



Research investment for a better building system

# Our vision is to challenge Aotearoa New Zealand to create a building system that delivers better outcomes for all.

BRANZ – the Building Research Association of New Zealand – is a multi-faceted, science-led organisation.

We invest the Building Research Levy to improve building system performance.

We co-create enduring solutions that make a real difference in the lives of people in Aotearoa New Zealand.



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RE:INVEST 2023

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# Kia ora from our Chief Executive

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## ***He aha te mea nui o te ao? He tangata, he tangata, he tangata.***

*What is the most important thing in the world? It is the people, it is the people, it is the people.*

I'm proud to be introducing this edition of RE:INVEST as the new Chief Executive Officer of BRANZ. I am passionate about our people, the work we do and the part we play in empowering positive change across the building system in Aotearoa New Zealand.

We are committed to a future where all New Zealanders can live in warm, dry, healthy and affordable homes. Where buildings are designed and constructed sustainably and can adapt to the changing climate. We want a strong, efficient and innovative industry in which people have the skills, knowledge and support they need to solve future challenges.

It's a big vision. But we can achieve this system-level change through system-wide collaboration.

### **WORKING TOGETHER**

Championing collaboration is at the heart of what we do. We listen, learn and share information, expertise and research to explore new ideas and find practical solutions.

We are committed to long-term working relationships with a range of system players. BRANZ has deep connections across the industry, engaging with a wide range of organisations and experts. This helps us to understand research needs and keeps our work grounded.

Our relationships with universities and other research providers are also essential and enable many of the projects in this RE:INVEST. We work with government organisations to help support evidence-based regulations, standards and policies that create better outcomes for people and planet.

This edition of RE:INVEST sees BRANZ working alongside **39 organisations** and **130 researchers** on **38 new research projects** that support this future vision. Together, these projects have received **\$15 million of Building Research Levy investment**.

### **COOPERATION ON CLIMATE CHANGE**

Aotearoa New Zealand is part of the enormous international effort to mitigate and reduce the impacts of climate change. Under the Paris Agreement, Aotearoa New Zealand has committed to reaching net-zero emissions by 2050.

The building and construction sector accounts for up to 20% of Aotearoa New Zealand's total carbon emissions. To achieve our emissions targets, we need to transform the way we build and live in our homes.

Within these pages, you will read about 12 new projects that advance climate change research. This includes a BRANZ-led initiative to explore the resilience of construction materials within a changing environment. It aims to empower the industry to make informed choices, support regulatory change and understand the impacts of material degradation.

We also feature an industry-wide collaboration that explores how to best accelerate skills for zero-carbon construction. From apprentices to decision makers, it will help to ensure that every person in the system can play their part in supporting a smooth transition to a zero-carbon built environment.

BRANZ has long been at the forefront of discussions around reducing the carbon footprint of Aotearoa New Zealand's buildings, and we will continue to find new materials, systems and ways to empower change. We are committed to playing our part to protect te taiao (the environment) for generations to come.

### POWER TO THE PEOPLE

If knowledge is power, then research organisations have a significant role to play in empowering people. Educating the people who live in, work in or use buildings is crucial. It is the end user who can potentially speed up transformational change by demanding a resilient, sustainable built environment that will withstand the increased rigours of climate change.

There is a golden opportunity across the building system to translate awareness into action by having conversations with anyone who is about to build, rebuild or renovate about how to build high-quality homes.

BRANZ is exploring the different points at which we can intervene in the building process to ensure people have the right information in the right way at the right time. For instance, we have invested in a collaborative project with an Aotearoa New Zealand bank to trial linking new-build mortgages with independent and personalised advice about how to build energy-efficient homes.

Another project close to my heart is about developing safer evacuation paths out of buildings for people with limited mobility. As we move towards higher-density housing, this mahi is essential in ensuring that everyone can quickly and safely escape their homes, schools and workplaces in an emergency.

By putting people at the heart of our research, we can empower change at a personal, community, national and international level.



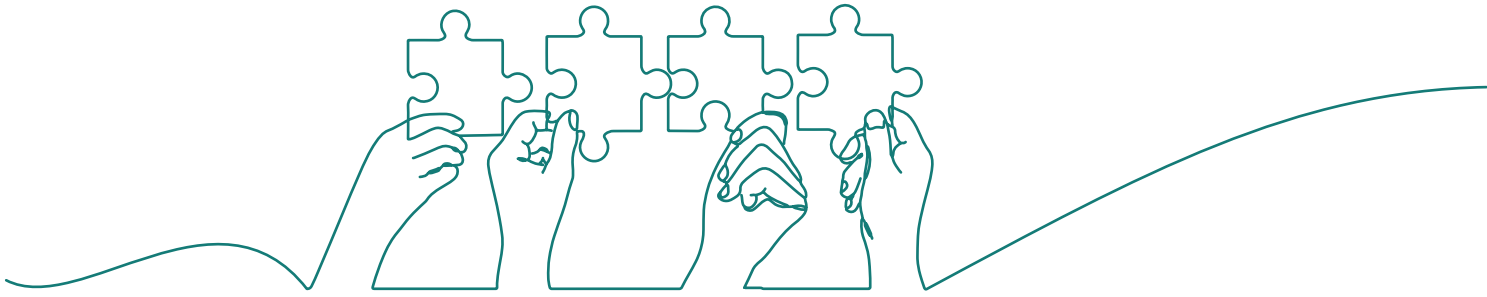
**By putting people at the heart of our research, we can empower change at a personal, community, national and international level.**

We are grateful for the strong relationships we have across the system. Kia ora to everyone who is playing a role in this change. It truly takes a collective effort to transform Aotearoa New Zealand's building system for the future.

Ngā mihi nui

Handwritten signature of Claire Falck.

**Claire Falck**  
Chief Executive Officer



## Ngā mihi to our RE:INVEST 2023 research collaborators

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### UNIVERSITY COLLABORATORS

- Te Herenga Waka | Victoria University of Wellington
- Te Kunenga ki Pūrehuroa | Massey University
- Te Wānanga Aronui o Tāmaki Makaurau | Auckland University of Technology
- Te Whare Wānanga o Ōtākou | University of Otago
- Te Whare Wānanga o Waikato | University of Waikato
- Te Whare Wānanga o Waitaha | University of Canterbury
- Waipapa Taumata Rau | University of Auckland
- Harvard University

### RESEARCH COLLABORATORS

- Beacon Pathway
- BRANZ Ltd
- Callaghan Innovation
- Livingston and Associates
- Resilient Organisations
- Scion
- The Workshop
- Third Bearing
- WSP New Zealand
- Independent researchers

### INDUSTRY COLLABORATORS

- Association of Wall and Ceiling Industries
- Aurecon New Zealand
- Beca
- Concrete NZ
- Holmes Group
- Heavy Engineering Research Association)
- Kestrel Group
- MATES in Construction
- Mott MacDonald New Zealand
- National Association of Steel Framed Housing
- NZ Joinery Manufacturers Federation
- Simpli
- Social Good
- Structural Engineering Society of New Zealand
- Townsend Architects
- Warren and Mahoney Architects
- Wellington Regional Healthy Housing Group
- Whakaratonga Iwi | Fire and Emergency New Zealand

### LOCAL GOVERNMENT COLLABORATORS

- Kaunihera a-rohe o Ōtepoti | Dunedin City Council
- Te Kaunihera o Tāmaki Makaurau | Auckland Council

## RE:INVEST 2023 investment at a glance

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**38** new research projects

**\$15 million** new Building Research Levy investment

**12** projects with a behaviour change focus

**39** collaborating organisations

**12** projects with a climate change focus

**130** researchers

**14** projects that address distinct industry needs

# Shaping our investment decisions

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The decisions we make about which research to invest in can have significant impact on our building system performance, now and into the future.

These decisions are informed and shaped through our system-scanning activities.

## SCANNING THE SYSTEM

BRANZ bases its investment decisions on the most up-to-date and accurate information available. A major part of our process is conducting robust and broad system scanning throughout the year.

This ensures investment is made in research that responds to the greatest and most pressing needs that Aotearoa New Zealand's building system faces.

BRANZ considers a wide range of inputs:

- national and international events
- findings from the biennial Industry Insights Survey
- statistics data and independent forecasting
- independent industry scanning and forecasting activities
- changes in or introduction of new government policy, reports and programmes
- system collaboration outcomes
- new entities
- the likely impact of legislation and regulatory changes.

This comprehensive dataset enables BRANZ to invest in research that responds to the greatest and most pressing needs that Aotearoa New Zealand's building system faces.

### Read more

Identifying building system needs. [branz.co.nz/investing-research/identifying-building-system-needs](https://branz.co.nz/investing-research/identifying-building-system-needs)

## PRIORITISING AND ALLOCATING RESEARCH FUNDING FOR 2023

Drawing on insights from our scanning activities, we know that environmental impact, home performance, affordability and resilience remain prominent challenges for Aotearoa New Zealand's built environment.

In our 2022 prospectuses, we asked for research proposals that address the following areas of system need:

- **Changing behaviour** in the building and construction system.
- How building system actors are **thinking and planning for change**.
- Material selection for a **changing environment**.
- Addressing **building costs** to support people seeking higher-performing homes.
- Growing an efficient and **resilient building system** for the future.

