimising the government investment of capital funds and quarterly service payments.

[24] As taken from the *Victoria's value creation and capture framework,* p.9.

2.4 Maintenance

The feasibility study presented here examines the specific conditions of the Barak Beacon Estate and evaluates the potential overall value of maintaining and renovating the existing dwellings.

The need for significant investment in public housing maintenance is the result of a long history of inadequate maintenance on public housing, which has been identified in government reports and audits since 1993.[25] In 2012, an audit into public housing explicitly found that 'due to the continuing operating deficit, there is an increasing, unfunded maintenance liability, which has led to a deterioration of the asset base.'[26] For detailed analysis of these VAGO findings and underspend on public housing asset management, see *RRR: Ascot Vale Feasibility Study and Design Proposal.*[27]

Then Minister for Housing, Richard Wynne described the South Yarra, Prahran, Port Melbourne (Barak Beacon) and Hampton East public housing sites due for demolition under the GLM2 as 'outdated public housing homes that were in really poor condition…you have got to concede they were shockers.'[28] The Minster further emphasised,

> *I mean, truly they were some of the worst old concrete public housing that probably you could ever imagine. They were well past their time.*[29]

In a Legislative Council discussion relating to the *Residential Tenancies, Housing and Social Services Regulation Amendment (Administration and Other Matters) Bill* 2022, one member highlighted the value of the GLM model in providing 'rebuilds' that were energy efficient, climate friendly and accessible. While no refurbishment feasibility study has been conducted (to our knowledge) of the GLM2 sites, the member reported

> *That is why we are rebuilding, because, guess what, when you renovate some of these old sites* ***you cannot make them truly climate friendly. You cannot make them energy efficient. You cannot retrofit.***
>
> *I have asked about this, because I know this has been put forward—and there are some unhealthy distortions that have been circulated, even in the media.* ***I think it is important to be really clear about the fact that some buildings just cannot be renovated to make them truly climate friendly and energy efficient and to provide accessibility.***[30] (Emphasis added)

[25] Victorian Auditor-General's Office, *Managing Victoria's Public Housing* (Victoria Auditor-General's Office, 2017). https://www.audit.vic.gov.au/report
[26] Ibid.
[27] *RRR: Ascot Vale Feasibility Study,* p.11.
[28] Public Accounts and Estimates Committee, *Inquiry into the 2022-23 Budget Estimates.* Available: https://new.parliament.vic.gov.au
[29] Ibid.
[30] Parliament of Victoria, Parliamentary Debates (Hansard), *Legislative Council: Fifty-Ninth Parliament First Session*. p.3251

This feasibility study identifies the overall value of retaining the existing Barak Bacon Estate, and how energy efficiency, thermal comfort and access can be delivered without demolition - and without the relocation of the community, and for a lower overall cost.

Front and rear photos of a block at Barak Beacon showing the blocks of flats to be in sound condition. The RRR proposal looks at minimal intervention to bring these flats up to contemporary standards. Photos by Ben Hosking

3. Barak Beacon Estate

3.1 History of Barak Beacon Estate

The Barak Beacon Estate site was previously storage sheds built by the United States Army during the second World War.[31] Post-war these sheds remained and were regarded as an eyesore as they sat empty for years, with any type of development being halted due to the land being reserved as the site for a possible rail link to the dock.

In the 1980s, the newly formed Ministry of Housing aimed to increase public housing stock through the development of government owned sites.[32] Barak Beacon was identified, and the land released for housing. Assisted by the City of Port Melbourne, the Barak Beacon housing estate was built in 1982 and consisted of 21 low rise concrete walk-ups with 89 dwellings.

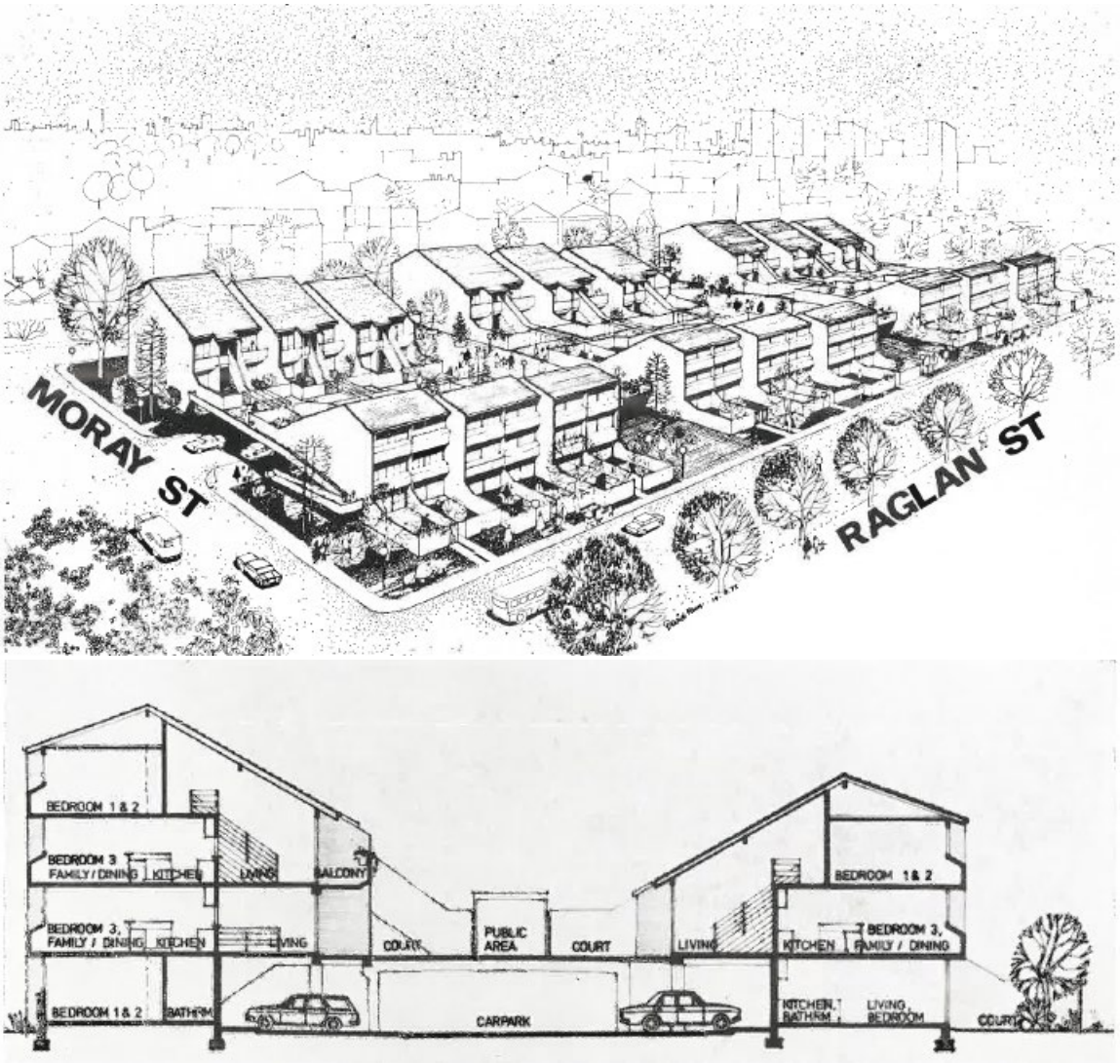
While there is limited information on the design for the Barak Beacon Estate, it is reminiscent of a number of estates being proposed by the Housing Commission as far back as 1970.[33] This unusual design can be seen as a direct reference to the internationally recognised housing estates being built in London at that time. These significant sites would have been visited during an overseas study tour in 1968 by the Housing Commission Architects.[34]

Alexandra Road Estate in Camden, designed in 1968, is representative of the exemplar public housing occurring in London at the time. Image from The Guardian: Aalmy

[31] Housing Innovation - Port Places
[32] VPARL1982-85No81.pdf (parliament.vic.gov.au) p 14
[33] The Housing Commission News July 1970 p 3
[34] The Housing Commission News December 1968 p 1

The first built proposal of the Barak Beacon *interlocking flat* design, deemed to be a 'new concept in medium density housing'[35] was the Raglan Street Terraces in South Melbourne in 1975. This design, which informed the architecture at Barak Beacon, received high praise from The Royal Australian Institute of Architects' Victorian Chapter; unanimously taking out the Bronze Award for housing.[36] Daryl Jackson, a prominent Melbourne architect and one of the jury members described,

> *We chose this project not just for what it actually is, but also for the overall concept. It's an attempt by the government to match its building programme with the desire and needs of the people.*[37]



Perspective sketch of the Raglan Street development illustrating the row house typology. The section demostrates the multilevel flats and the elevated public area above the car park. Images from The Housing Commission News 1973

[35] The Housing Commission News December 1973 page 1
[36] 4-volume-1-section-6-part-3-min.pdf (portphillip.vic.gov.au) page 332
[37] The Housing Commission News December 1973 page 1

The design for Raglan Street was developed further and deployed at Barak Beacon, using the advanced concrete technology implemented by the Homesglen Factory. This State owned concrete factory constructed most of the Housing Commission's prefabricated houses, towers and walk-ups during this period.

In contrast to the Raglan Street design, the Barak Beacon design prioritised large and open green spaces between the buildings rather than the elevated car parking structure built prior. With the Homeslgen Factory closing in 1979, and operations ceasing in December 1981, Barak Beacon Estate is one of the last public housing estates built by the factory, representing a significant moment for the history of Victorian public housing.

3.2 Big Housing Build, Barak Beacon Estate

Resident Announcement
Residents of the 89 properties at the Barak Beacon estate were informed on the 13th of December 2021 by Homes Victoria that the Estate was to be demolished and they would have to be relocated to alternative housing, with the option to return upon completion in 2025.[38]

In response to a question in Parliament about the Ground Lease Model program at Barak Beacon demolishing occupied and high-quality housing, the Minster explained:

> *At Barak Beacon, Homes Victoria will replace the 89 existing properties with a minimum 10 per cent increase in the number of modern, energy-efficient, and accessible social housing dwellings.*
>
> *The new homes will ensure that more Victorians including people with reduced mobility and people with disabilities can live in social housing at this well-located site in Port Melbourne close to transport, services and jobs. New energy efficient homes will provide savings to residents and ensure they are warmer in winter and cooler in summer. All residents temporarily relocated for the redevelopment will have the priority right to return on tenancy management conditions consistent with public housing once the project is completed.*[39]

[38] They lived in Melbourne public housing for decades; they learned it would be demolished without warning, The Guardian by Stephanie Convery, 28 August 2022
[39] Parliament of Victoria, Questions Without Notice No 574, 18 August 2022. https://parliament.vic.gov.au/publication-research/questions-database/details/53/18189

Dwelling Numbers

An expression of interest (EOI) was officially released by Homes Victoria on the 3rd of June 2022, outlining the packaging up of four estates; Prahran, South Yarra, Hampton East and Port Melbourne (Barak Beacon). The EOI outlined the project rationale, framework and governance structures of the GLM as well as specifics of each site.[40]

The EOI states that the buildings must be in operation by 2025 with construction to commence 'Q4 2023' - noting that the Government is to handover the site cleared of existing buildings, structures, footings and services.[41] As such, we estimate demolition to begin mid 2023.

While the number of units per estate is not defined, it is noted that there will be 1200-1400 new dwellings across the four sites (the EOI outlines that the selected Project Co can assist to determine the final dwelling numbers, based on commercial and design considerations).

The new dwellings will include a minimum 10 percent increase in social housing dwellings, with the rest a mix of affordable, market rental housing dwellings and Specialist Disability Accommodation (SDA).[42]

As we are unable to locate the specific proposed dwelling numbers, for the purpose of this study we have calculated the number of dwellings per site based on the area as demonstrated in Table 5:

Table 5: Dwellings per site of the GLM2 based on area

Estate	Area M2	Proposed Dwellings
Barak Beacon (Port Melbourne)	20,950	350
South Yarra	25,000	422
Prahran	5,800	99
Hampton East	31,500	529
Total	83,250	1400

Based on these calculations we estimate a total of 350 dwellings will be proposed for Barack Beacon Estate under the GLM2 with 98 being social housing and the remaining a mix of affordable, market rental and SDA with the percentage of this provision remaining unclear. As highlighted in the RRR: Ascot Vale study, a common occurrence in PHRP estate renewal delivery has been a reduction in

[40] Ground Lease Model -South Yarra, Prahran, Hampton East and Port Melbourne- Expression of Interest, June 2022
[41] Ibid, p. 24.
[42] Ibid, p. 24.

overall room numbers through the social housing increase of 10%. As demonstrated by Kelly et al, the 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.[43]

Costings

While official costs are not publicly available, Table 6 and Table 7 outline the key redevelopment costs associated with the proposed demolition, resident relocation and rebuild of Barak Beacon Estate using the 350 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 1, where uncertain, we have applied the most conservative cost projections. The rationale for each costing is also outlined in Appendix 1, and the method has previously been peer reviewed by SGS Economics and Planning.

Table 6: GLM2 new construction costs for 350 dwellings.

GLM Barak Beacon Construction Costs	
Total Building Costs (including demolition)	$95,601,500
Contingencies	$9,404,650
Total Construction Cost (350 dwellings)	**$105,006,150**

Table 7:GLM2 relocation costs for 89 dwellings

GLM Barak Beacon Relocation Costs	
Existing Resident Relocation Costs*	$14,618,250
Relocation Managerial Costs*	$1,575,092
Total Relocation Costs (89 dwellings)	**$16,193,342**

*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 2 for a spreadsheet of the costs per day multiplied by the number of units and the projected minimum relocation period.

[43] Kelly, D., et al., *Shh! Don't mention the public housing shortage. But no serious action on homelessness can ignore it.* (Victoria, The Conversation, 2019). https://theconversation.com/shh-dont-mention-the-public-housing-shortage-but-no-serious-action-on-homelessness-can-ignore-it-124875

As outlined in Table 8 the full costs for demolition, relocation and construction of the 350 new private and community housing using the GLM is calculated at $121,199,492.

Table 8:GLM Barak Beacon total construction and relocation costs

GLM Barak Beacon Construction and Relocation Costs	
Total Construction Costs	$105,006,150
Total Relocation Costs	$16,193,342
Total Costs exc Fees	$121,199,492

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 4.3, 4.4 and 4.5, this feasibility study introduces previously uncaptured value loss and project costs relating to social impact.

4.Retain, Repair, Reinvest: Barak Beacon

This report examines the feasibility of applying the Retain Repair Reinvest strategy to the Barak Beacon Estate.

The entire Barak Beacon Estate will be redeveloped over the next 3 years, with walk-up apartments slated for demolition. In addition to the broad rationale (outlined in Section 3.1) for the GLM, the Barak Beacon renewal was identified as essential due to the age and condition of the walk-up buildings.

While there is no clear reasoning why Barak Beacon Estate is being demolished, we have assumed, as outlined by the DHHS in other housing renewal projects, additional site-specific reasons for the renewal could include:

- The lack of lifts
- In-accessibility of buildings for people with mobility issues
- Age of building means they are difficult to maintain
- Uncomfortable in very hot or cold weather
- Not environmentally sustainable

It is unclear if an approach of upgrading or renovating the Barak Beacon was ever evaluated, despite the belief that age and condition of the flats meant upgrading was not possible.

Section 5.2 identifies how the Retain, Repair, Reinvest model can deliver against all of the above GLM objectives, while also providing improved economic, social, and environmental outcomes.

4.1 Resident Feedback

The design for the Retain, Repair, Reinvest proposal is also informed by resident feedback. The research team held two consultations and one presentation of initial design strategies with residents to discuss the research proposal, and gain insights regarding resident sentiments about living on the Estate. Residents responded to questions regarding:

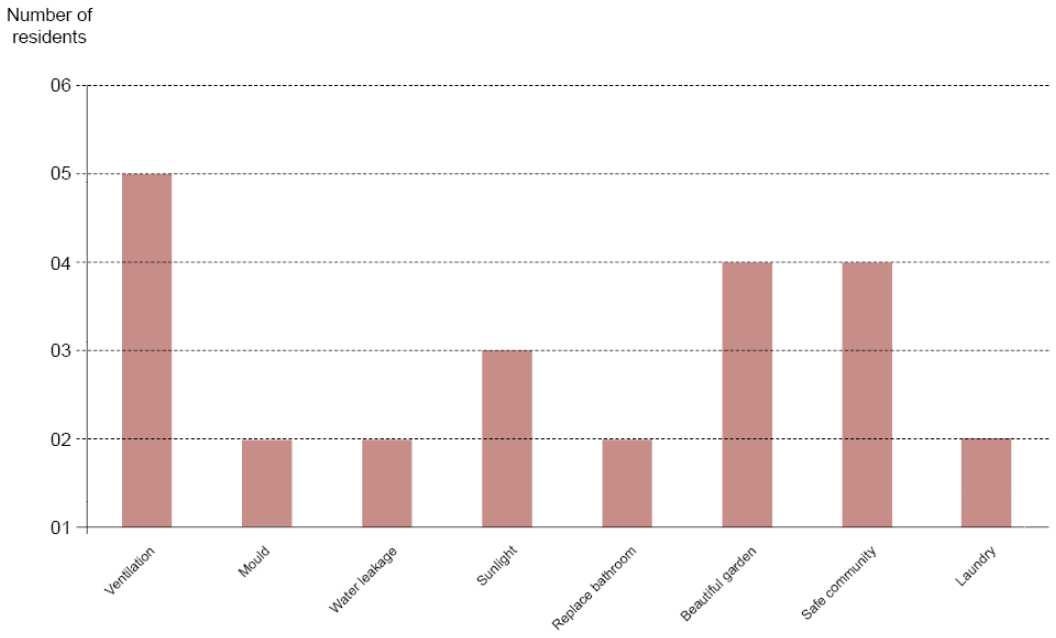
- If residents wished to remain at the site
- What worked well about the Estate? What do residents value about living on the Estate, and what could be improved?

With evictions already occurring on the site, beginning from the start of the year, it is estimated that 60% of the Estate was already vacated before we became involved. Due to this community loss and the understandable hopelessness felt by residents surrounding the impending demolition the team's opportunity for greater consultation was limited.

Across the two sessions, 6 residents provided written feedback of their experiences living at the Estate.

- Overall, 100% (6/6) of interviewed residents expressed a strong desire to remain on the Estate.
- All residents noted that it was the sense of community and vicinity of services that was valued the most.
- For the majority of residents the lack of maintenance to their flats was of greatest concern.

Items Barak Beacon Residents reported needed to be improved.



Full analysis of the resident feedback from these engagement sessions is provided in Appendix 5. Resident feedback also included resident reflections on the design, layout and functionality of their flats, which has been incorporated into the design response, as outlined in Section 5.3.

4.2 Social impact of relocation

There has been no publicly available social impact analysis conducted to measure the potential impact of the demolition, relocation and rebuild of the Barak Beacon 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 GLM2 model at Barak Beacon.

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.'[44]

For further discussion of the impact of relocation during estate renewal, see the RRR: Ascot Vale report.

Impacts of Relocation

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.'[45]

While it is difficult to quantify the full 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 9 highlights the cost of relocating residents, based on detrimental health outcomes and the interruption of education.

Table 9: Health and Education costs of relocation costs at Barak Beacon under GLM2

GLM Barak Beacon Social Costs (89 Dwellings)	
Health Cost (200 people)	$238,656
Education Cost (120 children)	$674,800
Total Social Costs	**$913,456**

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

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

5. Retain, Repair, Reinvest Design Proposal for Barak Beacon

A feasibility study has been conducted into the refurbishment of all existing buildings and proposed infill housing on the site.

The feasibility study contains:

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

5.1 Existing Buildings at Barak Beacon

The Barak Beacon Estate consists of 21 walk-up blocks which are repeated variations of the same design - including two, three and four-storey buildings. They are all precast concrete with an interlocking flat design, giving the majority of units multiple levels and dual frontages.

While this is an innovative design, it excludes residents with mobility issues due to the internal stairs. All the flats are fully self-contained with no shared facilities except for external communal spaces around the Estate. There are a mixture of two bedroom (72m2) and three bedroom (100m2) flats all with either a private yard or balcony. Most flats have a north facing orientation with cross ventilation and are accessed via an external staircase.

Site plan showing the breakdown of block types across the Estate. Image by OFFICE

5.2 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 carbon emissions,
Reinvest savings to improve comfort and upgrade public housing.

The Retain Repair Reinvest design proposal is to bring the existing housing blocks up to contemporary standards of living — in line with BHB objectives and environmental standards — while retaining the local residents. This is achieved through the staging of new works with the refurbishment of the existing building.

The design has been informed by;

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

Table 10 provides an overview of how the RRR: Barak Beacon proposal meets all of the environmental, liveability and access objectives of the BHB and GLM.

Table 10: RRR Feasibility study addressing key rationale for BHB and GLM

BHB & GLM objectives	Synopsis of Proposed RRR Response
Lack of lifts	The retrofitting of new stairs, external walkways and lift will make all refurbished flats accessible.
Liveable Housing Design Guidelines (LHDG) Gold Level for 1- and 2-bedroom social housing dwellings and Silver Level LHDG for 3- and 4-bedroom social housing dwellings	Silver Level is able to be achieved in all refurbished dwellings with Gold Level being supplied in the new infill.
Minimum standard of NatHERS 6 Stars with a 7-star average (social housing dwellings) and Green Star 5 Stars (all 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 5 star Green Star rating and 8 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 GLM2 of 350 dwellings
Meeting Better Apartment Design Standards	This design proposal for renovating the existing building meets all aspects of the Better Apartment Design Standards. (See Appendix 4 for full details)
Redevelopment will include 1,2 and 3 bedroom homes, responding to the changing needs of Victorian households	The refurbishment and infill will have a range of 1,2 and 3 bedroom dwellings.
5% of new community housing dwellings will be easy to access for Victorians with disabilities	20% of the block's flats will be SDA dwellings.
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.	25% increase in public housing achieved just through refurbishment.

5.3 Community Design Consultation

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

Across two sessions, 6 residents provided written feedback on their flats. Overall, 100% (6/6) of participating residents expressed a strong desire to remain living in their flat, and did not want to be relocated.

Residents identified a number of key features that work well within the current design of their flat:

- The size of the rooms.
- Natural light and big windows to the flat.
- The gardens and balconies

There were a number of items that residents reported needing to be improved:

- Replace Bathroom and Laundry

- Access
- Better storage
- Ventilation
- Accessible shower
- Both heating and cooling

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

- All glazed windows and doors to be replaced with double glazed units to achieve passive heating and cooling efficiencies. New security hardware will be also installed on all operable units.
- Insulation and new internal wall added to provide increased thermal comfort.
- All joinery within the kitchen and wet areas will be removed and replaced.
- A lift will be provided.

5.4 Structural Assessment

Due to the construction type, condition and age of the existing buildings a structural assessment was deemed unnecessary. There are no visible signs of damage and sufficient evidence to suggest that the external walls, footings and roofs are in good condition.

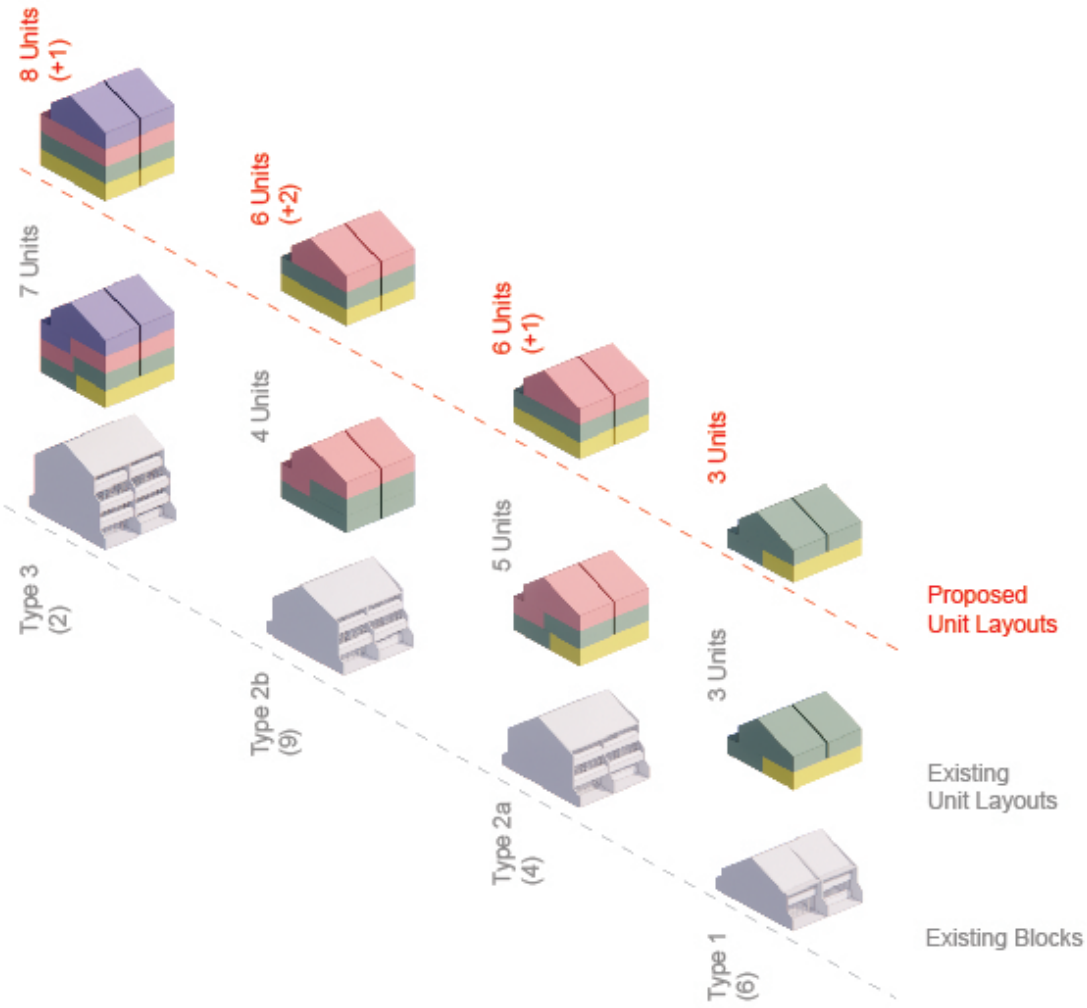
5.5 Architectural Design

Refurbishment
The design of the refurbished public housing incorporates feedback from the current Estate residents as well as addressing the BHB objectives. The architectural intent is to respect the existing buildings, while incorporating a range of simple design solutions to bring them up to contemporary standards. Due to the high-quality design and build, and the structural integrity of the dwellings - the refurbishment requires minimal large-scale interventions,

Key elements of the design are:

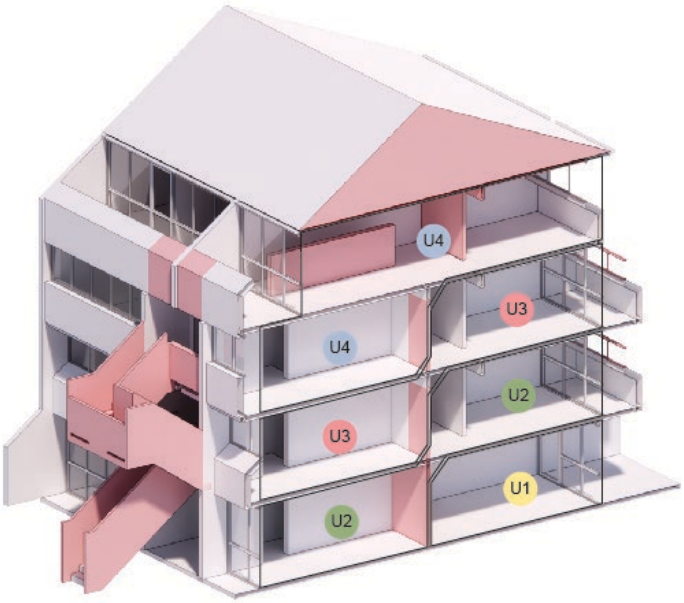
- The incorporation of new lifts, stairs and external circulation
- The conversion of multilevel flats to single level
- The widening of doors to make key flats wheelchair accessible
- Heating and cooling upgrades

Internally there are minimal interventions made, as the flats are converted into single floor types with the existing stairs built out rather than demolished: leaving open the possibility to reconnect to floors internally in the future. The horizontal flat on ground is reorientated to achieve cross ventilation and through this reconfiguring an increase of the total number of flats from 89 to 112 (+25%) can be achieved.

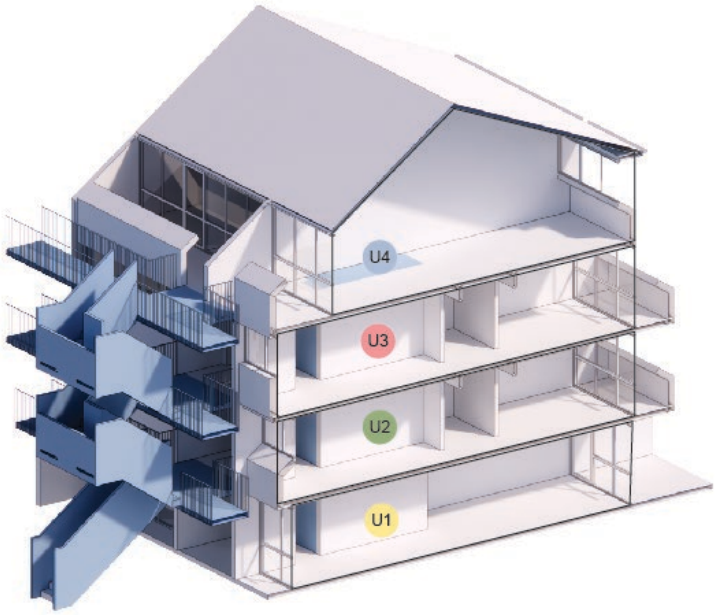


All wet areas, kitchens and joinery are replaced. New carpet in the bedrooms and polished concrete floor in the living areas and kitchen. Windows and doors are replaced with double glazed units, photovoltaic cells and water harvesting retrofitted achieving high energy efficiency targets.

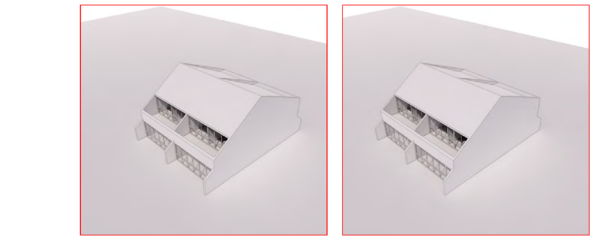
Externally, the key design intervention is the inclusion of new stairs and external walkway. This is due to the conversion of multilevel flats to single level, which requires access to each storey. The walkway will be pulled away from the facade to allow light penetration to the lower levels, as the new stairs reference the original brutalist design and key feature of the site. These walkways will link to the proposed infill buildings and vertical circulation such as lifts and stairs.



Sectional view of the existing block with multilevel flats. The red denotes extent of demolition works. Image by OFFICE

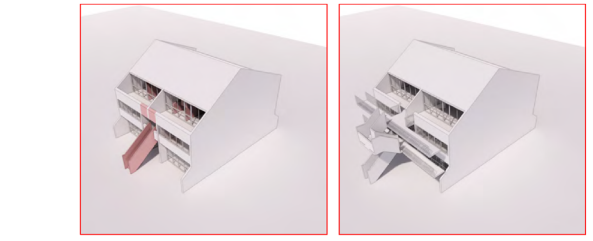


Sectional view of the proposed block with single level flats. The blue denotes the proposed works and external stair and walkway. Image by OFFICE

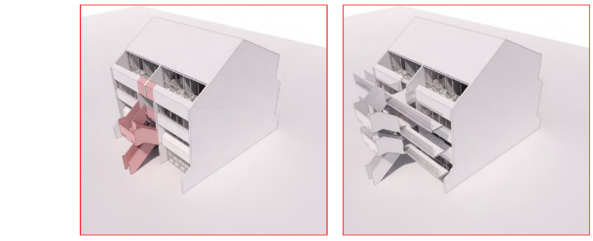


BARAK BEACON ESTATE, PORT MELBOURNE

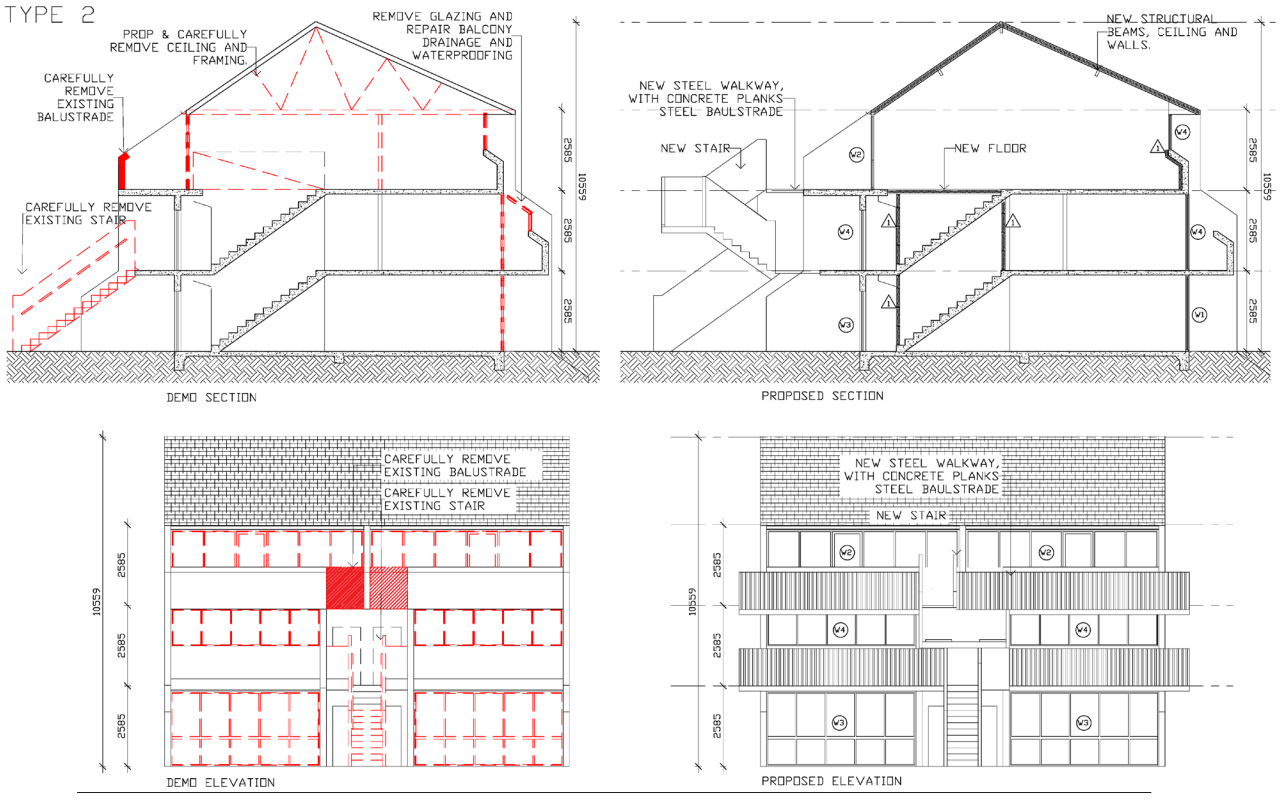
A00	COVER PAGE	NTS
A01	SITEPLAN	NTS
A02	TYPE 1 - DEMO	1:100
A03	TYPE 1 - PROPOSED	1:100
A04	TYPE 1 - ELEVATION/SECTION	1:100



A05	TYPE 2 - DEMO GF/1F	1:100
A06	TYPE 2 - DEMO 2F	1:100
A07	TYPE 2 - PROPOSED GF/1F	1:100
A08	TYPE 2 - PROPOSED 2F	1:100
A09	TYPE 2 - ELEVATION/SECTION	1:100