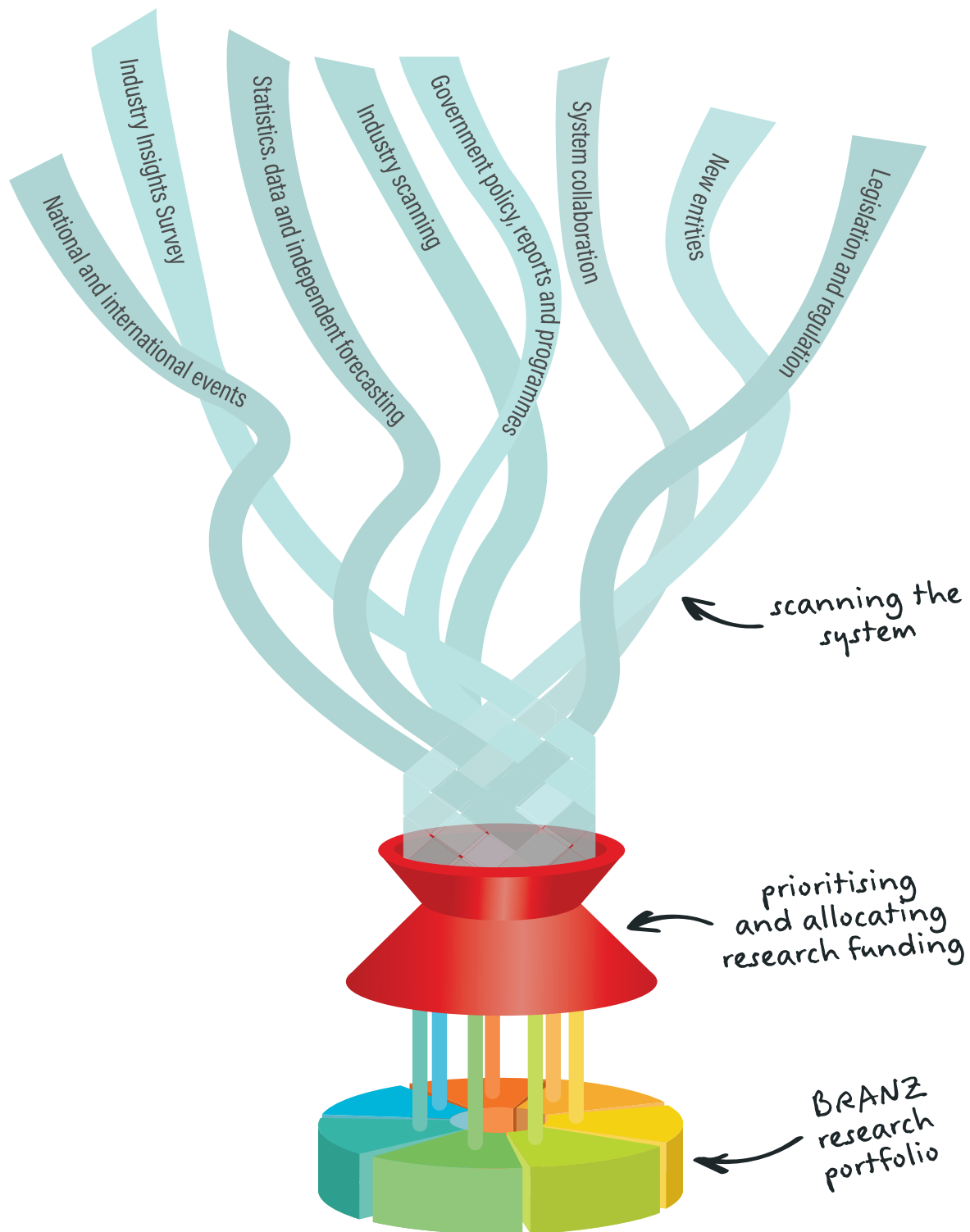
We also continue to invest in BRANZ Ltd long-term priority research programmes to deliver:

- **warmer, drier, healthier homes**
- **transition to a zero-carbon built environment**
- building **fire-safe densified housing** in Aotearoa New Zealand
- **knowledge-sharing** tools and education.

### Read more

- **Levy Investment Portfolio Statement 2022/23** – our Levy investment signals. [branz.co.nz/investing-research](https://branz.co.nz/investing-research)
- **Prospectus** – April 2022 and October 2022 – call for research proposals from external providers. [branz.co.nz/investing-research/research-funding-for-external-providers](https://branz.co.nz/investing-research/research-funding-for-external-providers)





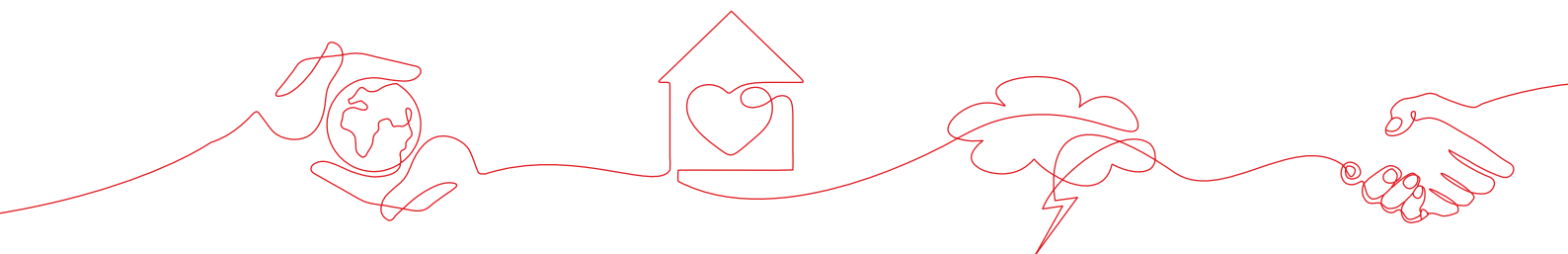
# The BRANZ research portfolio

**The BRANZ research portfolio responds to seven critical areas of research need within Aotearoa New Zealand's building and construction system.**

By investing the Building Research Levy in these areas, we aim to make the biggest difference to the lives of people in Aotearoa New Zealand.

We fund research to improve outcomes in the following areas:

- Low carbon
- Quality and performance of homes and buildings
- Resilience of the built environment
- Vibrant industry
- Housing affordability
- Thriving cities, regions and communities
- Meeting Aotearoa New Zealand's population needs





These areas of investment also help support our systems-thinking approach and provide a strong strategic framework to both organise and evaluate the work we do.

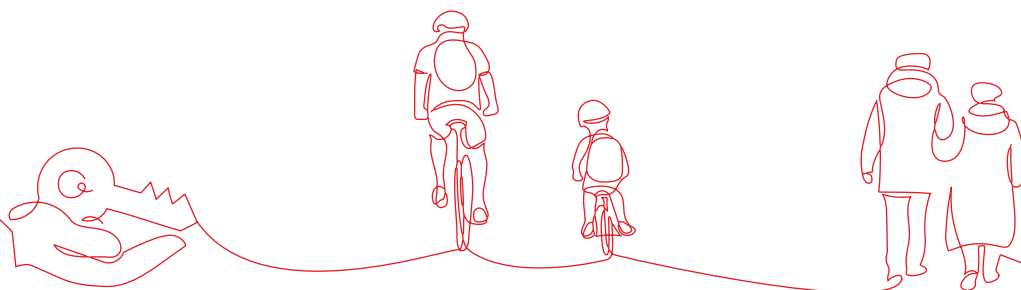
Our new and active Levy investments across our research portfolio are detailed in the following pages. Much of our new investment from 30 August 2022 to 30 August 2023 has been focused on activities that will drive change and build resilience across the system in response to changing environmental, regulatory and socio-economic needs.

### **NEW ONLINE ACCESS TO LEVY-FUNDED RESEARCH INFORMATION**

You can now browse BRANZ's full portfolio of Levy-funded research projects on our website. This includes projects from the past decade to today.

This new website feature shares our existing knowledge base and helps to identify new areas of research need and opportunities for collaboration.

Visit [branz.co.nz/research-portfolio](https://branz.co.nz/research-portfolio)







# Low carbon

Climate change is this century's most urgent challenge. Aotearoa New Zealand has signed up to ambitious targets to reduce its emissions under the Paris Agreement. The built environment has a key contribution to make in adapting to and mitigating climate change.

To support these targets, BRANZ connects expertise in whole-of-building life cycle assessment, understanding building quality and performance, construction waste, water use, sustainability, energy efficiency and social science.









## The Future of Work: Accelerate skills development for zero-carbon construction

Levy investment	\$1,873,500
Timeframe	January 2023 – March 2026
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Transition to a zero-carbon built environment research programme

The Future of Work is a multi-phase programme that aims to understand how zero-carbon skills and training can be better embedded within the building system. Through co-creation and engagement with industry stakeholders, government and researchers, the research seeks to empower behaviour change within the building system to support the transition to zero-carbon construction.

With the upcoming introduction of new Building Act regulations seeking to reduce greenhouse gas emissions, the building system needs to accelerate its skills for zero-carbon construction.

The first phase of the programme framed the challenge facing the industry around climate change literacy and understanding target behaviours. This next phase is about mapping, co-creating and prototyping a series of small-scale interventions involving professional learning.

This project will provide insights into the key knowledge and sources for information for zero-carbon advice within the building and construction sector. It will also provide direction for industry and policy development about the expertise, knowledge and competencies needed for zero-carbon building and construction.

By providing infrastructure and resources, it will enable the industry to better support zero-carbon skills development. With the resulting guidance for modifying qualifications, training and workplaces, this project aims to help the industry adopt the climate-related practices needed to accelerate zero-carbon construction in Aotearoa New Zealand.

### Read more

Future of work in building. [buildmagazine.org.nz/index.php/articles/show/future-of-work-in-building](https://buildmagazine.org.nz/index.php/articles/show/future-of-work-in-building)

## Transition to zero-carbon programme communication and dissemination 2023–25

Levy investment	\$518,000
Timeframe	January 2023 – March 2025
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Transition to a zero-carbon built environment research programme

Transitioning to zero carbon is a complex challenge. The building system must learn and respond quickly to the challenges zero carbon presents. This includes the upcoming changes to the Building Act for embodied carbon, waste management and operational efficiency of buildings.

To do this, the building system requires guidance on a wide range of issues. These span from an understanding of climate change and how it affects the built environment to technical knowledge about how to design and build low-carbon and low-impact buildings.

To support the industry to embed climate change practices, BRANZ needs to share ready-made guidance and resources efficiently and effectively. This includes increasing awareness of existing BRANZ tools like LCAQuick and creating new resources to support industry in the uptake of core climate change concepts.

This action-based project includes four key workstreams, including support for queries and training in zero-carbon tools, increasing knowledge of zero-carbon design and construction, science communication and engagement with stakeholders.

It aims to improve decision-making processes in industry practices and government policies and regulations to change attitudes across the system. It will look to strengthen and empower the industry to address climate change and reduce carbon emissions.

Ultimately, the aim of this programme is to support the building system to deliver net-zero carbon buildings by 2050 in an affordable way.

### Read more

Transition to a zero-carbon built environment. [branz.co.nz/environment-zero-carbon-research/transition](https://branz.co.nz/environment-zero-carbon-research/transition)

## Materials under the changing climate

<b>Levy investment</b>	\$2,725,000 new investment (\$3,018,000 total)
<b>Timeframe</b>	December 2022 – September 2028
<b>Lead organisation</b>	BRANZ Ltd
<b>Responds to</b>	Levy Investment Portfolio Statement 2022 – Transition to a zero-carbon built environment research programme

As an integral part of buildings, construction materials need to be resilient and sustainable. To achieve this, the building system needs a better understanding of how materials in the Aotearoa New Zealand built environment will perform under the changing climate.

This project is co-created with Waipapa Taumata Rau | University of Auckland and Te Wānanga Aronui o Tāmaki Makaurau | Auckland University of Technology researchers. It has support from Christchurch City Council, Toi Moana | Bay of Plenty Regional Council, New Zealand Steel, First Gas, Taihoro Nukurangi | NIWA, and Te Whare Wānanga o Waitaha | University of Canterbury.

This new project complements earlier research and combines with existing projects *Durability within the wall cavity and subfloor space* and *BRANZ monitoring network*.

The project aims to produce a full picture of material performance, including durability, environmental impact and carbon footprint.

Based on real-world experiments and artificial intelligence-enabled modelling, it will provide scientific evidence for:

- assessing climate change impacts on atmospheric corrosivity and predicting material durability
- reducing carbon emissions and building costs by specifying materials with an increased efficiency or climate resilience
- mitigating environmental impacts caused by material degradation by raising the visibility of known mitigation strategies, helping inform existing stormwater run-off prediction models and supporting the phasing-out of specific materials.

This research aims to empower the industry to identify new material solutions and increase awareness of environmental impacts caused by material degradation. It will also support regulation change for material adoption based on informed decisions about the trade-offs between durability, environmental impact and embodied carbon.

## Circular design for a changing environment: a design framework to reduce waste

<b>Levy investment</b>	\$150,500
<b>Timeframe</b>	March 2023 – October 2024
<b>Lead organisation</b>	Heavy Engineering Research Association (HERA)
<b>Responds to</b>	Prospectus October 2022 – material selection

Regulatory changes are requiring an increased focus on carbon reductions across the full life cycle of buildings.

However, stakeholder consultation has revealed significant confusion across the industry about how to calculate embodied carbon to include the different stages of a building's life. It has also indicated a need for increased understanding about the broader set of carbon considerations at the outset, including designing for reuse, waste minimisation, service life, reduced maintenance and longer life cycles.

To support this change, designers need comprehensive new tools and guidelines to select materials and designs that will achieve the lowest embodied carbon in the built environment.

The project is led by HERA and complements its Endeavour-funded Construction 4.0 programme, which includes a focus on circular design in building and construction. This new project is being supported by WSP and Aurecon and a wide range of stakeholders.

This research will develop and pilot a framework for preparing low-carbon design guidance. It will also deliver specific guidance for reducing carbon in low-rise buildings made from steel, steel-concrete or steel-timber.

The framework is intended to become standard practice for designers and practitioners to use at each stage of a building's life through design, construction, operation and dismantling. Lessons, templates, case studies and relationships developed in this project will be used to inform a potential framework expansion to cover mid-rise and high-rise designs.

By increasing understanding of how building design can reduce carbon emissions and by providing new guidance and tools, this project aims to support industry to deliver a lower-carbon built environment.



## Actionable steps for structural engineers towards lower embodied carbon design

<b>Levy investment</b>	\$33,000
<b>Timeframe</b>	March 2023 – December 2023
<b>Lead organisation</b>	Structural Engineering Society of New Zealand (SESOC)
<b>Responds to</b>	Prospectus October 2022 – material selection

The building and construction sector accounts for 15–20% of Aotearoa New Zealand's total carbon emissions. About half of these emissions are associated with embodied carbon and are directly impactable by structural design.

To meet Aotearoa New Zealand's net-zero carbon targets and respond to new carbon reduction regulations, it is essential that structural engineers can design and specify lower-carbon systems and materials for buildings. However, there is a lack of country-specific guidance about how to implement low-carbon structural design.

Led by the SESOC Sustainable Design Task Force, combining expertise from Waipapa Taumata Rau | University of Auckland, Mott MacDonald, Holmes Group, Beca, Aurecon and HERA, this research project will be by practitioners for practitioners.

Using knowledge from engineering teams already designing with low-carbon practices, it will create an actionable and accessible guide on embodied carbon specifically for Aotearoa New Zealand designers.

It will also include an interactive map of existing local and international embodied carbon structural design resources. The freely available guide and map will be living documents that can be updated with new research and technology developments.

Targeting residential and smaller-scale commercial buildings, the intent is to maximise potential carbon reductions and ensure more equitable information sharing across the industry. It aims to demonstrate good-practice principles in designing for lower embodied carbon to help structural engineers design better buildings for New Zealanders.

## Prediction tool for long-term contaminant release from building surfaces

<b>Levy investment</b>	\$154,050
<b>Timeframe</b>	March 2023 – May 2024
<b>Lead organisation</b>	Te Whare Wānanga o Waitaha   University of Canterbury
<b>Responds to</b>	Prospectus October 2022 – material selection

Material selection is usually based on durability and weather-tightness criteria as specified in the Building Code. However, building materials have profound implications for rivers, lakes and coastal areas due to run-off from surfaces.

Material corrosion and degradation mean contaminants such as chemicals, heavy metals, sediment, hydrocarbons, microplastics and emerging contaminants are released every time it rains. The majority of building run-off is discharged untreated into local waterways.

Councils, government, asset managers and the stormwater industry are calling for better environmental decision making about building materials. Led by Te Whare Wānanga o Waitaha | University of Canterbury with researchers from BRANZ Ltd, this project will help increase understanding of the contaminants released from different materials over their lifetime.

The research will generate new data and collate existing data on lifetime contaminant release rates for a wide range of building materials, including metals, bitumen-based membranes, composite plastics and concrete. The data will be used to develop a model framework to predict the change in contaminant loads from individual surfaces over the lifetime of the material.

Guidance tables will be produced and workshopped with councils and industry practitioners to help apply this knowledge across various stages of a building's life cycle, including material selection, design, building consent auditing and maintenance. The project will also provide a template for assessing the environmental performance of new materials.

The project will contribute to a better national performance framework to support the uptake of new materials and drive better material selection for climate change in Aotearoa New Zealand.



## Best-practice urban form for emissions reduction

Levy investment	\$139,649
Timeframe	November 2022 – May 2024
Lead organisation	Te Whare Wānanga o Waitaha   University of Canterbury
Responds to	Prospectus 2021 – reducing greenhouse gas emissions

Imagine if neighbourhoods were designed so that people could live sustainably with minimal effort. What can Aotearoa New Zealand learn from successful models both here and worldwide?

To increase understanding of the relationship between urban form and emissions, this project will develop tools to support urban planners to meet their carbon targets. This evidence-based strategic planning capability supports alignment with the National Policy Statement on Urban Development and the proposed Spatial Planning Act 2023.

Led by an interdisciplinary team at Te Whare Wānanga o Waitaha | University of Canterbury, the researchers will explore international examples of well-functioning cities, towns and neighbourhoods that have low greenhouse gas (GHG) emissions. This project will compare these high-performing examples with Aotearoa New Zealand towns and cities.

A web-based tool and scenario planner will be developed to understand emissions and develop profiles and best-practice guides for different types of neighbourhoods.

With access to these scenarios and guides that can be adapted to different transport and urban environments, decision makers and planners can better estimate potential impacts of urban development options. The tools will be freely available online so the public can also explore real-world impacts of new policy and strategy changes to support community engagement and local decision making.

By providing accessible and actionable lessons, this knowledge will support planners to meet GHG emissions reduction goals. It aims to enable them in developing and retrofitting more sustainable, healthy, accessible and resilient cities, towns and neighbourhoods across Aotearoa New Zealand.

## Modelling and calculating the carbon footprint of a building

Levy investment	\$149,626
Timeframe	March 2023 – October 2023
Lead organisation	Te Kunenga ki Pūrehuroa   Massey University
Responds to	Levy Investment Portfolio Statement 2022 – Transition to a zero-carbon built environment research programme

As Aotearoa New Zealand transitions to zero-carbon emissions by 2050, the building system needs to have accurate and reliable methods of calculating estimated future emissions for new and existing building stock.

Dynamic LCA (life cycle assessment) is a new method of accounting for carbon emissions and storage over time. Conventional methods usually quantify all carbon emissions as being released initially rather than being stored as carbon dioxide or methane over many years – meaning the results can be inaccurate or incomplete.

This study will be the first time that a dynamic LCA approach has been applied to Aotearoa New Zealand construction materials. It is led by Te Kunenga ki Pūrehuroa | Massey University and co-funded by Hikina Whakatutuki | Ministry of Business, Innovation and Employment with contributing research from Scion, BRANZ, Aalborg University in Denmark and École de Technologie Supérieure in Montréal.

This research applies the dynamic LCA method to two constructions. It will examine walls, ground floors and roof elements used in residential buildings with materials including timber, engineered wood, concrete and steel. These will be modelled over different stages of a building's life cycle, including operation and dismantling, to understand the potential contribution of carbon storage and timing of carbon emissions.

The researchers will compare the results using dynamic LCA with results from conventional methodological approaches. Using these findings, they will make recommendations on the preferred method to account for carbon storage and mitigate the carbon footprint of Aotearoa New Zealand's residential buildings.



## Roadmap to a net-zero carbon concrete industry

<b>Levy investment</b>	\$55,000
<b>Timeframe</b>	September 2022 – August 2023
<b>Lead organisation</b>	Concrete NZ & Te Whare Wānanga o Waitaha   University of Canterbury
<b>Responds to</b>	Levy Investment Portfolio Statement 2022 – Transition to a zero-carbon built environment research programme

Concrete plays a major role in Aotearoa New Zealand's built environment. To transition to zero carbon by 2050, the cement and concrete industry needs significant regulatory, technological, structural and behavioural changes across the entire supply chain.

A collaborative and integrated research programme will support the concrete industry to reduce greenhouse gas emissions. It plays an important part in the building system's commitment to Aotearoa New Zealand's Climate Change Response (Zero Carbon) Amendment Act 2019.

This research investment covers the programme's first phase, which was completed in August 2023 with the release of a comprehensive roadmap to achieve zero-carbon concrete.

The roadmap identifies key strategies that will reduce carbon dioxide emissions by 25% by 2025, 30% by 2030 and down to net-zero by 2050 and evaluate their environmental and economic impacts. It also outlines the key challenges that need to be addressed to reach these targets.

This project was led by Te Whare Wānanga o Waitaha | University of Canterbury (through the Building Innovation Partnership) and Concrete NZ. It was delivered in consultation with concrete specifiers, customers, engineers, procurers, standards authorities and government agencies.

It brought together the collective wisdom of the full concrete industry through a set of workshops, supported by information and modelling analyses provided by the research community. The results were informed by global and country roadmaps, modified to suit the needs and context of Aotearoa New Zealand.