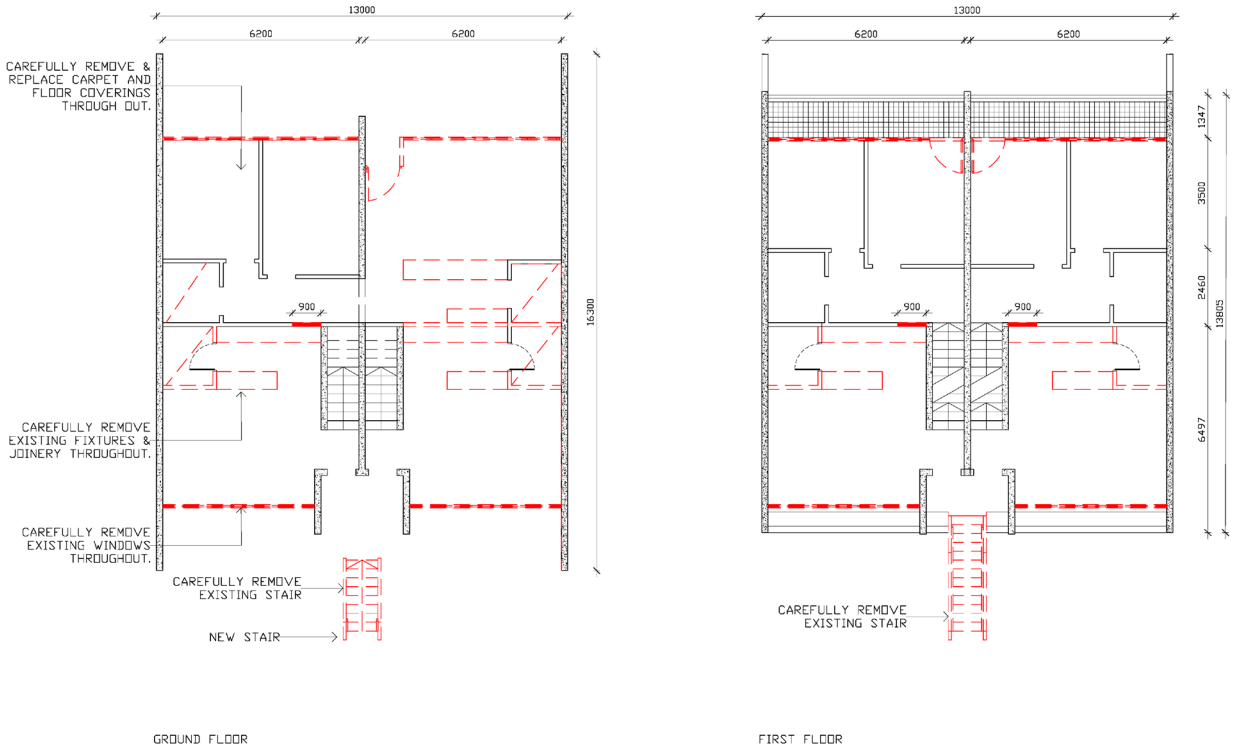


A10	TYPE 3 - DEMO GF/1F	1:100
A11	TYPE 3 - DEMO 2F	1:100
A12	TYPE 3 - PROPOSED GF/1F	1:100
A13	TYPE 3 - PROPOSED 2F	1:100
A14	TYPE 3 - ELEVATION	1:100
A15	TYPE 3 - SECTION	1:100
A16	SDA DESIGN - DEMO & PROPOSED	1:100

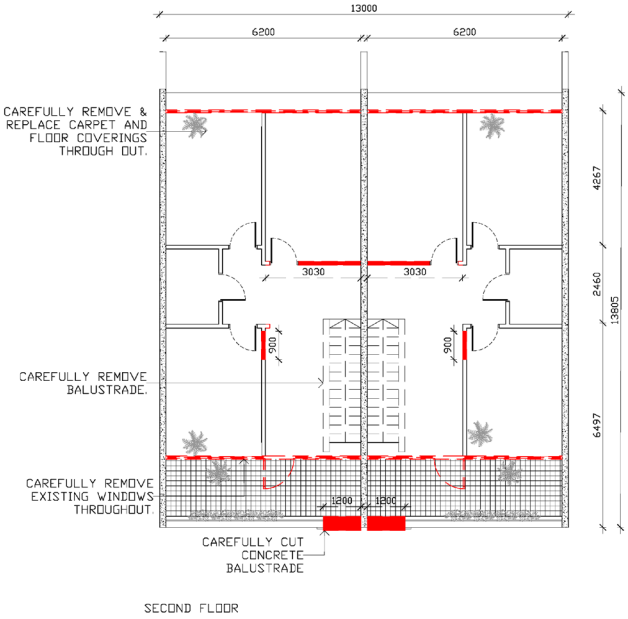


RRR Barak Beacon Type 2a – Demolition and Proposed Sections

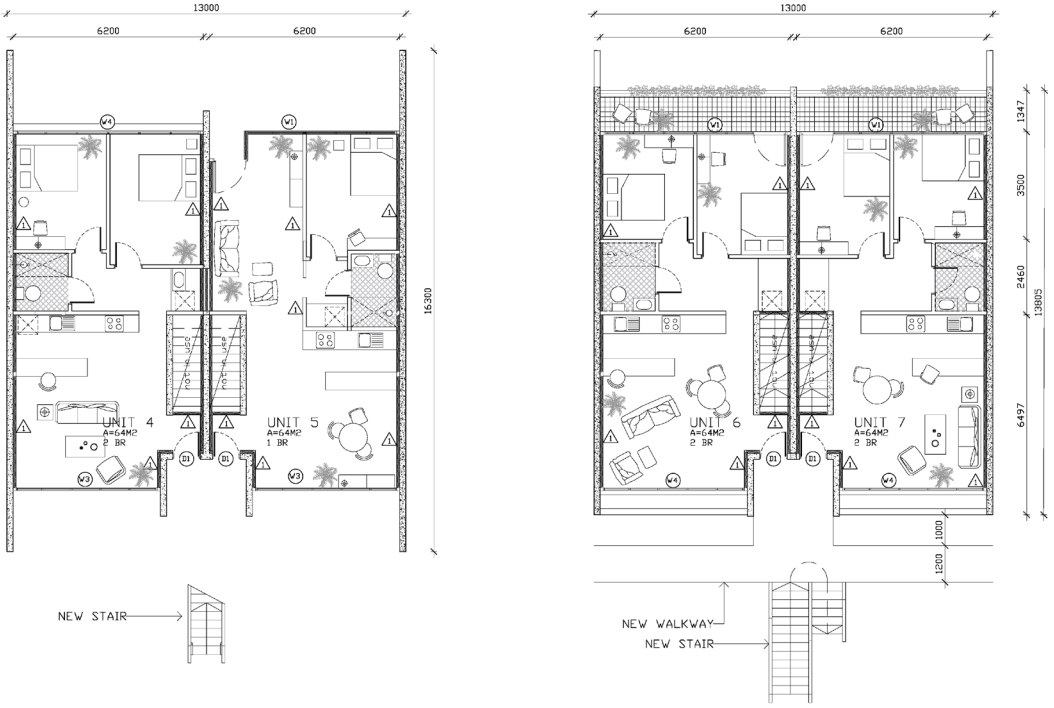
TYPE 2



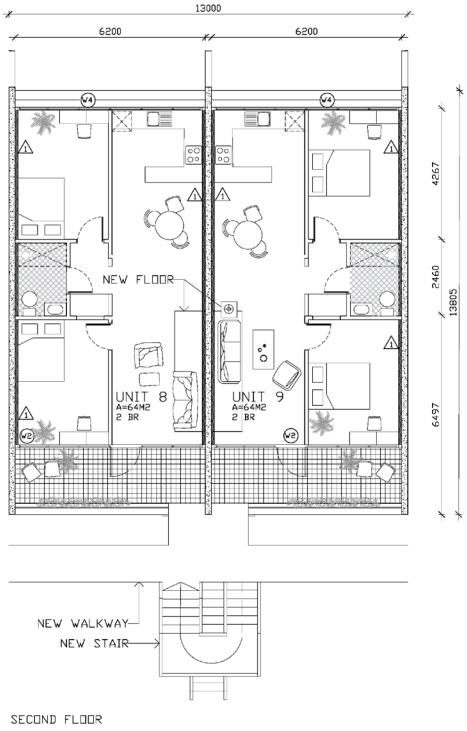
RRR Barak Beacon Type 2a – Demolition Ground and First Floor



RRR Barak Beacon Type 2a – Demolition Second Floor



RRR Barak Beacon Type 2a – Proposed Ground and First Floor



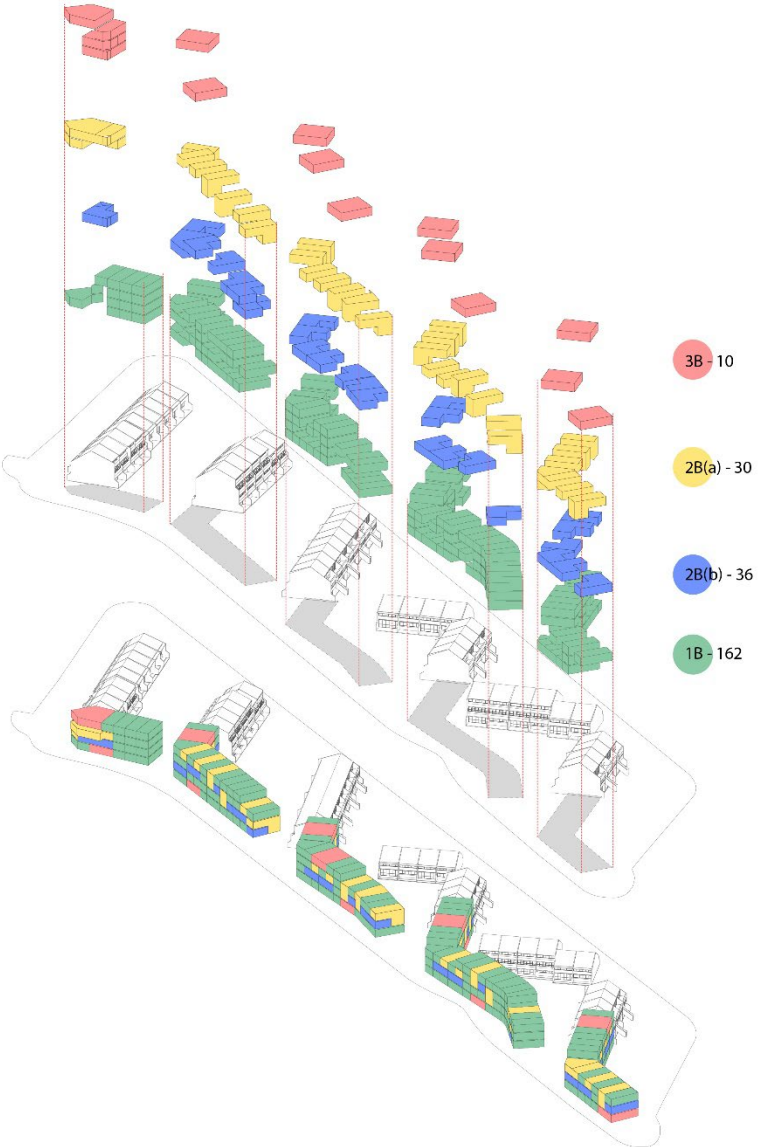
RRR Barak Beacon Type 2a – Proposed Second Floor

Infill

The architectural intent for the proposed infill housing is to integrate the new dwellings into the existing condition, in respect to the 1980s buildings and neighbourhood development.

By utilising the row house typology we propose that the new dwellings extend from the existing buildings on the eastern side of the site, protecting the northerly aspect of the existing flats and open space to the north west of the Estate.

The proposed dwellings will retain the 4 storey height limit with a combination of three and four storey block types. The proposed infill will consist of 238 dwellings in a variety of one (162) , two (66) and three (10) bedroom flats with an allocation of SDA dwellings as well as key community facilities on ground.



The vertical circulation of the new build will connect into the external walkways of the refurbishment, providing access to the majority of existing flats. In responding to the differing ceiling heights of the existing and new build a multi doored lift will provide access to the 2.6m and the 2.9m levels.

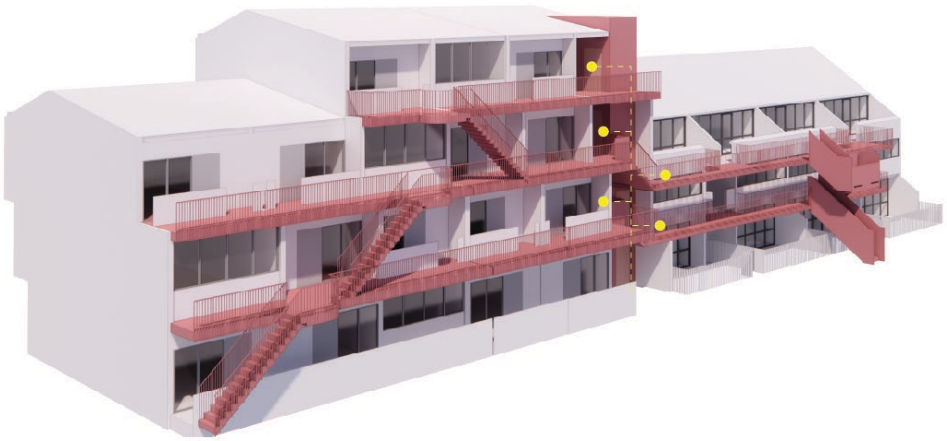


Image showing the connection of walkways and lift between proposed and existing. Image by OFFICE

In referencing the prefabricated material exploration of the HomesIgen Factory, the State owned concrete factory that built most of the Housing Commission homes including Barak Beacon, it is proposed that this new infill be constructed out of prefabricated cross laminated timber panels (CLT). These structural CLT panels are able to be prefabricated off site and easily assembled, saving on construction time and costs. There are also the environmental benefits of sustainably sourcing this material which is detailed further in Section 5.9.

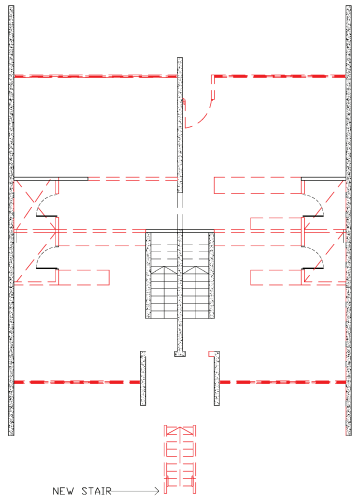
A higher m^2 construction cost rate has been applied to the RRR infill than the GLM2 proposal due to its better build quality and sensitive design. Refer to Section 5.10

5.6 Access

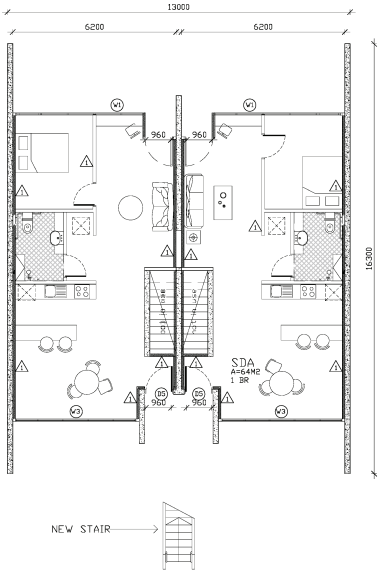
Access to the refurbished flats will be achieved with the installation of a lift connecting the proposed infill housing to the existing dwellings. Each level will be accessed by external walkways making the majority of existing flats accessible.

Two SDA dwellings can be located on the ground floor of each block depending on need. Doorways will be widened, joinery designed to suit accessibility needs and wet room design meeting the building code.

SDA Design



GROUND FLOOR DEMO



GROUND FLOOR PROPOSED

5.7 Environmental and Sustainability Upgrades

A NatHERS thermal assessment report was prepared for the existing buildings at Barak Beacon Estate by Makao Sustainability and ESD engineering. This report demonstrates how the refurbishment achieves an average 8 Star NatHERS Rating and a 5 Star Green Star rating. See Appendix 7.

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

- A 8 Star NatHERS energy rating meeting ‘Exceptional Performance’ star target.
- A minimum 29% reduction in demand for resources (energy and water) by future building occupants
- 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.

View of the refurbishment of Barack Beacon with photovoltaic cells retrofitted to the north oriented rooftops. Image by OFFICE

Passive energy strategies have been incorporated through the reorientation of flats to achieve cross ventilation, 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 electric heater while passive cooling will use ceiling fans, and operable windows for cross ventilation.

A thermal performance assessment was conducted on the heating and cooling loads of the proposed design. This proposed design scored an average 8 star rating outperforming the objectives of the BHB, with some refurbished units achieving 8.8. It was also noted that a total energy saving of 29% could be achieved with the new refurbishment.

Internal view of a refurbished flat with double glazed operable windows, ceiling fan and new insulated internal walls. Image by OFFICE

Rainwater harvesting will be captured from the roof into 6000L water tanks. This water will be reused in the toilets, laundries and irrigation. Additionally, this captured water is able to 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.

The proposed RRR refurbishment and infill with retention of communal open spaces between buildings. Image by OFFICE

5.8 Landscape Architecture

The landscape mirrors the architectural response in being founded in a respect for the existing qualities of the Estate. The design focuses on the retention of mature trees and the neighbourhood scale of the communal open space. The orientation of the proposed buildings allows for light to the communal and private space and sets up a range of climatic conditions, allowing occupation of the communal and private spaces throughout the year.

11,310m^2 of communal open space is provided on the ground plane, serving the Barak Beacon community and the wider neighbourhood; this provision is 45 times the 250m^2 requirement set out in the Better Apartment Standards. The landscape architectural response meets all the Better Apartment Guidelines (see Appendix 4).

The landscape strategy retains 60% of the mature trees on site, while ensuring that underground car parking is located underneath proposed buildings. It also retains 85% of the communal open space as deep soil areas, allowing for healthier trees and vegetation providing adequate growing room for larger trees between buildings, and reduction of urban heat island effect, supporting the passive energy strategies throughout the buildings.

The planting and material selection creates a low cost, low maintenance and high-quality landscape. Low ongoing maintenance 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. The planting design allows for the vertical layering of native vegetation which will greatly increasing 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 site plan for Barak Beacon Estate showing the retention of 60% of open space. Image by OFFICE

214 car parks have been provided predominantly underground, with some carparking being retained at grade to allow for easy pick/drop off zones for residents. Underground car parking is consolidated into three locations to free up the ground plane and minimise crossovers, while also ensuring that the majority of the site has deep soil for vegetation.

The landscape approach retains the character of the Barak Beacon estate through the retention of significant mature trees, and the neighbourhood scale of the existing buildings.

While respecting the character of the site, the new design provides an increased amenity, retention of informal surveillance, and passive cooling through increased vegetation, while still being a minimal intervention that is respectful of the character of the Estate and neighbourhood more broadly.

5.9 Life Cycle Assessment

A life cycle assessment between refurbishment/infill and demolition/rebuild was conducted. By comparing the refurbishment and infill works at Barak Beacon with the demolition and rebuilding of units to an equivalent density of the GLM1 model a 54% saving of total embodied energy could be achieved from refurbishment. The global warming potential would be reduced by 46% and land use reduced by 273% For summaries of the life cycle assessment see Appendix 11.

Table 11: Life cycle assessment outcomes

Life Cycle Assessment	Global Warming* Potential (kg CO eq)	Embodied Energy** (MJ NCV)	Land Use*** (m^2 .year arable)
GLM2 (Demolition & Rebuild)	15,086,511	168,155,294	20,783,853
RRR (Refurbishment % infill	10,345,154	109,375,278	5,572,979
Reduction achieved by RRR	**4,741,357 (46%)**	**58,780,016 (54%)**	**15,210,874 (273%)**

**Global warming is caused by an increase of greenhouse gasses in the earth's atmosphere. Global Warming Potential is expressed in equivalent greenhouse gasses released, measure in kgCO2e.*

***Embodied Energy is a measure of the primary energy content of non-renewable energy sources including the energy required to extract, process, and deliver the non-renewable fuels, or manufacture, transport and/or install and maintain a renewable generator.*

****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.*

5.10 Costings

A detailed cost plan was prepared for the proposed refurbishment of the three types of blocks at Barak Beacon by Melbourne Quantity Surveyors. The cost plan itemises the construction costs for all works to be carried out within the refurbishment of each block. For costing details see Appendix 8.

As outlined in Table 12 the existing public housing could be refurbished and brought up to BHB environmental and apartment standards, without displacing communities or demolishing – for the cost of $175,482 per dwelling.

Table 12: RRR: Barak Beacon refurbishment costs

RRR Barak Beacon Refurbishment Costs	
Total Building Costs	$17,688,600
Contingencies	$1,965,400
Total Construction Costs exc fees	**$19,654,000**
Cost per dwelling to refurbish	**$175,482**

As outlined in Section 2.1, the renovation of the existing public housing buildings identified as in need of upgrading as part of the BHB (9 previously under the PHRP) was deemed unviable due to a projected cost of $200,000 per dwelling. This feasibility study has highlighted the need for each Estate to be separately assessed, and for the costs of renovation to be considered against the full costs of demolition, relocation and rebuild.

For the proposed infill we have taken a high construction rate of $4,500/m2 due to the design and material selection. This is in accordance with the construction type and site condition at Barak Beacon.

Table 13" RRR: Barak Beacon proposed infill costs

RRR Barak Beacon Proposed Infill Costs	
Total Building Costs	$71,130,000
Contingencies	$7,113,000
Total Construction Costs (excluding fees)	$78,243,000

In combining the cost of refurbishment and infill the total construction cost for RRR: Barak Beacon is $97,897,000.

Table 14: RRR: Barak Beacon construction costs

RRR Barak Beacon Construction Costs	
Total Refurbishment Costs	$19,654,000
Total Proposed Infill Costs	$78,243,000
Total Construction Costs exc fees	**$97,897,000**

6. Comparative BHB and RRR Financial Findings

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

The below tables combine all of these values in financial terms, and compare the costs and benefits of the GLM2 and a Retain, Repair, Reinvest approach.

As outlined in Table 15, the total construction cost for the refurbishment and infill proposal of Barak Beacon is $97,897,000. When compared to Table 17, the total construction cost of the GLM, which includes the relocation costs of the existing tenants, it totals $121,199,492. Via a strategy of refurbishment we are able to achieve a saving of $23,302,492.

Table 15: RRR total construction costs

RRR Construction Costs	
RRR Refurb and Infill Construction Costs	$97,897,000

Table 16: GLM Barak Beacon total construction costs

GLM Construction Costs	
GLM Construction Costs	$105,006,150
Relocation Costs	$16,193,342
Total	**$121,199,492**

Table 17: GLM2 Barak Beacon total project costs

GLM Project Costs	
Construction Costs	$105,006,150
Relocation Costs	$16,193,342
Displacement Health Costs	$238,656
Displacement Education Costs	$674,800
Total Project Cost (350)	**$122,112,948**

Table 14 details a full breakdown of the costs associated with both the GLM2 approach and RRR Barak Beacon proposal.

Table 18: Comparison of costs between GLM2 approach and RRR: Barak Beacon proposal.

	GLM Barak Beacon	RRR: Barak Beacon Proposal
RETAIN		
Increasing social housing	The GLM project will replace 89 public housing dwellings with 98 community housing dwellings. This is an increase in 9 dwellings (10%)	Retain, Repair, Renew increases the number of public housing by 25% through refurbishment alone. 89 to 112 dwellings
External Relocation costs	The total relocation costs of existing tenants within the GLM project is estimated to be $16 million.	Relocation fees for RRR are $0 due to the staging of works. There would be a budget for a small removalist fee from relocating residents within the Estate during the new build and refurbishment. **The RRR strategy saves $16 million in State Government financing.**
Health and wellbeing cost	The cost to health and wellbeing is estimated at $238,656 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 at $674,800 for relocated residents.	By retaining the existing community, there are no educational impacts through relocation. **The RRR strategy has no educational impact cost.**
REPAIR		
Direct Financial Investment	The construction costs of the GLM development will be approximately $121,199,492.	Barak Beacon can be refurbished with new infill housing achieving the BHB environmental and apartments standards without displacing communities or demolishing buildings for $97,897,000 **The RRR refurbishment cost is therefore $23,302,492 less than the GLM.**
BHB Objectives (Lifts, Energy Efficiency, Accessibility)	Addressed through demolition, relocation and rebuild.	Addressed through refurbishment and infill. **The RRR refurbishment strategy can meet all BHB objectives, for a lower financial investment.**
Embodied Energy Comparison	The embodied energy to demolish and build the new housing is calculated at 168,155,294 MJ NVC.	The embodied energy of the refurbishment and infill proposal is 109,375,278 MJNVC. **The RRR model has an embodied energy saving of 54%.**
Increase Housing Numbers	The GLM will increase the number of dwellings on Barak Beacon Estate to 350.	**RRR will increase the dwelling numbers on Barak Beacon to 350.**
REINVEST		
Overall cost savings	The full costs for demolition, relocation and construction of the new community housing under the GLM is calculated at $121,199,492 .	The RRR strategy would see the Barak Beacon Estate refurbished and housing infill without displacing communities or demolishing buildings for $97,897,000 **Refurbishing and infill at the Barak Beacon Estate is financially viable, and savings could be invested into other public housing maintenance and building.**

7. Future of the Barak Beacon Estate

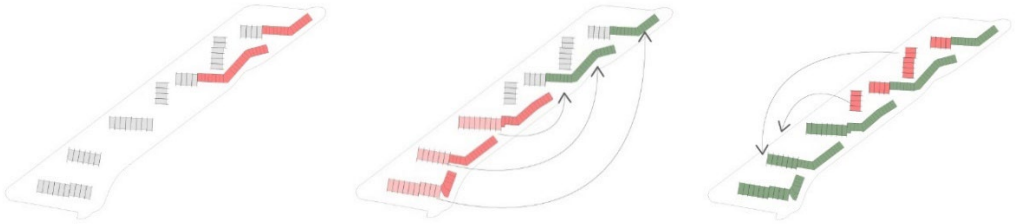
The renewal of the entire Barak Beacon Estate is planned over the next 3 years. A masterplan for the site is currently under development with final proposals due February 2023.[46] Demolition of the site is expected to begin mid 2023 with construction to start later that year.

The findings of this feasibility report into the refurbishment potential of Barak Beacon Estate show there is demonstrable capacity to undertake the proposed infill and refurbishment work within the same timeline without relocating tenants.

7.1 Staging of Refurbishments

Through the design of the new infill dwellings, the staging of works and sequenced decanting of occupied buildings it is proposed that Barak Beacon Estate could be incrementally redeveloped.

It is proposed that new works would start at the north of the site. Existing residents from the southern portion of the Estate would be moved into the finished apartments as their homes are refurbished and new works to the south of the site start. The remaining existing residents would then be moved into the finished southern apartments as the final existing dwellings are refurbished. All residents would have the choice to remain living in their newly renovated public housing or newly built community housing.



Staging of works demonstrating no existing resident would be relocated off the Estate. Image by OFFICE

This approach enables all residents to remain on the Estate during the construction and refurbishment, and avoids disruptions to schooling, work, community groups and family. The associated costs of housing the relocated tenants are also minimised as private rental and external administration fees are no longer required as well as the associated social impact costs that come with relocation as identified in Section 4.3.

[46] Ground Lease Model -South Yarra, Prahran, Hampton East and Port Melbourne- Expression of Interest | June 2022 p 9

8. 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 the design team that this strategy be undertaken on other housing estates 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 BHB approach of demolition, this Retain, Repair, Reinvest strategy offers an alternative approach. By conducting publicly available feasibility studies into these sites significant social impact, heritage loss and environmental damage can be avoided.

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.

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

By making these findings public we hope that this study can be used to advocate for the retention of the existing public housing and the communities that inhabit them.

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
ESD Engineer - Makao Group
Quantity Surveyor - Melbourne Quantity Surveyor
Photography - Ben Hosking

Appendices

1. Total building costs of demolition and rebuild of Barak Beacon under the Ground Lease Model

The total construction costs for GLM2 Barak Beacon have been calculated using area calculations from the EOI Tender document as well as a $4000/m2 construction estimates. The breakdown of costs can be found below in Figure 5.

Figure 5. Total building costs of demolition and rebuild of Barak Beacon GLM

GLM Project Financial Cost						
		Qty	M2	Rate	Total	Notes
GLM Construction Costs						
	Demolition Existing Buildings					
	Type 1	6		45,000	$270,000	
	Type 2	13		75,000	$975,000	
	Type 3	2		155,000	$310,000	
	Total Demolition Costs				$1,555,000	
	Building Costs					
	New build (exc carparking)					
	1 bedrooms	238	55	$4,000	$52,360,000	
	2 bedrooms	94	70	$4,000	$26,320,000	
	3 bedrooms	18	90	$4,000	$6,480,000	
	Services, ciculation etc @10%	1	2,139	$3,500	$7,486,500	
	Underground carpark	1	350	$4,000	$1,400,000	
	Total Building Costs				$94,046,500	
	Design Contingency			5%	$4,702,325	
	Construction Constingency			5%	$4,702,325	
	Total Contingency				$9,404,650	
	Total Construction Costs				$105,006,150	

2. Resident relocation costs

The relocation costs for the previous tenants at Barak Beacon 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[47].

The length of time that the existing tenants will be relocated has been calculated at 1095 days. This is based on construction being completed late 2025.

The breakdown of costs can be found below in Figure 6.

Figure 6 Resident relocation costs

BB Relocation Costs					Relocation for period oct 2022 - late 2025 (caculated october) 1095 days	
	Relocation fee per dwelling @ $150/day * The proposed construction period will last for 1095 days, with 89 existing tenants requiring relocation.	1095 days x 89 dwellings = 97,455	$150	$14,618,250	Supreme Court Affidavit pg 24 states the $150/day relocation costs	
	Relocation Managerial Costs			$1,575,092	Supreme Court Affidavit pg 25 states the Relocation Managerial Fee as 1.5% of the construction costs.	
	Total Relocation Costs			$16,193,342		

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

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.[48] 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.[49]

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*[50] and *The Social Value of Community Housing in Australia.*[51]

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 7 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 MSSI (2017)	$19,000 Flatau (2020)	$6,182 MSSI (2017)	$4,236 ABS (2016)	Not relevant	Not relevant	No data found to support monetisation
Very low income household	$640 Net Balance (2010)	$47,220 Flatau (2020)	No data found to support monetisation	Not relevant	Not relevant	Not relevant	No data found to support monetisation
Low income household	$1,872 Net Balance (2018)	$19,000 Flatau (2020)	No data found to support monetisation	$17,784 Ravi and Reinharr (2010)	$8,199 SGS (2021)	$3,016 Ravi and Reinharr (2010)	No data found to support monetisation

[48] Witte, E. 'The case for investing in last resort housing', *MSSI Issues Paper No. 10*, (Melbourne, Melbourne Sustainable Society Institute, The University of Melbourne, 2017).
[49] MacKenzie, D, et al., *The Cost of Youth Homelessness in Australia: Research Briefing* (Swinburne University Institute for Social Research, the University of Western Australia and Charles Sturt University, 2016). www.swinburne.edu.au/news/ latest-news/2016/04/the-cost-of-youth-homelessness-in-australia-.php.
[50] Flatau, P., et al., (2020). 'The drivers of high health and justice costs among a cohort young homeless people in Australia'. *Housing Studies*, (35)4, 648-678.
[51] Ravi, A., & Reinhardt, C. (2011). The Social Value of Community Housing in Australia. Melbourne: Net Balance.

Figure 8 SGS Analysis applied to Barak Beacon Estate residents

BB Project Economic Cost	*Relocation period 3 years						
		Qty	Rate	Impact	Years	Total	Notes
BB Displacment Health Costs							
	Health Cost-Saving Loss for 200 People on very low income	200	640	0.5	3	$192,000	
	Inflation 24.3% from 2010					$46,656	Inflation Calculator | RBA
	Total					$238,656	
		Qty	Rate	Impact	Years	Total	Notes
BB Displacment Education Costs							
	Education Cost-Saving Loss for 54 children. This is calculated on demographic studies of 1.6 children per family	120	3016	0.5	3	$542,880	
	Inflation 24.3% from 2010					$131,920	Inflation Calculator | RBA
	Total					$674,800	

4. Better Apartment Design Standards

The 2021 Apartment Design Guidelines for Victoria have been assessed by the design team with the proposal meeting all applicable areas as show in the attachments.

Apartment Design Guidelines for Victoria 2021		
Barak Beacon Estate, Port Melbourne		
Section	Title	Meet
1	Siting and Building Arrangement	
1.1	Establish building setbacks to respond to the existing or preferred urban context.	
1.2	Establish setbacks to adjacent buildings and uses to ensure adequate amenity.	
1.3	Establish the street frontage setback alignment of buildings to contribute to the character and amenity of the public realm	
1.4	Establish internal setbacks to achieve daylight, privacy and outlook objectives between dwellings within a site.	
1.5	In streets where buildings have zero side setback, such as in dense urban contexts, main streets or for podium forms within centres, continue the built form pattern.	N/A
1.6	Provide side setbacks in contexts where they contribute to the landscape character of the street.	
1.7	Typically, on narrow infill sites, minimise side setbacks and face habitable rooms towards the street and the rear of the site.	N/A
1.8	Where habitable spaces and balconies face towards side boundaries, increase side setbacks to allow access to daylight and outlook, while maintaining privacy.	N/A
1.9	Where contexts allow for buildings in landscaped areas, configure the building setbacks to retain existing mature trees and to accommodate deep soil areas.	
1.10	Ensure building setback is responsive to the adjoining building form and height to deliver adequate daylight, privacy and outlook for dwellings.	
1.11	Avoid use of lightwells as the primary source of daylight to a habitable room.	
1.12	Use building setbacks and the relationship between buildings on a site, as the primary method of limiting views into habitable room windows and private open spaces.	
1.13	• Creating oblique and controlled views such as bay windows. • Limiting lengths of facades that direct views towards the adjoining habitable rooms and private open spaces by shaping, staggering or realigning facades. • Using sill and balustrade heights and depths to limit direct views downwards. • Using pergola and shading devices to screen views to dwellings and private open spaces on lower levels.	
1.14	When habitable room windows and private open spaces in separate dwellings directly face each other, generally provide greater building separations than where one dwelling faces the side of another dwelling.	
1.15	Arrange building setbacks to control direct views into habitable room windows or private open spaces from public and communal spaces, other uses or dwellings.	
1.16	Use building setbacks to provide outlook and a visual connection from a dwelling to its context and allowing for visual relief.	
2	Communal Open Space	

Number of dwellings	Minimum area of landscaped communal outdoor open space	Minimum area of communal open space	Total minimum area of communal open space
10	30 square metres	nil	30 square metres
50	30 square metres	95 square metres (38 x 2.5 metres)	125 square metres
100	30 square metres	220 square metres (88 x 2.5 metres)	250 square metres