### Read more

A Net-Zero Carbon Concrete Industry for Aotearoa New Zealand: Roadmap to 2050. [concretenz.org.nz/page/2050\\_roadmap](https://concretenz.org.nz/page/2050_roadmap)

## Scholarship: Kevin Manalo – Capturing the carbon footprint of open-cut pipeline excavations

Levy investment	\$20,000
Timeframe	March 2023 – November 2023
Lead organisation	Te Kunenga ki Pūrehuroa   Massey University
Responds to	BRANZ Scholarship Programme – Transition to a zero-carbon built environment research programme

In Aotearoa New Zealand, government and local authorities are making progress in capturing and reducing their carbon emissions. For instance, Te Kaunihera o Tāmaki Makaurau | Auckland Council has set its goal to reduce greenhouse gas emissions by 50% by 2030, and Watercare aims to reduce its emissions factor by 40% by 2025.

However, these entities still need a standard methodology to capture and record baseline carbon emissions from their activities. By developing a methodology and template, the project will help contractors to capture their carbon footprint when installing stormwater, water and wastewater pipelines for open-cut excavation.

They can use this template to interrogate whether the calculated inventory for carbon in an open-cut excavation is correct. They can also assess how data might be calibrated if the values are different and provoke thought on how to further reduce carbon emissions.

This research project aims to support all stakeholders involved in open-cut excavations for pipelines to set up transparent carbon budgets and work towards reducing emissions. This will help change contractors' positions from being reactive to proactive in the journey to net-zero carbon in Aotearoa New Zealand.



Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Prediction tool for long-term contaminant release from building surfaces						●●●●●●					154,050
Roadmap to a net-zero carbon concrete industry					●●●●●						55,000
Scholarship: Emily Newmarch – Designing low-carbon architecture in New Zealand			●●●●●●●●●●●●●●●●								75,000
Scholarship: Kevin Manalo – Capturing the carbon footprint of open-cut pipeline excavations						●●●●●					20,000
Scholarship: Rosa Gonzalez – Carbon case for resilient design				●●●●●●●●●●●●●●●●							75,000
The Future of Work: Accelerate skills development for zero-carbon construction						●●●●●●●●●●●●●●●●					1,873,500
Transition to zero-carbon programme – leadership 2019–24		●●●●●●●●●●●●●●●●									527,200
Transition to zero-carbon programme communication and dissemination 2023–25						●●●●●●●●●●●●					518,000
Zero-carbon built environment science leadership 2021–24			●●●●●●●●●●●●●●●●								454,300



# Quality and performance of homes and buildings

Buildings are essential to our way of life. They are our homes, our workplaces, our schools and our social and public spaces. Improving the quality, function and performance of our buildings is vital for supporting economic growth as well as the health, safety and wellbeing of all New Zealanders.

BRANZ drives expertise in building performance modelling, testing, materials research and knowledge of building systems, codes and standards to help improve the country's built environment.







## Energy use and conditions in New Zealand homes: Insights from HEEP2 data

Levy investment	\$3,065,000
Timeframe	August 2022 – March 2026
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Warmer, drier and healthier homes research programme

To help support an effective transition to a zero-carbon economy, we need reliable, robust data on how, when and why people use energy in homes and the conditions they live in.

The Home Energy End-use Project 2 (HEEP2) is a national data collection aiming to provide such insights. HEEP2 involves detailed monitoring of energy use and indoor conditions over a 12-month period in a sample of around 300 households throughout the country. An additional 130 households are taking part through surveys and granting access to metered (retailer) electricity data. It builds on the success of HEEP1, which ran from 1995–2010, to provide an improved understanding of the performance of Aotearoa New Zealand's housing.

The outputs from HEEP2 are in high demand, with stakeholders expressing an urgency for findings to inform critical energy wellbeing and climate change programmes. This research investment is focused on extracting and sharing insights from this rich dataset to meet these needs and ensure the value of the collected data is maximised.

It will provide analysis on energy end-use and housing conditions, including by sub-population groups and dwelling type. It will also explore measures of energy wellbeing and validate different energy models to help quantify the gap between required and actual energy use.

Research findings will help drive innovative solutions to improve energy efficiency and reduce greenhouse gas emissions in our housing stock. This research aims to address the dual challenges of climate change and energy hardship in Aotearoa New Zealand.

### Read more

Household Energy End-use Project (HEEP2).

[branz.co.nz/environment-zero-carbon-research/heep2](https://branz.co.nz/environment-zero-carbon-research/heep2)

## Simulation-based multi-objective optimisation of school building energy retrofit

Levy investment	\$200,000
Timeframe	December 2022 – December 2025
Lead organisation	Te Whare Wānanga o Waitaha   University of Canterbury
Responds to	Prospectus April 2022 – building costs

In Aotearoa New Zealand, there are nearly 2,100 schools with a total of over 16,000 buildings. According to Te Tāhuhu o te Mātauranga | Ministry of Education, about 33% of these buildings were constructed more than 50 years ago. This means there is constant ongoing work to ensure schools are well maintained and fit for purpose.

Energy retrofitting – adding new features or improvements to existing buildings to improve energy use – can help minimise both costs and greenhouse gas emissions. However, school boards often do not have the expertise to consider the full life cycle of building costs and environmental impacts.

There is a strong need for accessible information about optimal energy refit packages for school buildings that balance the trade-off between life cycle costs, total energy consumption, life cycle assessment and thermal comfort. Using a simulation-based framework to measure these different criteria, this project will create a database of building energy retrofit measures and develop a decision-making framework to identify the best options for schools.

The project is led by Te Whare Wānanga o Waitaha | University of Canterbury with research from Harvard University and Mott MacDonald. It will include strong stakeholder engagement, most importantly with Te Tāhuhu o te Mātauranga | Ministry of Education.

It aims to support optimal energy retrofitting options in school buildings, provide good-practice guidance for schools, government, architects and engineers and contribute to achieving the 2050 net-zero carbon emissions target.



## Evaluation of an intervention to enable bank customers to achieve better building performance in new-build homes

Levy investment	\$262,000
Timeframe	November 2022 – July 2024
Lead organisation	Beacon Pathway
Responds to	Prospectus April 2022 – changing behaviour

Aotearoa New Zealand’s housing stock plays a critical role in the health of New Zealanders and in reducing the national carbon footprint. However, newly built homes are often still low performing with high carbon budgets and without consideration of the future impacts of climate change.

While some banks offer customers financial incentives to build better-performing homes, the uptake is not meeting the potential of these schemes. Homes are complex and costly to build and run. To make informed decisions, homeowners need independent and personalised advice from a trusted expert. But this impartial advice is hard to find.

Led by Beacon Pathway, this project brings together a multidisciplinary research team, the Eco Design Advisor network, Te Herenga Waka | Victoria University of Wellington and a retail bank. It aims to co-create and trial a bank-tied advice programme that supports bank customer decision making to build a healthy and energy-efficient home.

It will then evaluate how this behaviour change intervention could help consumers. This includes in-depth interviews, analysis of perceived barriers and opportunities and their experiences of working with the Eco Design Advisors and their bank.

Driven by the need to demystify people’s perceptions around costs of energy efficiency improvements, this project aims to create a low-risk opportunity for banks to support new-build consumers. It seeks to connect banks and the Eco Design Advisor network, a free and independent advice service, to improve the efficiency and reduce the emissions of new homes across Aotearoa New Zealand.

## Changing evacuation behaviour to meet densified housing needs

Levy investment	\$279,751
Timeframe	February 2023 – March 2026
Lead organisation	Te Whare Wānanga o Waitaha   University of Canterbury
Responds to	Prospectus April 2022 – changing behaviour

People with mobility impairments are often not considered by building designers to the extent that they can be literally left behind in emergencies. With elevators usually taken out of operation, people with mobility impairment often have to wait until somebody can help them down the stairs or through unfamiliar routes.

The increasingly ageing and mobility-impaired population in combination with housing densification means this situation is becoming increasingly common.

Designers do not have the right tools to easily consider mobility impairment into their processes. Current design packages and simulation tools use flow data for young and able-bodied people gathered over 50 years ago.

This project aims to build new digital tools and design guidance that automatically and accurately includes people with mobility impairments by default. It is led by Te Whare Wānanga o Waitaha | University of Canterbury with support from Whakararonga Iwi | Fire and Emergency New Zealand and BRANZ researchers.

The new digital tools will include a building information modelling-based evacuation model and add-in. These will support the use of new modelling methods to assess different body types, speeds and flows, reflecting the different population mixes of today.

It also includes co-creation research on occupant notification systems like alarms and signage, evacuation elevators and safe areas within a building. This research will use virtual reality experiments to develop design guidance and help people use new ways to escape.

These tools will help designers and authorities to automatically consider mixed-ability populations within design processes. This project aims to ensure that the evacuees feel safe and included in their journey out of the building.



## Natural ventilation in homes – a quantitative exploration of behaviours and intervention for change

Levy investment	\$199,788
Timeframe	November 2022 – January 2024
Lead organisation	Te Whare Wānanga o Ōtākou   University of Otago
Responds to	Prospectus April 2022 – changing behaviour

Home-occupant behaviour in respect to ventilation in Aotearoa New Zealand is under-researched, despite the benefits that a well-ventilated building may have on respiratory health. Most Kiwi homes rely on natural ventilation by opening windows, which is occupant controlled.

As the climate changes, natural ventilation will be increasingly important not just for reducing moisture but for reducing exposure to high indoor temperatures without increasing energy costs and carbon emissions.

This research aims to understand how and to what extent people ventilate their homes, and ways in which ventilation might be improved.

The project will examine previously collected data to identify patterns of ventilation that are most closely associated with reduced indoor humidity and low indoor mould levels. The researchers will also interview housing assessors and whānau living in homes with known dampness issues.

Using this knowledge, the researchers will pilot a low-cost intervention aimed at improving ventilation behaviours. The effectiveness will be monitored using a sensor system that will alert occupants to poor ventilation in their living areas. Researchers will assess the levels of indoor mould before and after the intervention, followed by interviews with participants about their experiences.

The analysis of the data will establish a baseline of standard ventilation practice in Aotearoa New Zealand. It will identify whether a low-cost intervention can change people's ventilation behaviours to reduce indoor relative humidity and visible mould in Kiwi homes.

## Developing aspirational change – better kitchen joinery outcomes for all

Levy investment	\$201,859
Timeframe	November 2022 – November 2025
Lead organisations	Te Herenga Waka   Victoria University of Wellington & New Zealand Joinery Manufacturers' Federation
Responds to	Prospectus April 2022 – changing behaviour

Zero-carbon aspirations challenge us to reconsider many aspects of how we build and use housing. However, there is little guidance on how to envision, implement and accelerate such necessary changes.