2.1	Use the urban context report to identify locations for the communal open space which can achieve adequate amenity and is responsive to existing uses of adjacent sites.	
2.2	Provide communal open space that is usable throughout the year and in a range of weather conditions.	
2.3	Provide lighting in communal open space to support safe movement and evening use.	
2.4	Provide clear delineation of public, communal and private open spaces to encourage access and use by all residents.	
2.5	Layout the communal open spaces to be usable with easy access for cleaning and maintenance.	
2.6	Integrate communal open space with internal common areas, where provided, to promote better use of both spaces.	
2.7	Integrate landscaping into communal open space to improve the outlook into and from the communal open space.	
2.8	Layout the communal open space to minimise the visual and noise impacts of building services.	
2.9	Layout communal open space to create informal surveillance opportunities within the development and from adjoining buildings.	
3	solar access to communal outdoor open space	
3.1	Locate communal open space in areas that will have minimal overshadowing from surrounding buildings.	
3.2	When locating communal open space to achieve winter sun, also select the location to provide usability and amenity.	
4	Landscaping	
4.1	Retain significant vegetation where appropriate.	
4.2	Select and locate evergreen and deciduous trees to optimise winter sunlight and summer shading of surrounding dwellings to encourage passive cooling opportunities.	
4.3	Locate and size appropriate canopy trees and other vegetation away from basements or other obstructions to allow for future growth to protect built structures.	
4.4	Consolidate deep soil areas where possible, to support healthier trees and provide adequate growing room for larger trees between buildings.	
4.5	Optimise urban heat reduction through integrating planting, stormwater management, water sensitive urban design and selection of surface materials.	
4.6	Where the deep soil standard cannot be met due to the urban context, alternative forms of landscaping should demonstrate equivalent canopy cover.	
5	Building Entry and Circulation	
5.1	Locate the main pedestrian entry to provide a sense of address by being clearly visible and accessible from the street.	
5.2	Provide clear sightlines from the foyer to the street so people can see both in and out when entering or leaving the building.	
5.3	Where ground floor dwellings face the street, individual entrances can assist in promoting a sense of personal address and activate the street.	
5.4	Separate the pedestrian and vehicle entries to the buildings.	
5.5	Provide shelter and waiting space on the street at pedestrian entries to buildings.	
5.6	Provide mail boxes and parcel post facilities close to the building entries in a well-lit and weather protected area, with potential for informal surveillance.	
5.7	Locate and arrange utility service installations to minimise their impact on the building's active street frontage.	
5.8	Provide appropriate access between street ground level and the entry lobby floor level for safe, functional and efficient movement.	
5.9	Design windows and openings in corridors to respond to the site context.	N/A
6	Building Performance	
6.1	If the development is not within a Noise Influence Area	
6.2	If the development is within a Noise Influence Area	
6.3	Ventilation - Meet the noise requirements through an acoustic report or a standard design treatment.	
7	Energy Efficiency	
7.1	Plan for energy efficiency of buildings and involve a specialist ESD consultant early in the design process to make energy efficient design integral to the building form and layout.	
7.2	Apply the cooling load caps for all apartments.	
7.3	Reduce building cooling loads through design and construction responses.	
8	Waste and Recycling	
8.1	Prepare a Waste Management Plan (WMP) that details how different waste streams (including hard waste) will be stored and collected in the development.	
8.2	Provide bins suitably sized to accommodate all categories of waste. Provide a waste room that is sufficiently sized to accommodate all bins.	
8.3	Provide dual waste and recycling chutes (or equivalent system) in taller buildings with openings on each floor to provide convenient access for residents.	
8.4	Design waste facilities to provide adequate drainage, noise and odour controls including provisions for a bin wash down area.	
9	integrated water and stormwater management	

	9.1	Reduce stormwater runoff from the lot to the minimum volume possible.		
	9.2	Apply principles of water sensitive urban design (WSUD) to reduce the volume of stormwater runoff and to improve the quality of stormwater.		
	9.3	The storm water drainage system should be designed so that any overflow during heavy rain periods is safely conveyed to the legal point of discharge (LPD) to protect public safety and property		
	9.4	Connect the apartment building to a reticulated recycled water supply (purple pipe) where available.		
	10	Section 3 - Dwelling Amenity		
	10.1	Demonstrate usability and functionality of room configurations by including furniture layouts with realistically scaled furniture and adequate circulation space.		
	10.1	Apartment layouts which propose irregularly shaped or atypical spaces, need to demonstrate functionality and usability of the design with realistically scaled furniture and circulation.		
	11	room depth		
	11.1	Increase the size and head height of windows to improve the daylight penetration into the depth of the room.		
	11.2	Allow for sufficient structural floor to floor heights to achieve required ceiling heights for the room depth.		
	11.3	Configure balconies to suit the orientation of the apartment and increase daylight while controlling sunlight.		
	12	windows		
	12.1	Design the window type, size, glazing selection, orientation and placement to respond to the site context and to optimise daylight.		
	12.2	Design windows and other openings to balance privacy with daylight and outlook.		
	12.3	Skylights may be used to contribute to daylight but should not provide the only source of daylight into a habitable room.		
	13	storage		
	13.1	Provide practical arrangement of storage appropriate to each space within the dwelling.		
	13.2	Long term storage provided externally to an apartment can be provided in basements and car parking areas, or in a common area convenient to the apartment.		
	14	natural ventilation		
	14.1	Configure floorplates with corner or through apartments to achieve effective cross ventilation.		
	14.2	Wherever possible, provide openable windows or doors into habitable rooms to achieve natural air flow.		
	14.3	Locate and design windows that are on different orientations of a dwelling to provide cross ventilation with optimal breeze paths.		
	14.4	An adequately sized operable roof light in a single aspect apartment may achieve cross ventilation where adequate air flow can be demonstrated by engineering analysis.		
	14.5	Demonstrate alternative effective ventilation solutions where cross ventilation is constrained, for example, by consistently high wind conditions or heritage or adaptive reuse of existing buildings.		
	15	private open space		
	15.1	Configure balconies to support other internal apartment amenity objectives.		
	15.2	For north- and south-facing apartments, run narrower balconies across the living area and bedroom to connect the indoor and outdoor spaces.		
	15.3	For taller buildings — where the urban context and site layout constrain provision of outdoor private open space (balconies) —provide extra space inside: in the living area or bedroom.	NA	
	15.4	Where the urban context and site layout constrain the provision of private openspace, compensate with increased areas of communal open space.		
	16	accessibility		
	16.1	Locate the main bedroom with convenient access to the adaptable bathroom.		
	16.2	Configure spaces to achieve clear access paths while allowing for functional furniture arrangements.		
	16.3	When providing an adaptable bathroom to meet either option A or option B make use of the typical configurations illustrated or demonstrate that the standard is met with an alternative layout.		
	16.4	When applying bathroom design option A, if the toilet cannot be located in the corner of the room, include a nib wall adjacent to the toilet	NA	

5. Resident Feedback

The research team held two consultations and one presentation of initial design strategies with residents to discuss the research proposal, and gain insights regarding resident sentiments about living on the Estate. Residents responded to questions regarding:

- If residents wished to remain at the site
- What worked well about the Estate? What do residents value about living on the estate, and what could be improved?

Across the two sessions, 6 residents provided written feedback of their experiences living at the Estate. This feedback also included resident reflections on the design, layout and functionality of their flats, which has been incorporated into the design response, as outlined in Section 5.3.

Value of the Estate
Overall, 100% (6/6) of participating residents expressed a strong desire to remain living at the Estate and did not want to be relocated.

The primary feature that residents valued about living on the Estate was the residing gardens and walkways that allow for social groups to occur within their existing communities. 2/6 respondents highlighted the Port Melbourne location as being close proximity to schools, doctors, shops – as well as easy to get into the city.

Other key features residents valued about the Estate included:

- Three participants highlighted the sense of community and connection as making the Estate feel like home
- Three residents valued the size of the dwellings within the Estate, and the large amounts of natural light that fill them
- Six residents valued the open green space within the Estate, and the grass and trees in the shared spaces

Other feedback from ‘what works well’ about living in the Port Melbourne Estate included

- Thermal quality of dwelling (3/6)
- The overall Estate design and layout (6/6)
- Feeling safe (3/6)

What could be improved

Residents that participated in the Retain, Repair, Reinvest community engagement sessions overwhelmingly highlighted delays or failures of maintenance as the worst thing about living on the estate. For 5/6 residents, a lack of maintenance and upkeep to the buildings was detrimental to their experience of living on the estate.

Comments included

> Cooling and heating; in winter upstairs is cold and in summer upstairs is hot.

Many of the residents' comments were about minor maintenance issues and this reflects broader reports of inadequate maintenance in Victorian Public Housing, as outlined in Section 2.2.

Other feedback about 'what doesn't work well' included

- Repeated mould in bathroom (2)
- Water leaking (1)
- Kitchen dark (1)

6. Liveable Housing Guidelines

The Liveable Housing Guidelines have been assessed by the design team with the dwellings with lift access meeting all applicable areas as show in the attachments,

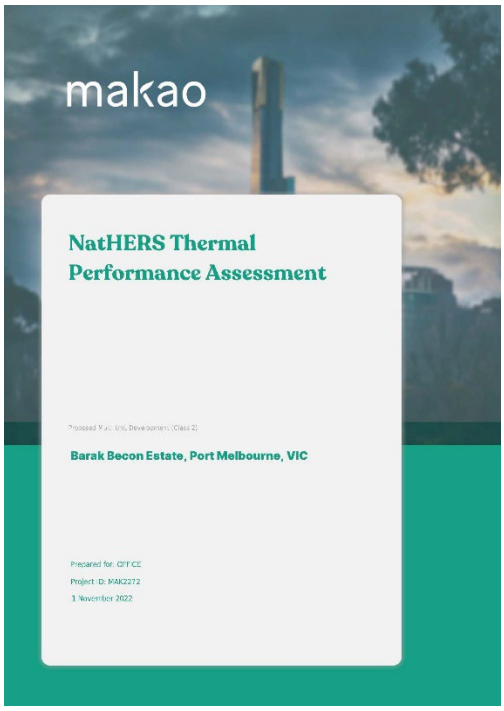
SLLHA_GuidelinesJuly2017FINAL4.pdf (livablehousingaustralia.org.au)

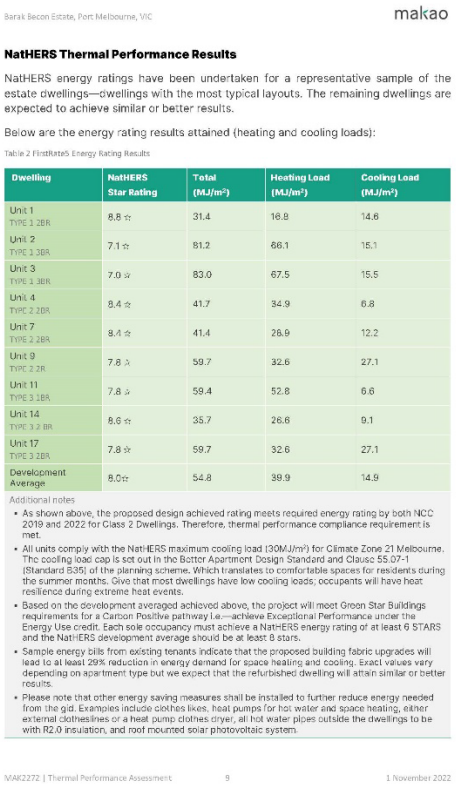
Liveable Housing Design Guidelines - Fourth Edition

	Achieved
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.	✓
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.	✓
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).	✓
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	NA
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.	NA
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	✓
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	✓
c. Where the threshold at the entrance exceeds 5mm and is less than 56mm, a ramped threshold may be provided (see Figure 1(b))	NA
d. The level (step-free) entrance should be connected to the safe and continuous pathway as specified in Element 1.	NA
3 Internal Doors and 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).	✓
b. Internal corridors/passageways to the doorways referred to in (a) should provide a minimum clear width of 1000mm.	✓
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 6	✓
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.	✓
b. The shower recess should be located in the corner of the room to enable the installation of grabrails at a future date.	✓
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.	✓
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)	✓
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)	✓
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)	✓
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.	NA
8 Kitchen Space	
Silver Level	
No requirements.	✓
9 Laundry Spaces	
Silver Level	
No requirements.	✓
10 Ground (or entry level) bedroom space	
Silver Level	
No requirements.	✓
11 Switches and powerpoints	
Silver Level	
No requirements.	✓
12 Door and tap hardware	
Silver Level	
No requirements.	✓
13 Family/living room space	
Silver Level	
No requirements.	✓
14 Window sills	
Silver Level	
No requirements.	✓
15 Flooring	
Silver Level	
No requirements.	✓

7. Energy Report

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 8 stars.





NatHERS Thermal Performance Results

NatHERS energy ratings have been undertaken for a representative sample of the estate dwellings—dwellings with the most typical layouts. The remaining dwellings are expected to achieve similar or better results.

Below are the energy rating results attained (heating and cooling loads):

Table 2 FirstRate5 Energy Rating Results

Dwelling	NatHERS Star Rating	Total (MJ/m²)	Heating Load (MJ/m²)	Cooling Load (MJ/m²)
Unit 1 TYPE 1 2BR	8.8 ☆	31.4	16.8	14.6
Unit 2 TYPE 1 3BR	7.1 ☆	81.2	66.1	15.1
Unit 3 TYPE 1 3BR	7.0 ☆	83.0	67.5	15.5
Unit 4 TYPE 2 2BR	8.4 ☆	41.7	34.9	6.8
Unit 7 TYPE 2 2BR	8.4 ☆	41.4	28.9	12.2
Unit 9 TYPE 2 2R	7.8 ☆	59.7	32.6	27.1
Unit 11 TYPE 3 1BR	7.8 ☆	59.4	52.8	6.6
Unit 14 TYPE 3 2 BR	8.6 ☆	35.7	26.6	9.1
Unit 17 TYPE 3 2BR	7.8 ☆	59.7	32.6	27.1
Development Average	8.0☆	54.8	39.9	14.9

Additional notes

- As shown above, the proposed design achieved rating meets required energy rating by both NCC 2019 and 2022 for Class 2 Dwellings. Therefore, thermal performance compliance requirement is met.
- All units comply with the NatHERS maximum cooling load (30MJ/m²) for Climate Zone 21 Melbourne. The cooling load cap is set out in the Better Apartment Design Standard and Clause 55.07-1 (Standard B35) of the planning scheme. Which translates to comfortable spaces for residents during the summer months. Give that most dwellings have low cooling loads; occupants will have heat resilience during extreme heat events.
- Based on the development averaged achieved above, the project will meet Green Star Buildings requirements for a Carbon Positive pathway i.e.—achieve Exceptional Performance under the Energy Use credit. Each sole occupancy must achieve a NatHERS energy rating of at least 6 STARS and the NatHERS development average should be at least 8 stars.
- Sample energy bills from existing tenants indicate that the proposed building fabric upgrades will lead to at least 29% reduction in energy demand for space heating and cooling. Exact values vary depending on apartment type but we expect that the refurbished dwelling will attain similar or better results.
- Please note that other energy saving measures shall be installed to further reduce energy needed from the grid. Examples include clothes likes, heat pumps for hot water and space heating, either external clotheslines or a heat pump clothes dryer, all hot water pipes outside the dwellings to be with R2.0 insulation, and roof mounted solar photovoltaic system.

8. Costings of refurbishment proposal for Barak Beacon 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
· Demolition
· GST
· Design contingencies
· Construction contingencies
· Consultants' fees
· Cost escalation up to completion of construction April, 2024
· Asbestos removal
· Project management fees

The Cost Plan excludes the following:
· External works
· External Services
· Rainwater harvesting
· Landscaping
· Site and services infrastructure upgrades
· Automation, IT, AV and communications equipment
· Supply authority charges
· FF&E including furniture, window dressings & equipment etc
· Cost escalation after April, 2024
· Rock excavation
· Site decontamination
· Building Permit and sundry fees

EXECUTIVE SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne

6 October 2022

Cost Plan No.1 - Type 1
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	258 m²
Unenclosed Covered Areas (UCA)	15 m²
Gross Floor Areas (GFA) (FECA + UCA)	273 m²

INTRODUCTION

The Cost Plan is based on Feasibility documents from .

DOCUMENTS

Architectural Drawings (18 Pgs)

TOTAL CONSTRUCTION COST ESTIMATE

The current anticipated Total End Cost is:

Building Works	$414,000
External Works and Services	$0
Contingencies and Allowances	$42,000
Fees, FFE, ITC and Other Client items	$59,000
Escalation	$17,000
GST	$53,200
Total End Cost	**$585,200**

Note:

Due to current market volatility factors which at present are having an unknown and un-quantifiable impact on Construction pricing, MQS recommends including the following additional Market volatility factor to all projects prior to and throughout construction.

Market Volatility	5.00%	Additional market conditions		0.00%		
Up To	Date	Months	%/year	Weighting	Total %	
Tender	Apr, 23	6	5.00%	100%	2.50%	$14,700
Completion	Apr, 24	12	5.00%	50%	2.50%	$14,700

Refer to the attached Cost Plan No.1 - Type 1 for details.

COST PLAN SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne

6 October 2022

Cost Plan No.1 - Type 1
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	258 m²
Unenclosed Covered Areas (UCA)	15 m²
Gross Floor Areas (GFA) (FECA + UCA)	273 m²

	Quantity	$/m2	Total
COST PLAN SUMMARY			
CONSTRUCTION AREA SUMMARY			
Fully Enclosed Covered Area (FECA)	**258 m²**		
Existing Ground Floor	132 m²		
Existing First Floor	126 m²		
Unenclosed Covered Area (UCA)	**15 m²**		
Existing First Floor Balconies	15 m²		
Gross Floor Area (GFA = FECA + UCA)	**273 m²**		
CONSTRUCTION COST SUMMARY			
Total Building Cost	273 m²	$1516/m²	414,000
External Works and Services	273 m²	$0/m²	0
NET CONSTRUCTION COST (NCC) (ex GST) (Oct, 2022)		$1516.48/m²FECA	**414,000**
CONTINGENCIES			
Additional costs for staging of the works			excluded
Design contingency	5.00%		21,000
Construction contingency	5.00%		21,000
TOTAL CONSTRUCTION COST (TCC) (ex GST) (Oct, 2022)		$1670.33/m²FECA	**456,000**
FEES, FFE, IT AND OTHER CLIENT ITEMS			
Consultants' fees	8.00%		36,000
Furniture, furnishings and equipment			excluded
Automation, IT, AV and equipment			excluded
Project Management fees	5.00%		23,000
Supply authority and headworks charges			excluded
Disbursements			excluded
Management support costs			excluded
TOTAL PROJECT COST (TPC) (ex GST) (Oct, 2022)		$1886.45/m²FECA	**515,000**

EXECUTIVE SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne

6 October 2022

Cost Plan No.1 - Type 2
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	417 m²
Unenclosed Covered Areas (UCA)	42 m²
Gross Floor Areas (GFA) (FECA + UCA)	459 m²

INTRODUCTION

The Cost Plan is based on Feasibility documents from Office .

DOCUMENTS

Architectural Drawings (18 Pgs)

TOTAL CONSTRUCTION COST ESTIMATE

The current anticipated Total End Cost is:

Building Works	$952,000
External Works and Services	$26,000
Contingencies and Allowances	$98,000
Fees, FFE, ITC and Other Client items	$140,000
Escalation	$39,000
GST	$125,500
Total End Cost	**$1,380,500**

Note:

Due to current market volatility factors which at present are having an unknown and un-quantifiable impact on Construction pricing, MQS recommends including the following additional Market volatility factor to all projects prior to and throughout construction.

Market Volatility	5.00%	Additional market conditions		0.00%		
Up To	Date	Months	% / year	Weighting	Total %	
Tender	Apr, 23	6	5.00%	100%	2.50%	$34,600
Completion	Apr, 24	12	5.00%	50%	2.50%	$34,600

Refer to the attached Cost Plan No.1 - Type 2 for details.

COST PLAN SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne
Victoria

6 October 2022

Cost Plan No.1 - Type 2
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	417 m²
Unenclosed Covered Areas (UCA)	42 m²
Gross Floor Areas (GFA) (FECA + UCA)	459 m²

	Quantity	$/m2	Total
COST PLAN SUMMARY			
CONSTRUCTION AREA SUMMARY			
Fully Enclosed Covered Area (FECA)	**417 m²**		
Existing Ground Floor	143 m²		
Existing First Floor	137 m²		
Existing Second Floor	137 m²		
Unenclosed Covered Area (UCA)	**42 m²**		
Existing First Floor Balconies	17 m²		
Existing Second Floor Balconies	25 m²		
Gross Floor Area (GFA = FECA + UCA)	**459 m²**		
CONSTRUCTION COST SUMMARY			
Total Building Cost	459 m²	$2074/m²	952,000
External Works and Services	459 m²	$57/m²	26,000
NET CONSTRUCTION COST (NCC) (ex GST) (Oct, 2022)		**$2130.72/m² FECA**	**978,000**
CONTINGENCIES			
Additional costs for staging of the works			excluded
Design contingency	5.00%		49,000
Construction contingency	5.00%		49,000
TOTAL CONSTRUCTION COST (TCC) (ex GST) (Oct, 2022)		**$2344.23/m² FECA**	**1,076,000**
FEES, FFE, IT AND OTHER CLIENT ITEMS			
Consultants' fees	8.00%		86,000
Furniture, furnishings and equipment			excluded
Automation, IT, AV and equipment			excluded
Project Management fees	5.00%		54,000
Supply authority and headworks charges			excluded
Disbursements			excluded
Management support costs			excluded
TOTAL PROJECT COST (TPC) (ex GST) (Oct, 2022)		**$2649.24/m² FECA**	**1,216,000**

EXECUTIVE SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne

6 October 2022

Cost Plan No.1 - Type 3
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	603 m²
Unenclosed Covered Areas (UCA)	19 m²
Gross Floor Areas (GFA) (FECA + UCA)	622 m²

INTRODUCTION

The Cost Plan is based on Feasibility documents from Office .

DOCUMENTS

Architectural Drawings (18 Pgs)

TOTAL CONSTRUCTION COST ESTIMATE

The current anticipated Total End Cost is:

Building Works	$1,305,000
External Works and Services	$26,000
Contingencies and Allowances	$134,000
Fees, FFE, ITC and Other Client items	$190,000
Escalation	$53,000
GST	$170,800
Total End Cost	**$1,878,800**

Note:

Due to current market volatility factors which at present are having an unknown and un-quantifiable impact on Construction pricing, MQS recommends including the following additional Market volatility factor to all projects prior to and throughout construction.

Market Volatility	5.00%	Additional market conditions		0.00%		
Up To	Date	Months	% / year	Weighting	Total %	
Tender	Apr, 23	6	5.00%	100%	2.50%	$47,000
Completion	Apr, 24	12	5.00%	50%	2.50%	$47,000

Refer to the attached Cost Plan No.1 - Type 3 for details.

COST PLAN SUMMARY

Melbourne Quantity Surveyors

Barak Beacon Estate
Port Melbourne
Victoria

6 October 2022

Cost Plan No.1 - Type 3
Revision A
Feasibility

BUILDING AREAS	AREA (m2)
Fully Enclosed Covered Areas (FECA)	603 m²
Unenclosed Covered Areas (UCA)	19 m²
Gross Floor Areas (GFA) (FECA + UCA)	622 m²

	Quantity	$/m2	Total
COST PLAN SUMMARY			
CONSTRUCTION AREA SUMMARY			
Fully Enclosed Covered Area (FECA)	**603 m²**		
Existing Ground Floor	143 m²		
Existing First Floor	157 m²		
Existing Second Floor	157 m²		
Existing Third Floor	146 m²		
Unenclosed Covered Area (UCA)	**19 m²**		
Existing Third Floor Balconies	19 m²		
Gross Floor Area (GFA = FECA + UCA)	**622 m²**		
CONSTRUCTION COST SUMMARY			
Total Building Cost	622 m²	$2099/m²	1,305,000
External Works and Services	622 m²	$42/m²	26,000
NET CONSTRUCTION COST (NCC) (ex GST) (Oct, 2022)		**$2139.87/m²FECA**	**1,331,000**
CONTINGENCIES			
Additional costs for staging of the works			excluded
Design contingency	5.00%		67,000
Construction contingency	5.00%		67,000
TOTAL CONSTRUCTION COST (TCC) (ex GST) (Oct, 2022)		**$2355.31/m²FECA**	**1,465,000**
FEES, FFE, IT AND OTHER CLIENT ITEMS			
Consultants' fees	8.00%		117,000
Furniture, furnishings and equipment			excluded
Automation, IT, AV and equipment			excluded
Project Management fees	5.00%		73,000
Supply authority and headworks charges			excluded
Disbursements			excluded
Management support costs			excluded
TOTAL PROJECT COST (TPC) (ex GST) (Oct, 2022)		**$2660.71/m²FECA**	**1,655,000**

Calculations for refurbishment works to all 21 blocks of flats on Barak Beacon Estate.

	Block Qtys
Type 1	6
Type 2a	4
Type 2b	9
Type 3	2
	21

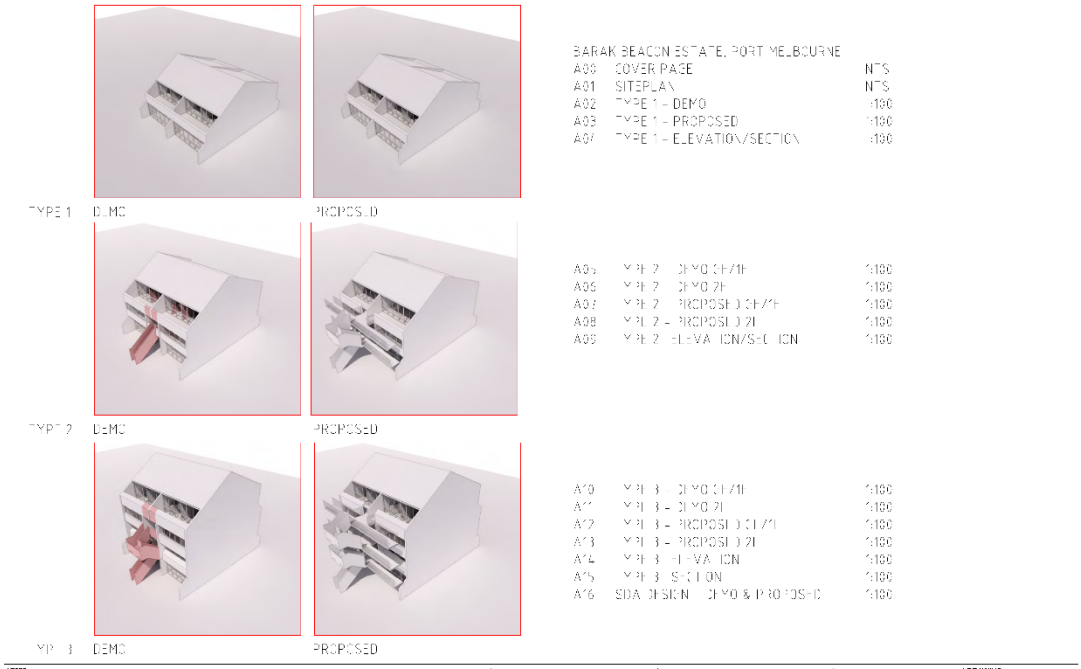
Refurbishment Constructic	Per Block
Type 1	$456,000
Type 2	$1,076,000
Type 3	$1,465,000

Estate Refurbishment Construction Costs	
Type 1	$2,736,000
Type 2	$13,988,000
Type 3	$2,930,000
Total	$19,654,000
per dwelling	$175,482

9. Costings of infill proposal for Barak Beacon Estate

New Infill					
RRR Construction Costs					
	Building Costs	qty	m2	Rate	Total
	New build (exc carparking)				
	1 bedroom	158	55	$4,500	$39,105,000
	2 bedrooms	66	70	$4,500	$20,790,000
	3 bedrooms	10	90	$4,500	$4,050,000
	Services, ciculation etc @ 10%	1	1,420	$3,500	$4,970,000
	Underground carpark	1	350	$3,500	$1,225,000
	Total Building Costs				$70,140,000
	Design Contingency			5%	$3,507,000
	Construction Constingency			5%	$3,507,000
	Total Contingency				$7,014,000
	Total Infill Construction Costs				$77,154,000
				average per dwelling	$329,718

10. Barak Beacon Refurbishment Proposal



BARAK BEACON ESTATE, PORT MELBOURNE

A00	COVER PAGE	NTS
A01	SITEPLAN	NTS
A02	TYPE 1 - DEMO	1:100
A03	TYPE 1 - PROPOSED	1:100
A04	TYPE 1 - ELEVATION/SECTION	1:100
A05	TYPE 2 - DEMO GF/1F	1:100
A06	TYPE 2 - DEMO 2F	1:100
A07	TYPE 2 - PROPOSED GF/1F	1:100
A08	TYPE 2 - PROPOSED 2F	1:100
A09	TYPE 2 - ELEVATION/SECTION	1:100
A10	TYPE 3 - DEMO GF/1F	1:100
A11	TYPE 3 - DEMO 2F	1:100
A12	TYPE 3 - PROPOSED GF/1F	1:100
A13	TYPE 3 - PROPOSED 2F	1:100
A14	TYPE 3 - ELEVATION	1:100
A15	TYPE 3 - SECTION	1:100
A16	SDA DESIGN - DEMO & PROPOSED	1:100

NOTES
These drawings form part of a larger research proposal for the refurbishment of Barak Beacon Estate

Note:

REV	ISSUE	DATE
-	-	-

RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

RETAIN REPAIR RENEWBY BB OFFICE

DRAWING: COVERPAGE
SHEET SIZE: A3
DRAWING NO.: A-00
ISSUE: -

NOTES
These drawings form part of a larger research proposal for the refurbishment of Barak Beacon Estate

Note:

REV	ISSUE	DATE
-	-	-

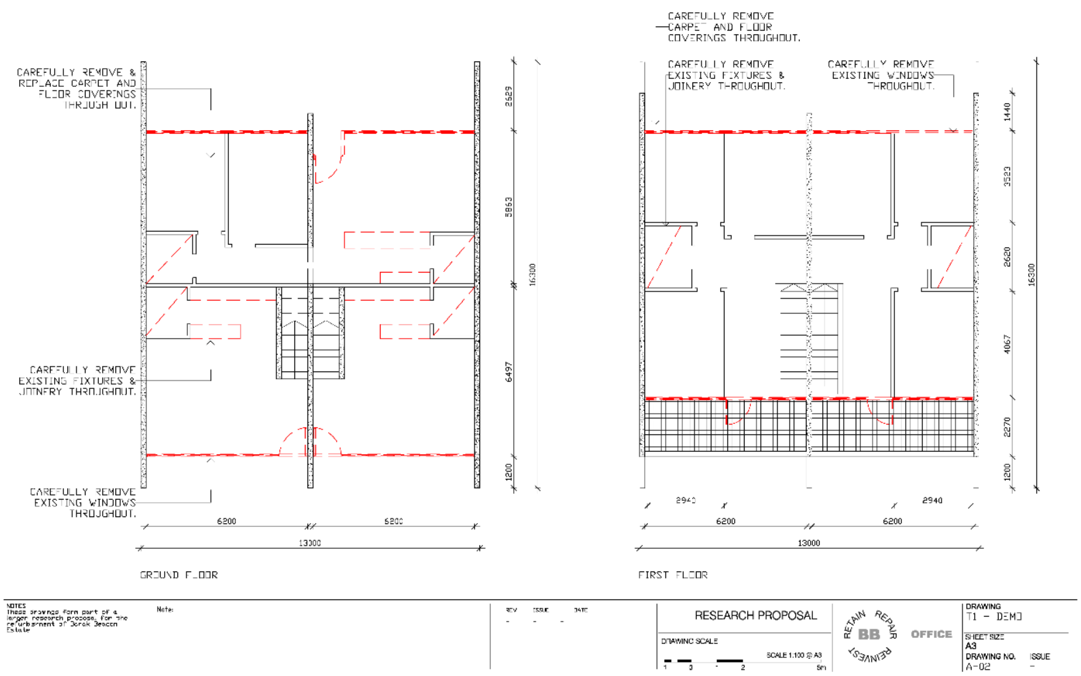
RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

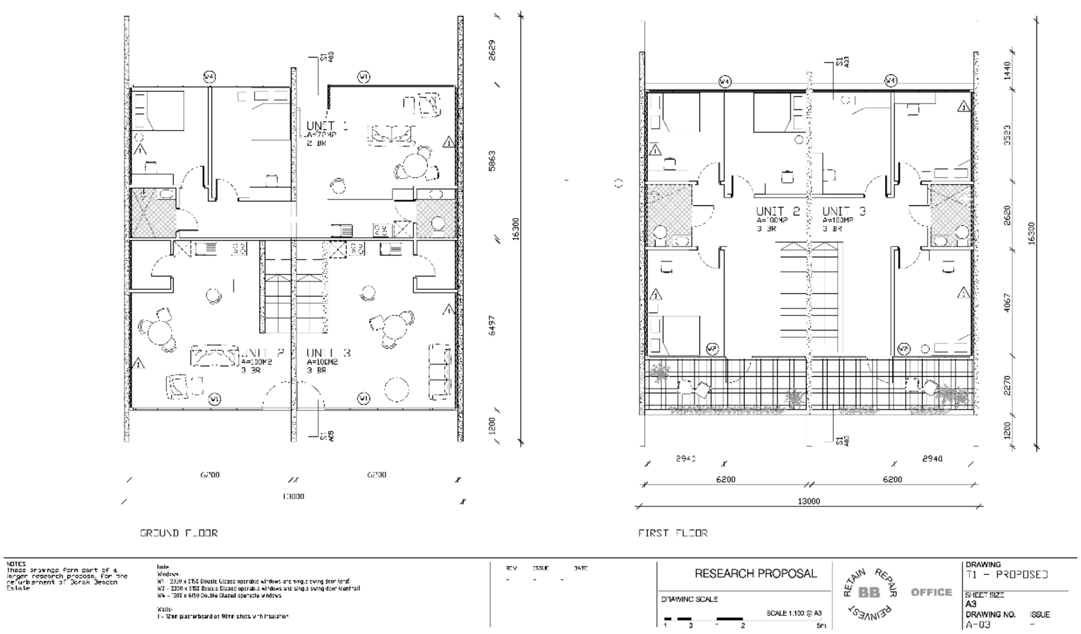
RETAIN REPAIR RENEWBY BB OFFICE

DRAWING: SITEPLAN
SHEET SIZE: A3
DRAWING NO.: A-01
ISSUE: -

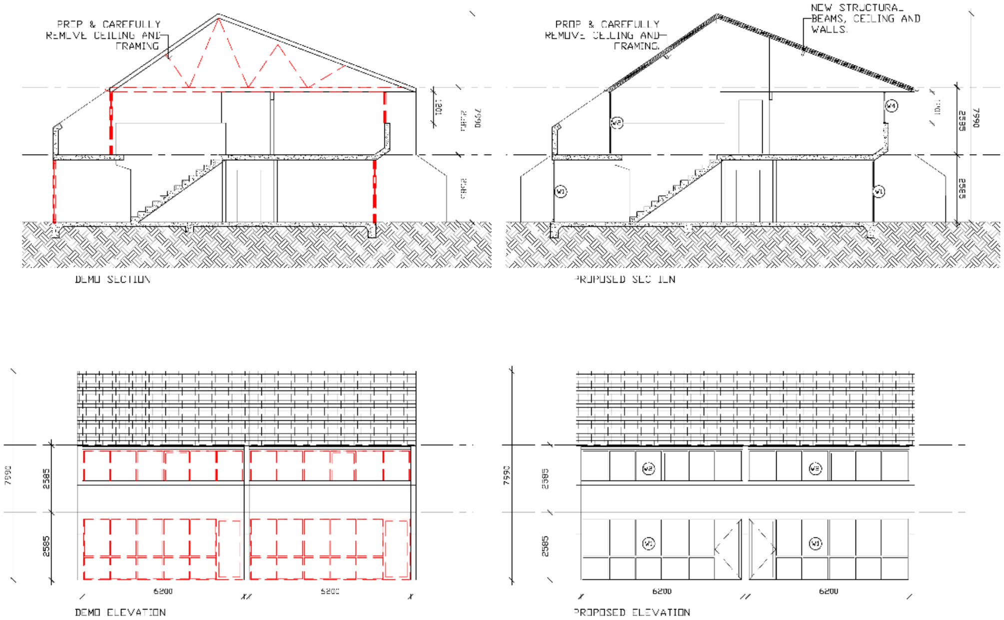
TYPE 1


CAREFULLY REMOVE CARPET AND FLOOR COVERINGS THROUGHOUT.
CAREFULLY REMOVE EXISTING FIXTURES & JOINERY THROUGHOUT.
CAREFULLY REMOVE EXISTING WINDOWS THROUGHOUT.
CAREFULLY REMOVE & REPLACE CARPET AND FLOOR COVERINGS THROUGH OUT.
CAREFULLY REMOVE EXISTING FIXTURES & JOINERY THROUGHOUT.
CAREFULLY REMOVE EXISTING WINDOWS THROUGHOUT.
GROUND FLOOR
FIRST FLOOR
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3
RETAIN REPAIR REINVEST
BB OFFICE
DRAWING
T1 - DEMO
SHEET SIZE
A3
DRAWING NO.
ISSUE
A-02