Using kitchen joinery – the fixed elements of a kitchen such as cabinets and benches – as a case study, this project aims to develop a new model for change. Kitchen joinery represents a small but complex subsystem within the building system and is relatively under-researched, despite being one of the most frequently changed parts of Kiwi homes.

Co-designed by Te Herenga Waka | Victoria University of Wellington and the New Zealand Joinery Manufacturers' Federation, this project aims to develop new insights to inform systemwide behaviour change. It seeks to encourage innovation, waste reduction and reduction of toxicity and de-risk the uptake of new technologies and materials in kitchen joinery.

The core outcomes of this project include evidence-based knowledge about kitchen joinery solutions that produce lower carbon, waste and toxicity and contribute to a circular economy. The project will also develop, pilot and evaluate a specific model for change for Aotearoa New Zealand producers, suppliers and homeowners.

With scientific and governmental organisations working to stimulate sustainable interventions, this work will help increase understanding of ways change could be accelerated. It will also produce new knowledge and design strategies to develop more sustainable practices for kitchen joinery in Aotearoa New Zealand.

## Healthy homes: Communication action research

Levy investment	\$226,883
Timeframe	September 2022 – September 2025
Lead organisation	Wellington Regional Healthy Housing Group
Responds to	Prospectus April 2022 – changing behaviour

Warm, dry, and energy-efficient homes are a foundation for people’s physical, mental and social health and wellbeing and are essential for a low-carbon future. However, there is slow progress on the behavioural and policy changes needed to achieve these outcomes for New Zealanders.

The Wellington Regional Healthy Housing Group draws together over 50 key organisations\* (including BRANZ Ltd) to make a collective impact for the Wellington region. In partnership with The Workshop research agency, its work targets behaviour and policy change that leads to improved performance of residential buildings.

Key to achieving this change is communication. However, the group has found that traditional messaging has had limited effectiveness. Evidence suggests that narrative change strategies are more likely to achieve transformational system and behaviour change. Narrative change communications have been used effectively in Aotearoa New Zealand for complex social issues (such as child poverty) and for housing initiatives overseas.

Developed through stakeholder engagement, this collaborative project will test, monitor and refine narrative change communications campaigns and messaging. It will support the development of robust communications tools and resources and demonstrate how this approach can serve the wide range of organisations engaged in healthy homes work in Aotearoa New Zealand.

By changing narratives, this project aims to help build an environment where New Zealanders understand and value warmer, drier homes. It will support the policy and regulatory settings needed to make these homes financially, technically and politically possible.

\* See full list of members at [wrhgg.org.nz/members-list](http://wrhgg.org.nz/members-list)

## Cold-formed steel framing: Calibrating and modelling for energy efficiency

Levy investment	\$121,300
Timeframe	August 2023 – September 2024
Lead organisation	National Association of Steel Framed Housing (NASH)
Responds to	Levy Investment Portfolio Statement 2022 – distinct industry need

Many new residential buildings are not retaining heat efficiently. To improve new-build performance, Hikina Whakatutuki | Ministry of Business, Innovation and Employment increased the minimum R-values for building systems, which is a measure for how materials resist the transfer of heat.

In response, NASH and industry partners developed a programme of research to transform how Aotearoa New Zealand builds its residential dwellings. It focuses on how energy efficiency of roofing, walls, floors and junctions in dwellings constructed from cold-formed steel framing could be improved. This will contribute to warmer, healthier homes and to reducing greenhouse gas emissions.

The first phase of the research explored modelling software and current insulation practices to understand the need to develop solutions suited to Aotearoa New Zealand conditions. The second phase builds on this knowledge to develop and assess new cold-formed steel framing systems to achieve higher R-values that meet or exceed current regulations.

The project is led by NASH in partnership with Waipapa Taumata Rau | University of Auckland and working with New Zealand Steel, FRAMECAD, Thermakraft / Kingspan, Winstone Wallboards and Comfortech.

Using new designing-detailing framing for walls with junctions, roofing/ceilings and suspended floors, the research team will determine what new systems might be viable. These systems will be fabricated in both Tāmaki Makaurau Auckland and Ōtautahi Christchurch to assess energy efficiency, durability, ease of installation and manufacturing and affordability in two different climatic regions.

The successful systems will then be tested using WUFI modelling, which calculates heat and moisture transfer in building components. The lessons will be used to develop an energy efficiency steel framing code of practice for the sector.



## Quality and performance of homes and buildings investment overview

● Under way ● New funding 2023/24

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Building for wellbeing			●	●	●	●	●	●	●	●	836,961
Changing evacuation behaviour to meet densified housing needs						●	●	●	●	●	279,751
Cold-formed steel framing: Calibrating and modelling for energy efficiency						●	●	●			121,300
Developing aspirational change – Better kitchen joinery outcomes for all						●	●	●	●	●	201,859
Durability verification database 2021–24			●	●	●	●	●	●			41,000
Evaluation of an intervention to enable bank customers to achieve better building performance in new-build homes						●	●	●	●		262,000
Healthy homes: Communication action research						●	●	●	●	●	226,883
HEEP2 – Energy insights from our homes		●	●	●	●	●	●	●			5,660,000
Higher-performing buildings					●	●	●	●	●		2,231,000
Energy use and conditions in Aotearoa New Zealand homes: Insights from HEEP2 data						●	●	●	●	●	3,065,000
Indoor air quality (IAQ/IEQ) research					●	●	●	●	●		1,204,300
Mould – Finding the invisible – Phase 1 investigation				●	●	●	●	●	●	●	309,397
Natural ventilation in homes – a quantitative exploration of behaviours and intervention for change						●	●	●			199,788
Potential unintended consequences of high-performance construction					●	●	●	●	●	●	1,049,000
Preservative treated timber outgassing			●	●	●	●	●	●			700,000
Programme leadership	← 2017	●	●	●	●	●	●	●	●	●	790,000
Scholarship: Phoebe Taptiklis – Maintenance and dampness	← 2015	●	●	●	●	●	●	●	●	●	75,000

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Scholarship: Griffin Cherrill – Internal moisture from thermal bridges				●●●●●●●●							50,000
Scholarship: Ting Yen Khor – Pre-contamination of wallboard with fungi		●●●●●●●●●●●●●●●●									20,000
Simulation-based multi-objective optimisation of school building energy retrofit						●●●●●●●●●●●●●●●●					200,000
The future of national housing surveys – Towards a collaborative approach				●●●●●●●●●●							64,000
Towards durable timber structures – Phase 2		●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●									1,186,755
Usage and uptake of engineered wood products in New Zealand				●●●●●●●●●●●●●●●●●●●●●●							68,000
Warmer, drier, healthier homes: Communications and dissemination 2021–23			●●●●●●●●●●●●●●●●								180,000





# Resilience of the built environment

Aotearoa New Zealand is vulnerable to many weather, climate and geological hazards. Buildings and infrastructure need to be designed to minimise the risks from and withstand events such as high winds and rain, sea-level rise, earthquakes and tsunamis.

BRANZ invests in structural and non-structural engineering research, fire research, materials research and knowledge of building systems, codes and standards to help strengthen Aotearoa New Zealand's built environment.









## B-RISK future development roadmap

Levy investment	\$320,000
Timeframe	January 2023 – October 2024
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Building fire-safe densified housing research programme

Fire safety research is about protecting people's lives. It is critical that we have robust models to understand the effect of fires so everyone can live as safely as possible in residential spaces such as densified housing.

B-RISK is a software application developed at BRANZ that allows users to analyse fire development and smoke spread in buildings.

B-RISK is a free publicly available tool widely used by fire engineering experts, organisations and students in Aotearoa New Zealand and is becoming increasingly used overseas. In the global Fire Research Group's 2021 report *Fire Engineering Practitioner Tools: Survey and Analysis of Needs*, it found B-RISK was the third most used fire modelling software internationally.

With strong industry validation, it is time to consider the next phase of this software to ensure it continues to be an effective and valuable tool. This research project will deliver a roadmap and develop an implementation plan for future use of B-RISK by the industry.

The intended outcomes include:

- ensuring the quality of B-RISK moving forward
- adapting B-RISK to support the building industry as it changes
- ensuring the most cost-effective use of developing the tool for fire safety practitioners
- maintaining B-RISK with user-friendly features
- improving collaboration on B-RISK development and maintenance.

B-RISK provides practising engineers and our fire safety professionals with best-practice tools to support innovative building fire safety design. Ensuring the application remains relevant and effective will help drive the construction of more cost-effective, sustainable and safer buildings for people around the world.

### Read more

B-RISK. [branz.co.nz/fire-research/projects/b-risk](https://branz.co.nz/fire-research/projects/b-risk)

## Seismic risk communication – Moving from understanding to behaviour change

Levy investment	\$169,400
Timeframe	November 2022 – June 2024
Lead organisation	Resilient Organisations
Responds to	Prospectus April 2022 – changing behaviour

The building and construction industry needs to change how it communicates about seismic risk.

Without owners and occupants clearly understanding the seismic risk of buildings, we are seeing a range of unwanted impacts from reluctance to rise above minimum Code requirements to unnecessarily vacating buildings.

This project builds on the BRANZ earthquake-prone building guidance and aims to unpick the interpretation of seismic risk information specifically by commercial building tenants.

By interviewing the people who provide seismic information to tenants, this research project will identify current language and tactics as well as concerns and information gaps. It will then test existing and proposed communication approaches with commercial building tenants, exploring how issues such as perceived liability and trust play into the way messages are delivered and received.

The outcome is to create guidance for engineers, property managers, property owners and policy makers to improve seismic risk communication and support more informed conversations with commercial building tenants.

By increasing collective understanding, this project aims to drive a sensible and measured approach to seismic risk in buildings, increasing safety and minimising disruption through unnecessary closures. This research will also help enable the property market to understand the value of investment in seismic resilience and take opportunities to enhance resilience.



## Development of a seismic qualification framework for non-structural elements in New Zealand

Levy investment	\$110,000
Timeframe	February 2023 – January 2023
Lead organisation	Te Whare Wānanga o Waitaha   University of Canterbury
Responds to	Prospectus October 2022 – material selection

Non-structural elements (NSEs) are essential for building function and liveability – including, for instance, ducting, suspended ceilings and façades. However, there is insufficient knowledge about their seismic performance, which leads to increased risk of seismic failures and poor earthquake safety.

Building professionals are also struggling to solve specification, construction and procurement challenges, creating higher construction costs and risks. In a previous Levy-funded study, building professionals unanimously stressed that the lack of minimum acceptable standards for the seismic qualification of NSEs is a pressing problem. The Commerce Commission has also identified the need for alternative compliance pathways for building components.