TYPE 1


UNIT 1
UNIT 2
UNIT 3
GROUND FLOOR
FIRST FLOOR
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3
RETAIN REPAIR REINVEST
BB OFFICE
DRAWING
T1 - PROPOSED
SHEET SIZE
A3
DRAWING NO.
ISSUE
A-03

TYPE 1



NOTES
These drawings form part of a larger research proposal for the refurbishment of Dorak Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 5150 Double Glazed operable windows and single swing door (central)
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

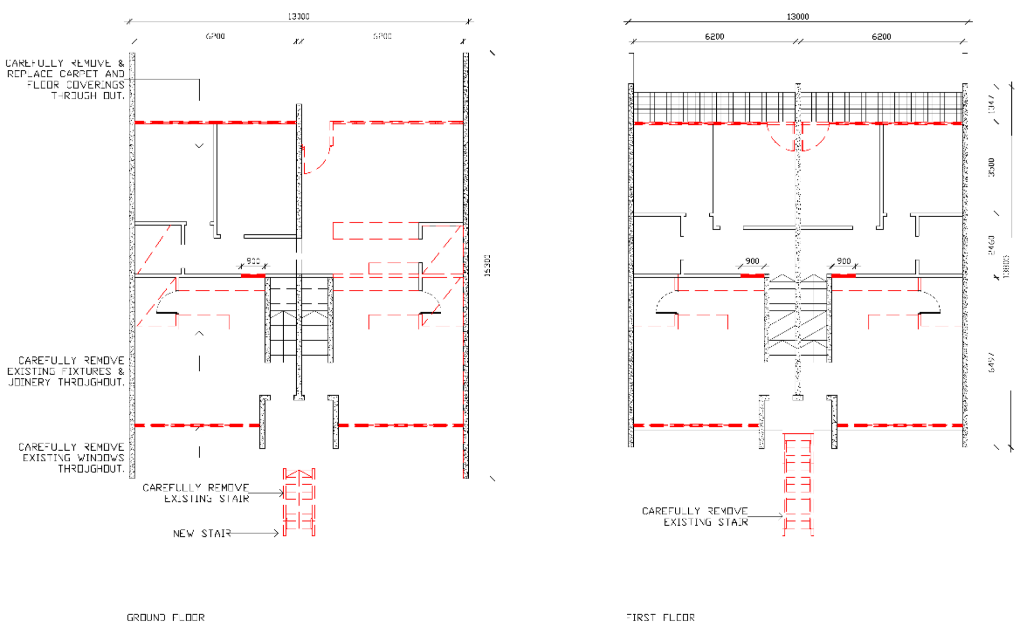
REV ISSUE DATE
- - -

RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3

RETAIN REPAIR REINVEST BB OFFICE

DRAWING
ELEVATION/SECTION
SHEET SIZE
A3
DRAWING NO. ISSUE
A-04 -

TYPE 2



NOTES
These drawings form part of a larger research proposal for the refurbishment of Dorak Beacon Estate

Note:

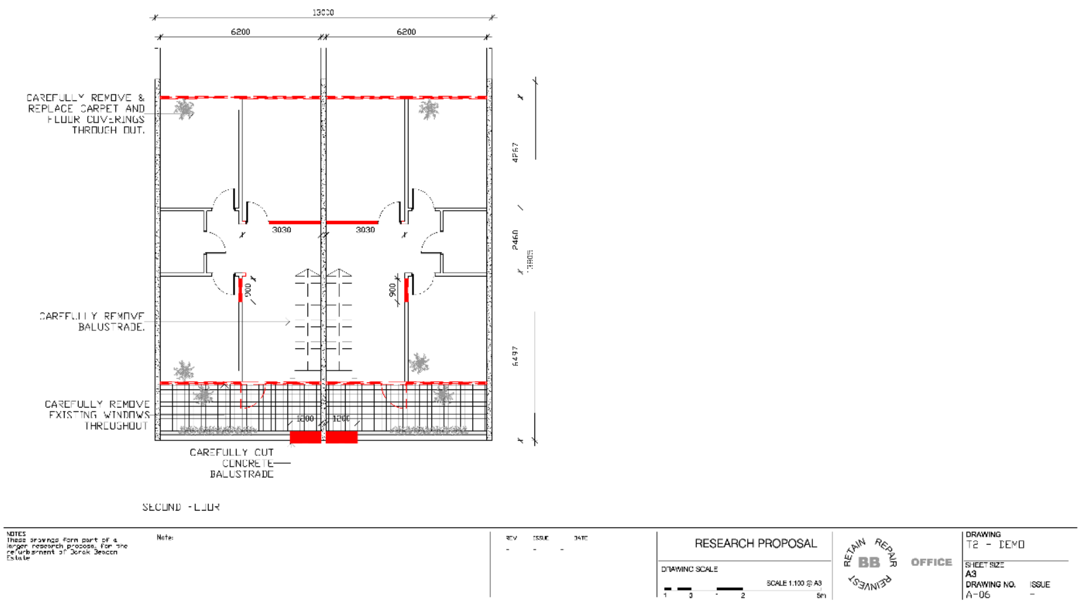
REV ISSUE DATE
- - -

RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3

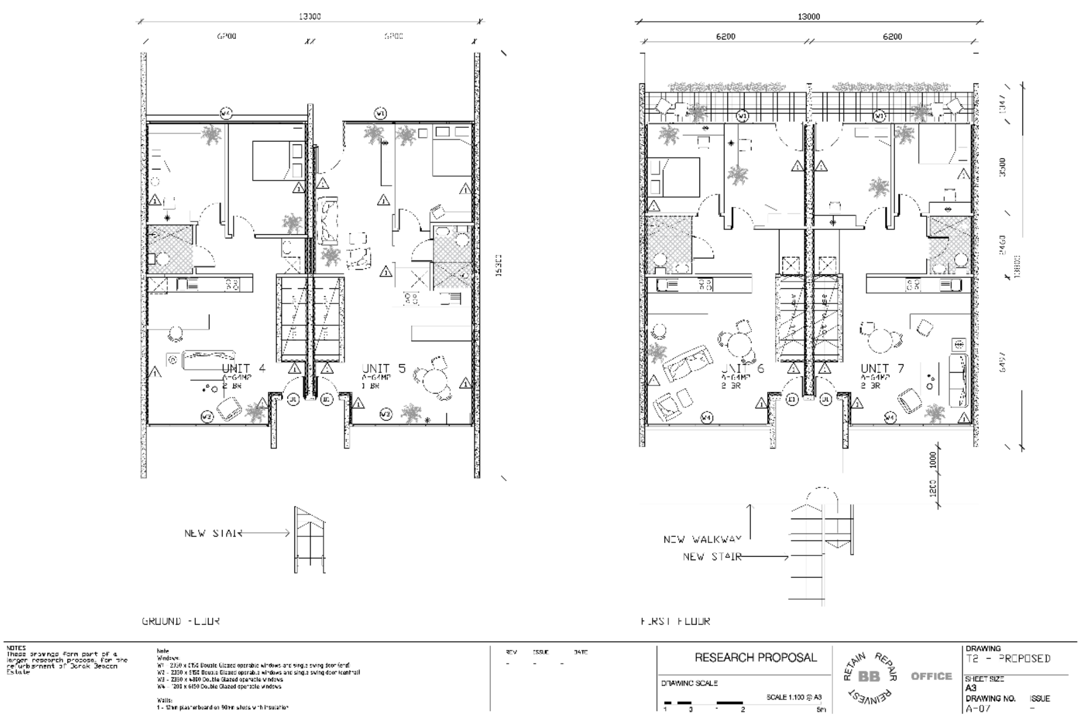
RETAIN REPAIR REINVEST BB OFFICE

DRAWING
T2 - DEMO
SHEET SIZE
A3
DRAWING NO. ISSUE
A-05 -

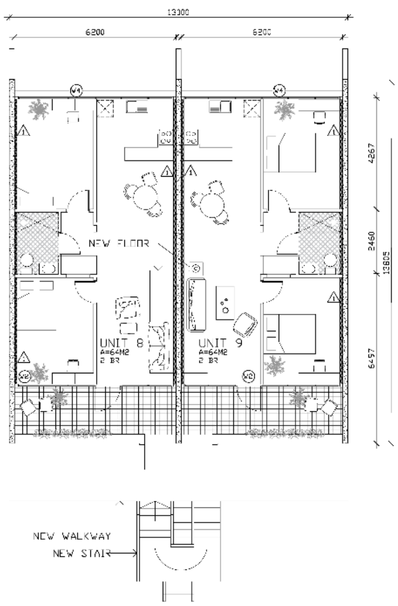
TYPE 2


13000
6200
6200
CAREFULLY REMOVE & REPLACE CARPET AND FLOOR COVERINGS THROUGH OUT.
CAREFULLY REMOVE BALUSTRADE.
CAREFULLY REMOVE EXISTING WINDOWS THROUGHOUT
CAREFULLY CUT CONCRETE BALUSTRADE
SECOND FLOOR
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3
RETAIN REPAIR REINVEST
BB
OFFICE
DRAWING
T2 - DEMO
SHEET SIZE
A3
DRAWING NO.
ISSUE
A-06

TYPE 2


13000
6200
6200
UNIT 4
2 BR
UNIT 5
1 BR
UNIT 6
2 BR
UNIT 7
2 BR
NEW STAIR
NEW WALKWAY
NEW STAIR
GROUND FLOOR
FIRST FLOOR
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3
RETAIN REPAIR REINVEST
BB
OFFICE
DRAWING
T2 - PROPOSED
SHEET SIZE
A3
DRAWING NO.
ISSUE
A-07

TYPE 2



SECOND FLOOR

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 5150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

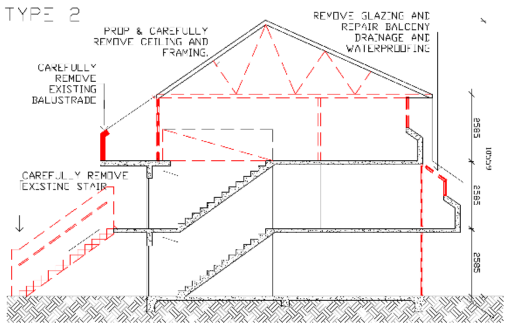
REV ISSUE DATE
- - -

RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3

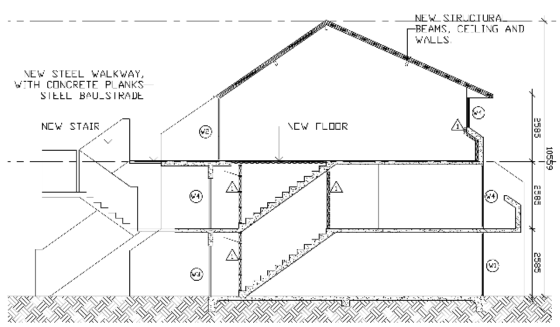
RETAIN REPAIR REINVEST
BB OFFICE

DRAWING
T2 - PROPOSED
SHEET SIZE
A3
DRAWING NO. ISSUE
A-08 -

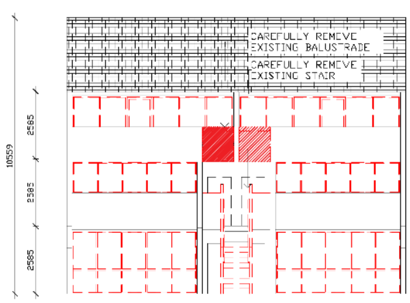
TYPE 2



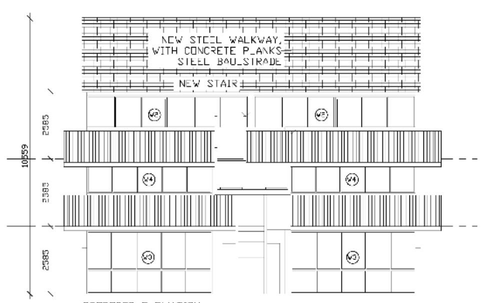
DEMO SECTION



PROPOSED SECTION



DEMO ELEVATION



PROPOSED ELEVATION

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 5150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

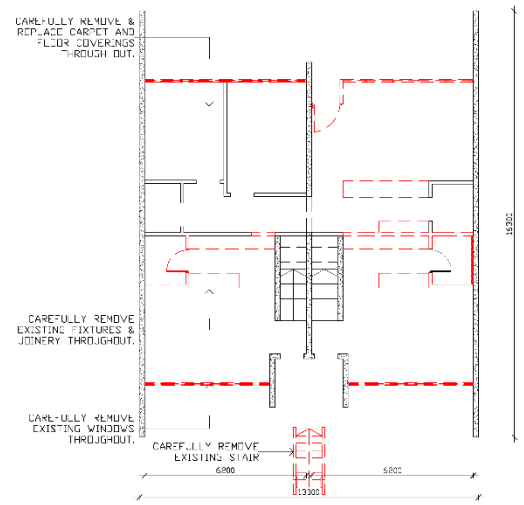
REV ISSUE DATE
- - -

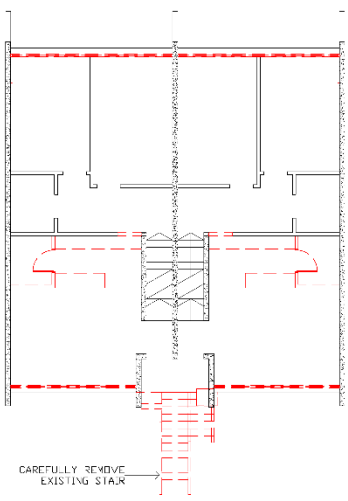
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3

RETAIN REPAIR REINVEST
BB OFFICE

DRAWING
ELEVATION/SECTION
SHEET SIZE
A3
DRAWING NO. ISSUE
A-09 -

TYPE 3





GROUND - FLOOR

FIRST FLOOR

NOTES
These drawings form part of a recent research process, for the refurbishment of Jarak Beacon Estate

Note:

REV	ISSUE	DATE
-	-	-

RESEARCH PROPOSAL

DRAWING SCALE

SCALE 1:100 @ A3

0m 1 0 1 2

RETAIN REPAIR REINVEST

BB OFFICE

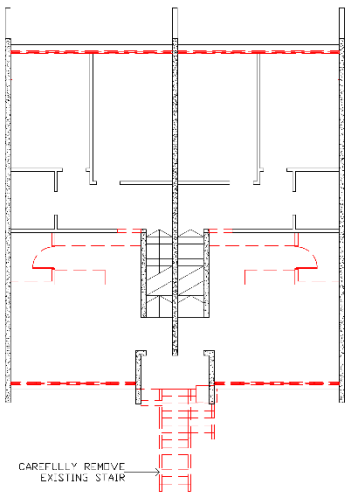
DRAWING
T3 - DEMO

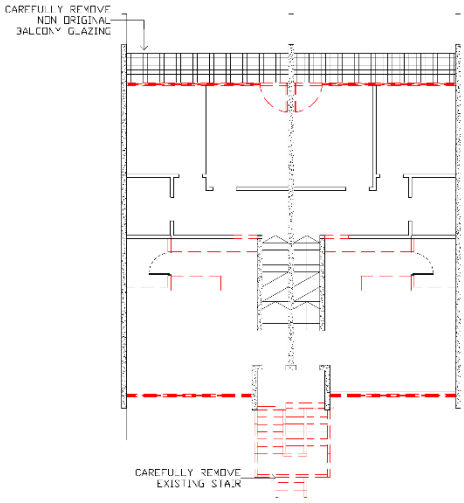
SHEET SIZE
A3

DRAWING NO. A-10

ISSUE -

TYPE 3





SECOND - FLOOR

THIRD FLOOR

NOTES
These drawings form part of a recent research process, for the refurbishment of Jarak Beacon Estate

Note:

REV	ISSUE	DATE
-	-	-

N

RESEARCH PROPOSAL

DRAWING SCALE

SCALE 1:100 @ A3

0m 1 0 1 2

RETAIN REPAIR REINVEST

BB OFFICE

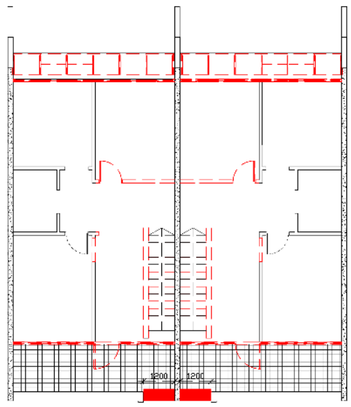
DRAWING
T3 - DEMO

SHEET SIZE
A3

DRAWING NO. A-11

ISSUE -

TYPE 3



FOURTH FLOOR

NOTES
These drawings form part of a larger research proposal for the refurbishment of Dorak Beacon Estate

Note:

REV	ISSUE	DATE
-	-	-

N

RESEARCH PROPOSAL

DRAWING SCALE

SCALE 1:100 @ A3

RETAIN REPAIR REINVEST

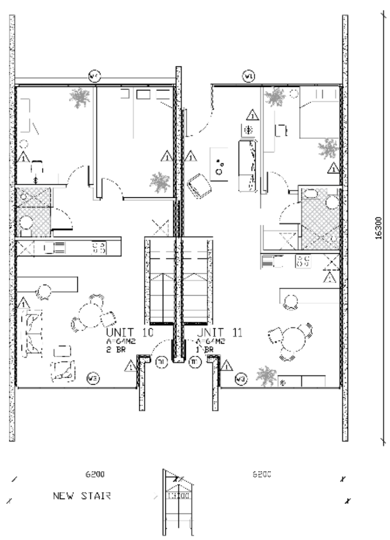
BB OFFICE

DRAWING
T3 - DEMO

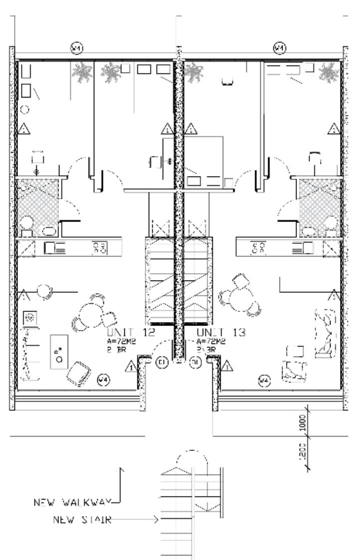
SHEET SIZE
A3

DRAWING NO. ISSUE
A-12 -

TYPE 3



GROUND FLOOR



FIRST FLOOR

NOTES
These drawings form part of a larger research proposal for the refurbishment of Dorak Beacon Estate