This has prompted a cross-organisational response, linking researchers from Te Whare Wānanga o Waitaha | University of Canterbury, WSP, Beca, Naylor Love and BRANZ, with co-funding from the Building Innovation Partnership.

The collaborative research project will develop a seismic qualification framework and a series of tools for NSEs in Aotearoa New Zealand. The framework will streamline performance characterisation, specification and quality assurance procedures and help inform procurement documentation and the consenting process.

Researchers will test whether existing protocols meet loading and performance requirements. They will develop new protocols if needed alongside data on design parameters for NSEs. These will be validated and tested on at least one live project.

The framework will bring reliability and transparency to design and procurement of NSEs. It will be a stepping stone to meeting resilience objectives and result in better, safer buildings for New Zealanders.

## Suspended ceilings code of practice update

Levy investment	\$18,480
Timeframe	May 2023 – September 2023
Lead organisation	Association of Wall and Ceiling Industries (AWCI)
Responds to	Levy Investment Portfolio Statement 2022 – distinct industry need

The danger, costs and disruption caused by the seismic failure of non-structural elements (NSEs), especially suspended ceilings, were starkly evident during the Ōtautahi Christchurch and Seddon earthquakes. In response, the Department of Building and Housing's Engineering Advisory Group called for better guidance on the installation of suspended ceilings.

In 2015, together with Hikina Whakatutuki | Ministry of Business, Innovation and Employment and AWCI, BRANZ produced an industry-agreed code of practice (COP) for the design, installation and seismic restraint of suspended ceilings. This CoP supports improved safety and reduced financial loss due to the failure of NSEs. It is a valuable tool for architects, designers, engineers and installers. The electronic version has been downloaded more than 2,000 times, and more than 800 people attended educational seminars around the country.

Since its publication in 2015, there have been many changes to building standards as well as best-practice fixing and fitting methods. The industry has therefore been calling for an urgent upgrade of the COP.

In collaboration with AWCI, this COP update will include all the current industry practices and research on suspended ceilings and provide more clarity on issues around gravity fixing. It will be developed by AWCI, including consultation with major manufacturers and suppliers, as well as the Christchurch Earthquake Centre.

From late 2023, the new COP edition will be freely available for download. The publication is predicted to have a significant positive effect on the design, installation and resilience of suspended ceilings.

### Read more

2015 AWCI code of practice for design, installation and seismic restraint of suspended ceilings. [awcinz.org.nz](http://awcinz.org.nz)



## Resilience of the built environment investment overview

● Under way ● New funding 2023/24

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
B-RISK future development roadmap						●●●●●●●●					320,000
B-RISK support 2021-24				●●●●●●●●●●							212,000
Building fire-safe densified housing programme – Communications and knowledge transfer 2021-24			●●●●●●●●●●								289,400
Building fire-safe densified housing programme – Leadership 2020-24		●●●●●●●●●●									361,000
Development of a seismic qualification framework for non-structural elements in New Zealand						●●●●●●					110,000
Fire safety quality processes in the New Zealand built environment				●●●●●●●●●●							407,000
Lithium batteries – Fire risks associated with buildings		●●●●●●●●●●									125,750
Scholarship: Jono MacIntyre – Predicting structural fire severity	●●●●●●●●●●										75,000
Scholarship: Gordon Chen – Steel beam-column connections in fire				●●●●●●●●●●							75,000
Scholarship: Kirill Panov – Metallic materials in geothermal environments				●●●●●●●●●●							75,000
Scholarship: Luke de Schot – Human behaviour in fire					●●●●●●●●●●●●●●●●						42,000
Scholarship: Mikhail Gedyma – Seismic performance and hybrid bracing					●●●●●●●●●●●●●●						75,000
Scholarship: Mohamed Mostafa PhD – Precast floors and torsion			●●●●●●●●●●								75,000
Seismic design and retrofit of hillside houses			●●●●●●●●●●●●●●								844,200

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Seismic design of low-rise and mid-rise hybrid residential buildings			●	●	●	●	●	●	●	●	1,021,000
Seismic risk communication – Moving from understanding to behaviour change						●	●	●	●		169,400
Suspended ceilings code of practice update						●	●				18,480



# Vibrant industry

The building sector is crucial to Aotearoa New Zealand's economy. It contributes more than 6% to our gross domestic product (GDP) and employs more than 250,000 people. A well-functioning sector will have a positive effect on our country's health, economic stability, security and social cohesion.

BRANZ connects expertise in leadership, systems knowledge, collaboration and economics to contribute to a well-functioning industry.







## Supporting industry action on waste

Levy investment	\$338,500
Timeframe	January 2023 – March 2024
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Transition to a Zero Carbon Built Environment research programme

The building and construction industry is one of Aotearoa New Zealand's largest waste producers, contributing up to 50% of all waste going to landfills. As the country looks to reduce its greenhouse gas emissions, the efforts to minimise construction and demolition waste is becoming increasingly important for industry and government players.

In 2024, Manatū Mō Te Taiao | Ministry for the Environment (MfE) and the Hikina Whakatutuki | Ministry of Business, Innovation and Employment Building for Climate Change programme are leading significant changes to building regulation in relation to waste minimisation.

To adapt, the industry needs new strategies and resources to tackle construction and demolition waste. In partnership with MfE, this project will bring together government, industry and researchers to support and co-create coordinated action. It seeks to drive waste minimisation behaviour change within the sector by changing agendas, enhancing knowledge, and improving decision making.

Exploring the existing information gaps and barriers to reducing waste, this research project will increase industry awareness by updating resources and guidance. By increasing knowledge and nurturing new approaches to waste minimisation, it aims to enable a smooth and equitable introduction of these regulatory changes to the building system.

As these new changes come into effect, the industry needs to be both inspired to act and equipped with the tools and resources it will need to make a positive change. When it comes to developing industry waste minimisation capacity, there is no time to waste.

## Digital knowledge transfer

Levy investment	\$1,248,000
Timeframe	September 2022 – March 2026
Lead organisation	BRANZ Ltd
Responds to	Levy Investment Portfolio Statement 2022 – Knowledge sharing and enabling activities

Changing industry behaviour is central to BRANZ's vision for better outcomes for all New Zealanders. Increasingly, BRANZ's digital tools are at the forefront of BRANZ's support for industry, providing opportunities for better conversations about pain points and systems and industry issues. Enhancing our digital tools to optimise knowledge transfer is therefore a high priority for BRANZ.

BRANZ digital products are important sources of information for industry, councils and government organisations and key channels for sharing our impartial and independent research. The Industry Insights Survey (Colmar Brunton, 2022) showed that 67% of industry seeking BRANZ information do so via our websites and digital tools.

This project funding provides for ongoing planning, updating, maintenance, support and licensing for BRANZ digital products throughout their entire life cycle. This will ensure our tools keep pace with legislative change and best practice and the demands of an increasingly technologically savvy audience whose expectations continue to evolve. Our digital products provide the tools to help us respond to the shifting requirements of the system.

Our digital services include the H1 Hub, Climate Xchange, BRANZ Maps, *Build* magazine online, MyBRANZ Knowledge, topic-specific websites and continuing support for the digitised *House insulation guide* and H1 calculators.

This work will ensure system players can access the information that supports them to undertake behaviour change activities. Using an industry-focused model, BRANZ provides industry with the digital content it needs to deliver a better built environment.



## Fostering the new good: biomaterials for a radically lower carbon built environment

Levy investment	\$54,060
Timeframe	March 2023 – July 2024
Lead organisation	Te Herenga Waka   Victoria University of Wellington
Responds to	Prospectus October 2022 – material selection

To realise Aotearoa New Zealand's zero-carbon aspirations, the industry needs to rethink its assumptions about what materials should be used in the built environment.

This can be achieved by engaging with promising novel and more established biomaterials. These materials are derived from or produced by biological organisms like plants, animals, bacteria, fungi and other lifeforms. These are often low carbon, and most biomaterials such as hempcrete or mycelium-based biocomposites actually reduce carbon through absorption during their growth phase.

This project seeks to determine the barriers and drivers to accelerate the use of these carbon-reducing biomaterials across the building system. It aims to identify points where intervention could help stimulate uptake and inform key regulators, innovators and early adopters.

It also aims to catalogue scientific understanding of the key performance characteristics of different biomaterials and will examine how specific biomaterials engage with mātauranga Māori (Māori knowledge).

Led by Te Herenga Waka Te Kura Waihanga | Victoria University of Wellington School of Architecture, this project brings together researchers from Warren and Mahoney Architects and Te Wānanga Aronui o Tāmaki Makaurau | Auckland University of Technology.

Research and interviews will inform the development of intervention-based experimental studies, which will then be tested with stakeholders and other participants. Based on the results, the team will prepare recommendations of possible interventions to help the system transition to using more biomaterials.

## Accelerating acceptance: Reducing regulatory barriers to adopting material and product innovations

Levy investment	\$76,975
Timeframe	March 2023 – February 2024
Lead organisation	Third Bearing
Responds to	Prospectus October 2022 – material selection

Increasing the adoption of new building materials and products is key to achieving Aotearoa New Zealand's greenhouse gas emissions targets as well as improving productivity.

However, using tried and tested materials and products is seen as a quicker and easier approach to gaining building consent. Hikina Whakatutuki | Ministry of Business, Innovation and Employment's *Issues Discussion Document – Review of the Building Consent System* (July 2022) noted that, in some cases, stakeholders felt there was an unreasonable level of scrutiny for new designs and methods. For larger designers and builders, this pattern is often repeated as they work with different building consent authorities (BCAs).

This project is led by Third Bearing, working with Simpli BCA members. With the aim of increasing the speed of consent, the project will investigate ways to improve the acceptability of new materials and ultimately improve their viability for the building and construction industry. It seeks to understand how to move new materials into common knowledge to reach a point of regulatory acceptance without needing additional requests for information.

With participation from nearly 30 BCAs, the project will engage with industry players who are developing new materials, products and systems. It will also analyse consenting data and conduct a series of interviews with BCA officers and industry innovators.

Using these insights, researchers will create guidance for BCAs, industry innovators and regulatory bodies to help improve the consenting process for new materials. By reducing barriers, it aims to increase the speed and volume of lower-carbon materials and methods being adopted by the industry to help support Aotearoa New Zealand's climate change targets.