Note:
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 6150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

REV	ISSUE	DATE
-	-	-

N

RESEARCH PROPOSAL

DRAWING SCALE

SCALE 1:100 @ A3

RETAIN REPAIR REINVEST

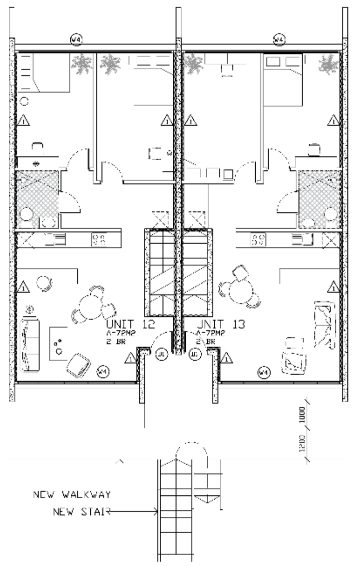
BB OFFICE

DRAWING
T3 - PROPOSED

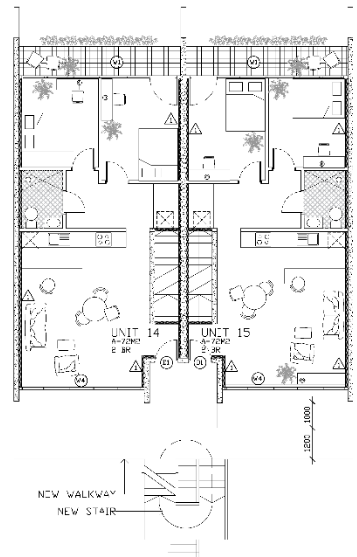
SHEET SIZE
A3

DRAWING NO. ISSUE
A-13 -

TYPE 3



SECOND FLOOR



THIRD FLOOR

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 6150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

REV	ISSUE	DATE
-	-	-

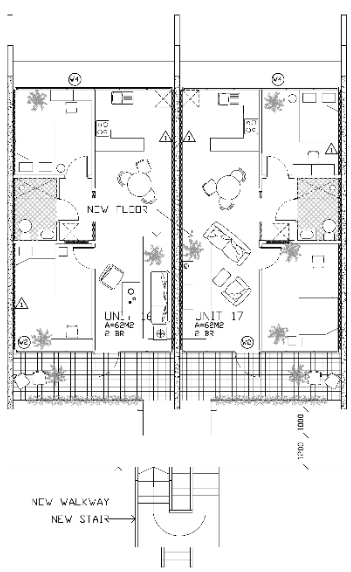
RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

RETAIN REPAIR REINVEST BB OFFICE

DRAWING: T3 - PROPOSED
SHEET SIZE: A3
DRAWING NO.: A-14
ISSUE: -

TYPE 3



FOURTH FLOOR

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 6150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

REV	ISSUE	DATE
-	-	-

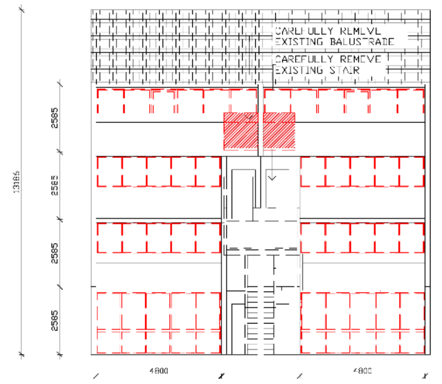
RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

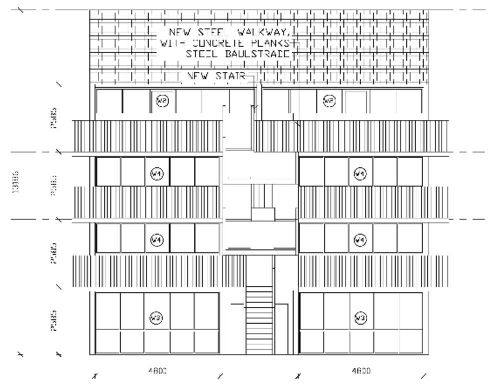
RETAIN REPAIR REINVEST BB OFFICE

DRAWING: T3 - PROPOSED
SHEET SIZE: A3
DRAWING NO.: A-15
ISSUE: -

TYPE 3



DEMO ELEVATION



PROPOSED ELEVATION

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 9150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

REV	ISSUE	DATE
-	-	-

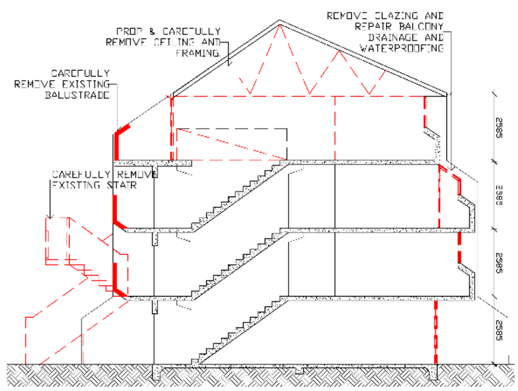
RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

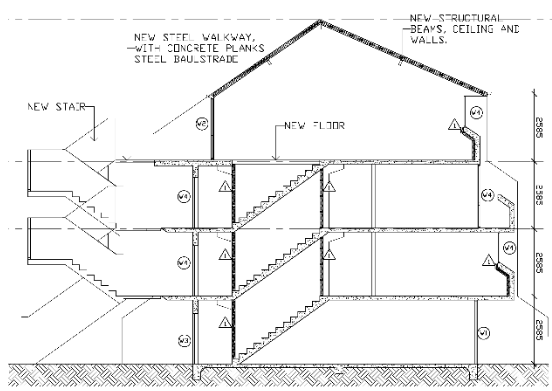
RETAIN REPAIR REINVEST BB OFFICE

DRAWING
ELEVATION
SHEET SIZE
A3
DRAWING NO. A-16
ISSUE -

TYPE 3



DEMO SECTION



PROPOSED SECTION

NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate

Note
Windows:
W1 - 2350 x 6150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 9150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows

Walls:
1 - 12mm plasterboard on 90mm studs with insulation

REV	ISSUE	DATE
-	-	-

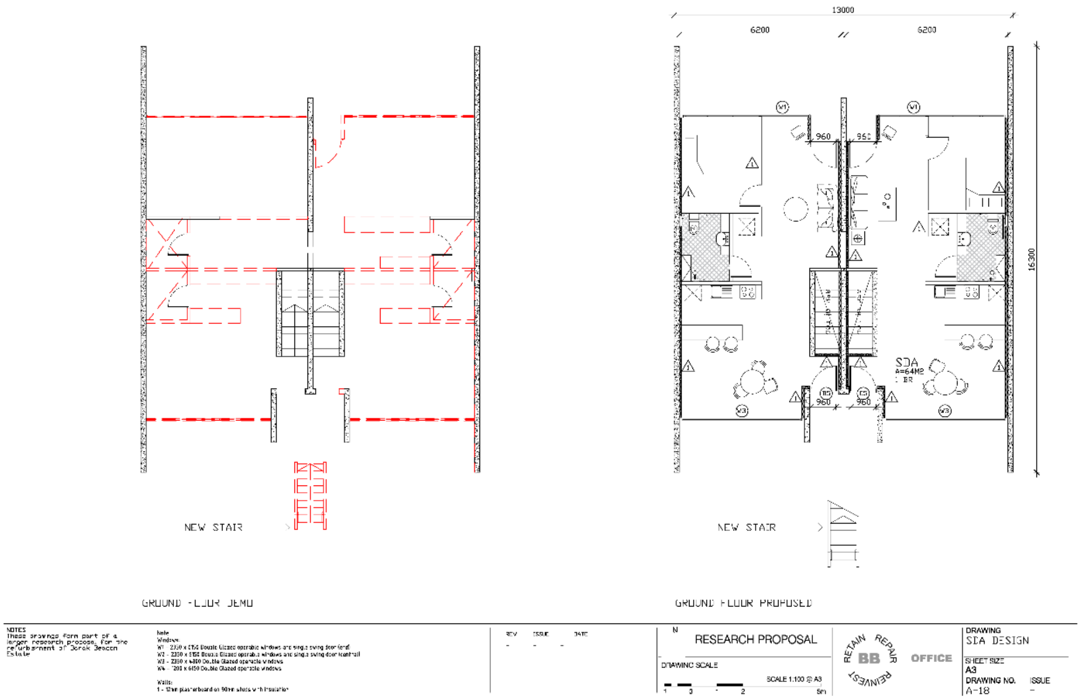
RESEARCH PROPOSAL

DRAWING SCALE
SCALE 1:100 @ A3

RETAIN REPAIR REINVEST BB OFFICE

DRAWING
SECTION
SHEET SIZE
A3
DRAWING NO. A-17
ISSUE -

SDA Design


13000
6200
6200
960
960
960
960
16300
SDA
1 BR
NEW STAIR
NEW STAIR
GROUND FLOOR DEMO
GROUND FLOOR PROPOSED
NOTES
These drawings form part of a larger research proposal for the refurbishment of Derek Beacon Estate
Note
Windows:
W1 - 2350 x 2150 Double Glazed operable windows and single swing door (end)
W2 - 2350 x 5150 Double Glazed operable windows and single swing door (central)
W3 - 2350 x 4800 Double Glazed operable windows
W4 - 1200 x 6150 Double Glazed operable windows
Walls:
1 - 12mm plasterboard on 90mm studs with insulation
REV
ISSUE
DATE
N
RESEARCH PROPOSAL
DRAWING SCALE
SCALE 1:100 @ A3
5m
RETAIN
REPAIR
REINVEST
BB
OFFICE
DRAWING
SDA DESIGN
SHEET SIZE
A3
DRAWING NO.
ISSUE
A-18

11. Life cycle Assessment

Independent review not completed on this study, use caution when interpreting the report.

Executive Summary

This Life Cycle Assessment has been completed for the Entire Fitout, located at 99 Beacon Rd, Port Melbourne VIC 3207. The Author of the study is Steve Mintern of OFFICE AU Limited and no critical review has been conducted.

The goal of this study is to profile and improve the environmental performance of the construction works at 99 Beacon Rd, Port Melbourne VIC 3207. The study has been conducted in accordance with ISO 14044 and EN15978.

The following table summarises environmental impact results.

Characterised Impacts Per Absolute(No Functional Unit)		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
Global Warming Potential, GWP	kg CO_2 eq	30400	4490.3	3284.9	-570.4	37600
Ozone Depletion Potential, ODP	kg CFC-11 eq	429	82.9	24.5	-1.643	535
Acidification Potential for Soil and Water, AP	kg SO_2 eq.	137.86	13.117	1.807	-0.877	152
Eutrophication potential, EP	kg PO_4 eq	35.264	6.989	0.392	0.016	42.661
Photochemical Ozone Creation Potential, POCP	kg ethylene	8.0795	0.9062	0.7873	-0.1376	9.6294
Resource Use						
Net use of fresh water, FW	kg	367	37.2	2.825	-6.7805	401
Additional Indicators						
Embodied Energy	MJ NCV	5.39e+5	54293	5443	-8325	5.91e+5
Water Footprint	m^3 deprived	165	16.6	1.6348	-2.8832	181
Land Use	m^2.year arable	30500	6040	21.77	-33.887	36500

Table 1: Summary of Results

The majority of impacts were found to be caused during the Materials and Construction (Module A) which had the highest impacts in 9 of the 28 environmental indicators.

Executive Summary

This Life Cycle Assessment has been completed for the Entire Fitout, located at 99 Beacon Rd, Port Melbourne VIC 3207. The Author of the study is Steve Mintern of OFFICE AU Limited and no critical review has been conducted.

The goal of this study is to profile and improve the environmental performance of the construction works at 99 Beacon Rd, Port Melbourne VIC 3207. The study has been conducted in accordance with ISO 14044 and EN15978.

The following table summarises environmental impact results.

Characterised Impacts Per Absolute(No Functional Unit)		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
Global Warming Potential, GWP	kg CO_2 eq	50700	8670.6	10000	-720.9	68700
Ozone Depletion Potential, ODP	kg CFC-11 eq	936	125	197	-9.899	1250
Acidification Potential for Soil and Water, AP	kg SO_2 eq.	232.4	23.03	13.84	-2.47	266.8
Eutrophication potential, EP	kg PO_4 eq	74	10.9	3.0143	0.6639	88.6
Photochemical Ozone Creation Potential, POCP	kg ethylene	22.7	1.3361	2.5163	-0.5566	25.966
Resource Use						
Net use of fresh water, FW	kg	2500	53.324	24.354	277	2850
Additional Indicators						
Embodied Energy	MJ NCV	1.04e+6	1.06e+5	42231	-21349	1.17e+6
Water Footprint	m^3 deprived	339	24.948	14.122	-3.074	369
Land Use	m^2.year arable	1.36e+5	8410	190.11	-94.7	1.45e+5

Table 1: Summary of Results

The majority of impacts were found to be caused during the Materials and Construction (Module A) which had the highest impacts in 9 of the 28 environmental indicators.

Executive Summary

This Life Cycle Assessment has been completed for the Entire Fitout, located at 99 Beacon Rd, Port Melbourne VIC 3207. The Author of the study is Steve Mintern of OFFICE AU Limited and no critical review has been conducted.

The goal of this study is to profile and improve the environmental performance of the construction works at 99 Beacon Rd, Port Melbourne VIC 3207. The study has been conducted in accordance with ISO 14044 and EN15978.

The following table summarises environmental impact results.

Characterised Impacts Per Absolute(No Functional Unit)		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
Global Warming Potential, GWP	kg CO_2 eq	41652	11165	17826	-509	70134
Ozone Depletion Potential, ODP	kg CFC-11 eq	1430	172	306	-14.474	1890
Acidification Potential for Soil and Water, AP	kg SO_2 eq.	237.59	29.3	21.19	-0.32	287.76
Eutrophication potential, EP	kg PO_4 eq	92.438	15.542	4.616	1.509	114
Photochemical Ozone Creation Potential, POCP	kg ethylene	28.8	1.6411	4.4242	-0.5431	34.3
Resource Use						
Net use of fresh water, FW	kg	3300	64.725	37.579	407	3810
Additional Indicators						
Embodied Energy	MJ NCV	1.30e+6	1.33e+5	64854	-26152	1.47e+6
Water Footprint	m^3 deprived	354	31.144	21.788	-1.963	405
Land Use	m^2.year arable	2.62e+5	12400	293	-111.94	2.74e+5

Table 1: Summary of Results

The majority of impacts were found to be caused during the Materials and Construction (Module A) which had the highest impacts in 9 of the 28 environmental indicators.

Executive Summary

This Life Cycle Assessment has been completed for the Whole Building, located at 99 Beacon Rd, Port Melbourne VIC 3207. The Author of the study is Steve Mintern of OFFICE AU Limited and no critical review has been conducted.

The goal of this study is to profile and improve the environmental performance of the construction works at 99 Beacon Rd, Port Melbourne VIC 3207. The study has been conducted in accordance with ISO 14044 and EN15978.

The following table summarises environmental impact results.

Characterised Impacts Per Absolute(No Functional Unit)		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
Global Warming Potential, GWP	kg CO_2 eq	7.59e+6	5.73e+5	7.82e+5	1.41e+5	9.09e+6
Ozone Depletion Potential, ODP	kg CFC-11 eq	88400	12700	37000	-4620	1.34e+5
Acidification Potential for Soil and Water, AP	kg SO_2 eq.	31700	2208.6	3497.4	-1632	35700
Eutrophication potential, EP	kg PO_4 eq	16400	666.4	759.7	264	18100
Photochemical Ozone Creation Potential, POCP	kg ethylene	2530	101	232	-11.268	2910
Resource Use						
Net use of fresh water, FW	kg	1.81e+6	5520	4710	2.78e+5	2.10e+6
Additional Indicators						
Embodied Energy	MJ NCV	7.18e+7	8.83e+6	9.55e+6	-2.48e+6	8.77e+7
Water Footprint	m^3 deprived	47200	2610	2730	1220	53800
Land Use	m^2.year arable	2.87e+6	30900	37000	-8596.6	2.93e+6

Table 1: Summary of Results

The majority of impacts were found to be caused during the Materials and Construction (Module A) which had the highest impacts in 9 of the 28 environmental indicators.

Executive Summary

This Life Cycle Assessment has been completed for the Whole Building, located at 99 Beacon Rd, Port Melbourne VIC 3207. The Author of the study is Steve Mintern of OFFICE AU Limited and no critical review has been conducted.

The goal of this study is to profile and improve the environmental performance of the construction works at 99 Beacon Rd, Port Melbourne VIC 3207. The study has been conducted in accordance with ISO 14044 and EN15978.

The following table summarises environmental impact results.

Characterised Impacts Per Absolute(No Functional Unit)		Materials and Construction	Use Stage	End of Life Stage	Benefits and Loads Beyond the System Boundary	Total
		A	B	C	D	
Environmental Impacts						
Global Warming Potential, GWP	kg CO_2 eq	1.25e+7	8.25e+5	1.52e+6	2.07e+5	1.51e+7
Ozone Depletion Potential, ODP	kg CFC-11 eq	1.79e+5	18400	55600	-6900	2.46e+5
Acidification Potential for Soil and Water, AP	kg SO_2 eq.	52000	3170.3	5694.9	-2252.9	58588
Eutrophication potential, EP	kg PO_4 eq	25500	943.7	1235.7	427.6	28100
Photochemical Ozone Creation Potential, POCP	kg ethylene	5949.3	144.61	436.3	0.05	6530
Resource Use						
Net use of fresh water, FW	kg	2.71e+6	7960	7056.5	4.13e+5	3.13e+6
Additional Indicators						
Embodied Energy	MJ NCV	1.44e+8	1.27e+7	1.54e+7	-3.79e+6	1.68e+8
Water Footprint	m^3 deprived	79400	3760	4088.9	1740	89000
Land Use	m^2.year arable	2.07e+7	44600	55375	-13100	2.08e+7

Table 1: Summary of Results

The majority of impacts were found to be caused during the Materials and Construction (Module A) which had the highest impacts in 9 of the 28 environmental indicators.