## Improving performance and collaboration for offsite construction

<b>Levy investment</b>	\$200,000
<b>Timeframe</b>	March 2023 – October 2025
<b>Lead organisation</b>	Waipapa Taumata Rau   University of Auckland
<b>Responds to</b>	Prospectus April 2022 – changing behaviour

Offsite construction (OSC) is a promising solution to address housing affordability and supply challenges in Aotearoa New Zealand. However, most OSC is still new and untested nationally. This means it is not yet effectively reducing costs, time and risks, which hinders broader adoption across the country.

From literature reviews and interviews with industry experts, we know that knowledge about OSC from existing build projects is highly valuable in informing new ones. However, designers, engineers and contractors often do not effectively capture and reuse knowledge.

Led by Waipapa Taumata Rau | University of Auckland, this research is in collaboration with Codify Asset Solutions and Te Whare Wānanga o Waitaha | University of Canterbury.

The project aims to build an open and freely available OSC knowledge base, develop best-practice guidelines for storing OSC learnings and data and create multiple case studies based on real projects. The researchers will then implement a longitudinal survey to evaluate its effectiveness.

By creating this shared and accessible information, the research aims to drive system-wide behaviour change for capturing and reusing OSC knowledge. Ultimately, it will support collaboration to make the productivity and financial benefits of OSC possible in Aotearoa New Zealand.

## De-risking the uptake of new technologies

<b>Levy investment</b>	\$200,000
<b>Timeframe</b>	October 2022 – September 2024
<b>Lead organisation</b>	Waipapa Taumata Rau   University of Auckland
<b>Responds to</b>	Prospectus April 2022 – changing behaviour

To best navigate skills shortages and sustainability challenges, organisations in the architecture, engineering and construction sector need to embrace rapid innovation.

Boston Consulting Group research figures show that full-scale digitisation may help the industry save up to \$1.7 trillion annually worldwide. However, a recent BRANZ study on technology implementation in the New Zealand construction sector found that there is a low uptake of technology among the 428 construction companies surveyed. This is often due to a lack of expertise and skills for technology integration.

This behaviour change project by the same group of researchers aims to encourage innovation in the sector. By introducing interventions that influence effective change management, they seek to de-risk the uptake of new technologies across the system.

The Waipapa Taumata Rau | University of Auckland researchers, in collaboration with Te Herenga Waka | Victoria University of Wellington and Callaghan Innovation, will trial a series of co-designed interventions with industry stakeholders. Case studies of other companies will be shared to influence change management and decision-making processes towards technology uptake.

The effectiveness of the interventions on behaviour change will be evaluated by using system dynamics modelling. The findings will inform the development of strategies and plans for the construction sector and associated stakeholders. Ultimately, the project aims to encourage companies to embark on a technology transformational journey to improve productivity and performance across the sector.

### Read more

ER71 Technology implementation: What does the future hold for construction? (2022). [branz.co.nz/pubs/research-reports/er71](https://branz.co.nz/pubs/research-reports/er71)



## ModelDocs: Transforming building consenting behaviour

Levy investment	\$200,000
Timeframe	November 2022 – November 2023
Lead organisation	Waipapa Taumata Rau   University of Auckland
Responds to	Prospectus April 2022 – changing behaviour

To keep building costs down, productivity is crucial to the building and construction industry. However, the consenting process is often a delaying factor due to miscommunication between industry and building officers. There is strong governmental and sector support for improving efficiencies in building consenting.

The consenting process in Aotearoa New Zealand is complex. There are more than 900 building officers that operate across 70 building consent authorities (BCAs). Each BCA has its own application form to assess housing compliance for 30,000 different organisations. Such complexity and variability have led to uncertainty, misunderstandings and entrenched behaviours on both sides of the consenting process and an increased dependence on additional requests for information.

This research aims to create more efficiencies within the system by understanding what behaviours are helpful or hindering for both applicants and building officers. Using these insights, the research team aims to streamline consenting behaviours by developing a set of model documents.

These ModelDocs will provide clear guidance on what information the building and construction industry needs to submit for more consistent communications and decision making from consenting authorities. They will include guidelines, a streamlined application form, a set of agile matrices and an extensive directory of good practice.

The project is led by Waipapa Taumata Rau | University of Auckland in collaboration with Building Officials Institute of New Zealand and Te Kāhui Whaihanga | New Zealand Institute of Architects. It includes support and consultation with representatives from Hikina Whakatutuki | Ministry of Business, Innovation and Employment Building Performance, MetroGroup (a collective representing Aotearoa New Zealand's six largest BCAs), Te Kaunihera o Tāmaki Makaurau | Auckland Council, builders, manufacturers and suppliers.

By streamlining the consenting process and facilitating clear communication, this project aims to ultimately result in faster, more robust consenting processes.



## Psychologically safer workspaces

Levy investment	\$191,638
Timeframe	November 2022 – February 2024
Lead organisation	MATES in Construction
Responds to	Prospectus April 2022 – changing behaviour

Construction is historically a high-stress industry. Construction workers in Aotearoa New Zealand can be exposed to many psychosocial hazards and risks such as long working hours, bullying behaviours and more. This has been linked to negative impacts on their mental health and wellbeing, with higher rates of suicide than the national average.

While there have been efforts to address these hazards, there is little existing research that explores which interventions could be most effective and acceptable to the building system. Organisations need to better understand barriers and facilitators to implementing evidence-based interventions for this workforce.

This research project is led by MATES in Construction New Zealand in collaboration with Te Herenga Waka | Victoria University of Wellington. It has endorsement from key industry stakeholders such as Hikina Whakatutuki | Ministry of Business, Innovation and Employment, Mahi Haumarū Aotearoa | WorkSafe and other tertiary institutions across Aotearoa New Zealand.

The research aims to map and evaluate existing interventions to address psychosocial hazards and support mental health and wellbeing. It will also identify the perceptions, behaviours and beliefs that contribute to which interventions are chosen by the industry. By understanding existing assumptions, the researchers will explore how decision makers can be encouraged to change their behaviours in selecting and implementing evidence-based interventions.

These findings will be used to create an accessible blueprint or tool to help the industry select the best interventions to address different psychosocial hazards. The blueprint will provide recommendations for policies, programmes and practices. The research aims to change behaviour to create psychologically safer work environments across the entire construction industry.

### REACHING OUT FOR SUPPORT

**MATES in Construction** – 0800 111 315: 24/7 helpline

**Need to talk?** Free call or text 1737 any time for support from a trained counsellor

**Lifeline** – 0800 543 354 (0800 LIFELINE)  
or free text 4357 (HELP)

**Suicide Crisis Helpline** – 0508 828 865 (0508 TAUTOKO)

**Healthline** – 0800 611 116

**Samaritans** — 0800 726 666

## Proactively eliminating quality issues in Construction 4.0

Levy investment	\$149,345
Timeframe	March 2023 – September 2024
Lead organisation	Te Kunenga ki Pūrehuroa   Massey University
Responds to	Prospectus April 2022 – changing behaviour

The quality of homes in Aotearoa New Zealand is influenced by the ability and willingness of building professionals to communicate, meet needs and manage issues. BRANZ research has found that more than 85% of new homeowners have to call back their builders to fix defects after they move in. Quality issues in buildings are an ongoing issue and have significant costs for both homeowners and the building system.

To raise the quality of housing, we need targeted industry behaviour change interventions.

Formed by insights from key industry stakeholders, this project aims to eliminate quality issues by changing construction professionals' perceptions, attitudes and behaviours towards proactive quality management.

By adopting well-tested psychology theories to stimulate behaviour and attitude changes in the construction sector, the researchers will develop interventions for the residential sector, specifically for owners of small and medium enterprises (SMEs). This could include education and training, the adoption of new technologies and improvements to processes, including regular quality measurement.

Led by Te Kunenga ki Pūrehuroa | Massey University with research from the University of Southern Queensland, this project has been developed through consultation with architects, construction management, software specialists, group-home builders and major product suppliers.

It aims to build strong engagement with industry professionals to form self-efficacy when it comes to quality management. By shifting accepted industry behaviours, it seeks to help support higher-quality new-build houses for the Aotearoa New Zealand population.



## Improving cost estimation of construction projects

Levy investment	\$190,000
Timeframe	November 2022 – February 2025
Lead organisation	Te Kunenga ki Pūrehuroa   Massey University
Responds to	Prospectus April 2022 – system resilience

Construction companies are under increasing cost pressures in delivering construction projects. In 2022, a higher-than-average number became insolvent.

While supply issues, labour shortages and increased costs are all factors, licensed insolvency practitioners suggest that sub-optimal cost-estimation and cost-management practices are among the main causes of insolvency. Internationally, defective cost-estimation practices have been ranked as one of the top factors affecting company failures.

Developing more robust cost-estimation processes across the system could reduce cost blowouts and potentially decrease insolvency risk.

This project will determine the role that variability in cost estimation plays in building company insolvency. It will identify different cost-estimation processes used at the tender stage and reasons for cost variations and seeks to establish the link between cost estimations leading to cost blowouts and insolvencies.

Through interviews with professional cost estimators in Aotearoa New Zealand's three largest cities, the researchers will develop good-practice guidelines to demonstrate accurate cost-estimation processes and potential improvements.

These guidelines are intended to support practitioners to change their practices to create better cost estimations. They will also assist cost estimators in construction companies to create standardised processes. By taking the guesswork out of cost estimation, this project aims to improve the sustainability of construction companies and create a more resilient system.

## Role of scale and business model approach to improve resilience

Levy investment	\$95,380
Timeframe	November 2022 – December 2023
Lead organisation	Third Bearing
Responds to	Prospectus April 2022 – system resilience

By necessity, most of Aotearoa New Zealand's residential construction firms are small scale. This is often seen as a weakness in terms of resilience and is perceived as one of the key reasons for the sector's vulnerability. However, there is limited understanding about which characteristics matter most for system resilience. Scale is a factor, but the business model approach may be equally or more important.

This project aims to understand the key factors of resilience, identify any weaknesses and analyse the role that business scale and business models can play in addressing these challenges. The project will work closely with industry bodies and large group-home builders.

A key focus will be on whether new changes to practice adopted by large firms (such as quality management and assurance systems) can be successfully extended to medium-sized firms. The project will establish whether such a move could improve sector resilience and influence a higher proportion of houses being constructed across the country.

With literature reviews, targeted interviews and analysis of available data, this project seeks to co-create mapping analysis with key industry players. Developing case studies and a self-assessment tool will turn these findings into free, practical and easy-to-digest guidance for the industry.

By understanding the factors that underpin resilience, this project seeks to support businesses in their business model approach and help to improve long-term resiliency of the construction system.



## ArchEngBuild 2023

Levy investment	\$80,000
Timeframe	August 2023
Lead organisation	BRANZ Ltd, Concrete NZ and Te Herenga Waka   Victoria University of Wellington
Responds to	Levy Investment Portfolio Statement 2022 – distinct industry need

Now in its 10th year, ArchEngBuild brings together Aotearoa New Zealand's future industry leaders.

Thirty of the country's best architecture, engineering and construction management students collaborate in this intensive 3-day competition, held this year in Te Whanganui-a-Tara Wellington.

ArchEngBuild aims to nurture collaboration and innovation for the industry's emerging talent.

Working together across disciplines, they will deliver a concept design in response to a project brief. Addressing real-life and pressing issues faced by industry, the competition encourages students to produce creative and innovative solutions.

Students gain insights into how their counterparts think and make decisions as well as their varying perspectives and priorities. Participants quickly learn that effective communication is essential to the design process.

The creativity and innovation the students bring always impress the ArchEngBuild judges, and the collaborative experience has made a real difference in past participants' work lives.

Past ArchEngBuild students have described the challenge as one of the best experiences of their studies and the only chance they had to collaborate with and get insight into the work of other disciplines.

Leading industry experts support the event by sharing their experience and expertise with inspiring keynote speeches, mentoring, judging and tours of their building project accomplishments.

ArchEngBuild 2023 is sponsored by Concrete NZ, Metals New Zealand, Sustainable Steel Council, WIDE and the New Zealand Timber Design Society.

ArchEngBuild is supported by Te Kāhui Whaihanga | New Zealand Institute of Architects, Te Ao Rangahau | Engineering New Zealand and the New Zealand Institute of Building.



## Vibrant industry investment overview

● Under way ● New funding 2023/24

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Accelerating acceptance: Reducing regulatory barriers to adopting material and product innovations						●●●●●					76,975
ArchEngBuild 2023						●					80,000
Building controls 2021–24				●●●●●●●●●●●●●●							990,000
De-risking the uptake of new technologies						●●●●●●●●					200,000
Digital knowledge transfer						●●●●●●●●●●●●●●●●●●					1,248,000
Fostering the new good: biomaterials for a radically lower carbon built environment						●●●●●●●●					54,060
Guideline 2021–24				●●●●●●●●●●●●●●							90,000
How do clients choose a quality builder?			●●●●●●●●●●●●●●								131,100
Improving cost estimation of construction projects						●●●●●●●●●●●●					190,000
Improving performance and collaboration for offsite construction						●●●●●●●●●●●●●●					200,000
Library – Information management 2021–24				●●●●●●●●●●●●●●							922,000
Materials and characteristics survey 2021–24			●●●●●●●●●●●●●●								310,000
ModelDocs: Transforming building consenting behaviour						●●●●●					200,000
New House Owners' Satisfaction Survey 2021–2025			●●●●●●●●●●●●●●●●●●								226,800
Plastic waste on construction sites – A cooperative approach					●●●●●●●●●●●●						171,885
Proactively eliminating quality issues in Construction 4.0						●●●●●●●●					149,345
Psychologically safer workspaces						●●●●●●					191,638
Role of scale and business model approach to improve resilience						●●●●●					95,380

Active projects	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Amount (NZD)
Scholarship: Gerard Finch – Prefab architecture	●	●	●	●	●	●	●	●	●	●	82,000
Supporting industry action on waste						●	●	●	●		338,500
Timber construction and demolition waste research					●	●	●	●	●	●	195,000
Understanding and redirecting waste in residential construction					●	●	●	●			79,699



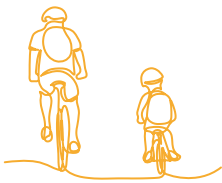
# Thriving cities, regions and communities

Successful well-functioning cities and regions are the engine room of a well-running country. Aotearoa New Zealand cities and regions are key to delivering a stronger, more diverse, inclusive and productive economy. However, while some urban areas and regions are growing rapidly, others are at risk of economic decline.

Aotearoa New Zealand's future economic, social and environmental performance relies heavily on the performance of all our cities, regions and urban areas. BRANZ drives expertise in economics, sustainability and building system and building performance to address this issue.







## Dashboard for assessing the functionality of residential neighbourhoods before and after a disaster event

Levy investment	\$199,000
Timeframe	October 2022 – December 2024
Lead organisation	Te Whare Wānanga o Waikato   University of Waikato
Responds to	Prospectus April 2022 – system resilience

Residential neighbourhoods are the building blocks of cities and towns. However, there is little research on how individual neighbourhoods might function following a disaster.

To support local and regional planning for disasters, this project will develop a resilience dashboard to identify which neighbourhoods are more vulnerable to natural hazards. The tool will also map any potential losses by assessing built environment and socio-economic capacity.

Councils and emergency response personnel will then be able to access real-time information during a disaster on the performance of different neighbourhoods.

Integrating engineering science with social science practices, the dashboard aims to show the combined impacts of residential building performance, utility outages, transportation networks and community connectivity.

Through stakeholder and community engagement, the project will collect data on the built environment and socio-economic factors to develop and test the dashboard before trialling it in a real-world scenario.

Once released, the dashboard will support people who are focused on safety, community risk management and disaster mitigation. It will help them to make evidence-based decisions about resource allocation, retrofits, infrastructure projects and community wellbeing.

It will help the building industry and councils to identify vulnerable buildings for prioritised repairs and ensure the community can dwell in place during an extended disaster recovery.

The dashboard will provide an understanding of how changes to the built environment (retrofits, changes to land use or additional redundancies) can affect its functionality and resilience to natural hazards. This new tool will inform future community planning and development, protecting and supporting the resilience of residential housing.

## Scholarship: Tim Boyle – Densification in our biggest cities

Levy investment	\$20,000
Timeframe	March 2023 – November 2023
Lead organisation	Te Whare Wānanga o Ōtākou   University of Otago
Responds to	BRANZ Scholarship Programme

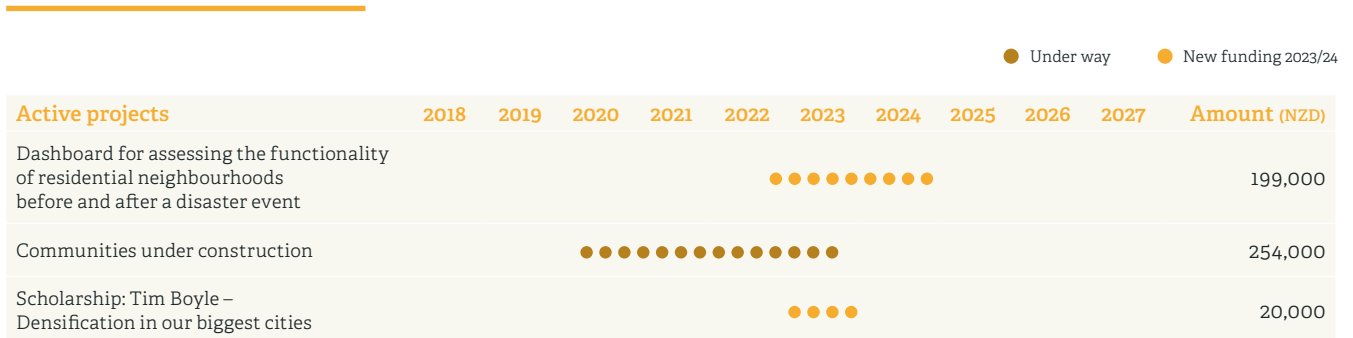
In cities across Aotearoa New Zealand, the enrolment zones around sought-after schools (schools that are perceived as high quality and desirable) are contributing to spatial inequalities. These enrolment zones often affect demand for housing and house prices, which is contributing to socio-economic residential and educational disparities in our urban centres.

While this impact is well understood by researchers globally and felt by communities locally, it is not often acknowledged in Aotearoa New Zealand’s residential planning systems. Ōtautahi Christchurch and Tāmaki Makaurau Auckland are both already experiencing complex challenges due to an underexplored relationship between state schools and society.

Newly introduced legislation and policy aim to increase urban density in the country’s major cities, raising concerns about whether this might exacerbate existing inequalities within school zones.

This research project explores the disconnect between plans, social equity, housing availability and housing prices in school zones. It aims to gain a greater understanding of the relationship between housing density, school accessibility and school provision to support decision making for urban environments.

## Thriving cities, regions and communities investment overview







# Meeting Aotearoa New Zealand's **population needs**

As our population grows and changes, the demands on our homes, public buildings such as schools, hospitals and libraries and commercial buildings also change. We need to ensure that our buildings continue to meet Aotearoa New Zealand's diverse population needs now and into the future.

BRANZ connects expertise in economics, forecasting, survey design, sustainability, understanding building quality and performance to help develop a built environment that will meet the needs of all New Zealanders.







## Housing typology outcomes, demographic drivers and housing market constraints in Greater Christchurch

Levy investment	\$243,800
Timeframe	March 2023 – March 2025
Lead organisation	Livingston and Associates
Responds to	Prospectus October 2022 – thinking and planning for change

Aotearoa New Zealand households are constantly evolving. The number of people living in a dwelling, the types of homes we live in and the number of cars for each household have shifted significantly over the past decade.

The government's National Policy Statement on Urban Development issued in May 2022 aims to encourage denser housing in areas of high demand and access. This has received mixed responses from communities and councils across Aotearoa New Zealand. For instance, Christchurch City Council is looking to deliver a bespoke solution, with an independent investigator appointed to work with the council on its housing intensification plan.

Using Ōtautahi Greater Christchurch as a case study, this research aims to improve our understanding of the changing needs in this region and how they are affecting the demand for housing. It aims to inform the debate around housing intensification and provide a platform that can be replicated in other housing markets.

Using Census data and interviews with stakeholders and residents, the research will include analysis of changes in households, their different dwelling typologies and vehicle ownership. It will also investigate the constraints of the housing system.

The key findings will be published as the research progresses, followed by a final technical report that can be replicated in other regions. The researchers will also deliver in-depth seminars at the end of each stage focused on making the findings accessible for council, government representatives and other key stakeholders.

With improved understanding of the interaction between population growth demographics and housing demand by location, type and tenure, we can better predict and prepare for housing market needs of the future.

## Scholarship: Danielle Smith – Sustainable whenua (land) development for Māori housing and hauora (health)

Levy investment	\$75,000
Timeframe	March 2023 – January 2026
Lead organisation	Te Whare Wānanga o Waikato   University of Waikato
Responds to	BRANZ Scholarship Programme

As tangata whenua (people of the land), Māori identity is strongly connected to whenua. This research seeks to address the existing information gap about the development of Māori whenua for housing and hauora purposes. It also aims to increase understanding of how to support efficient, successful and sustainable land development.

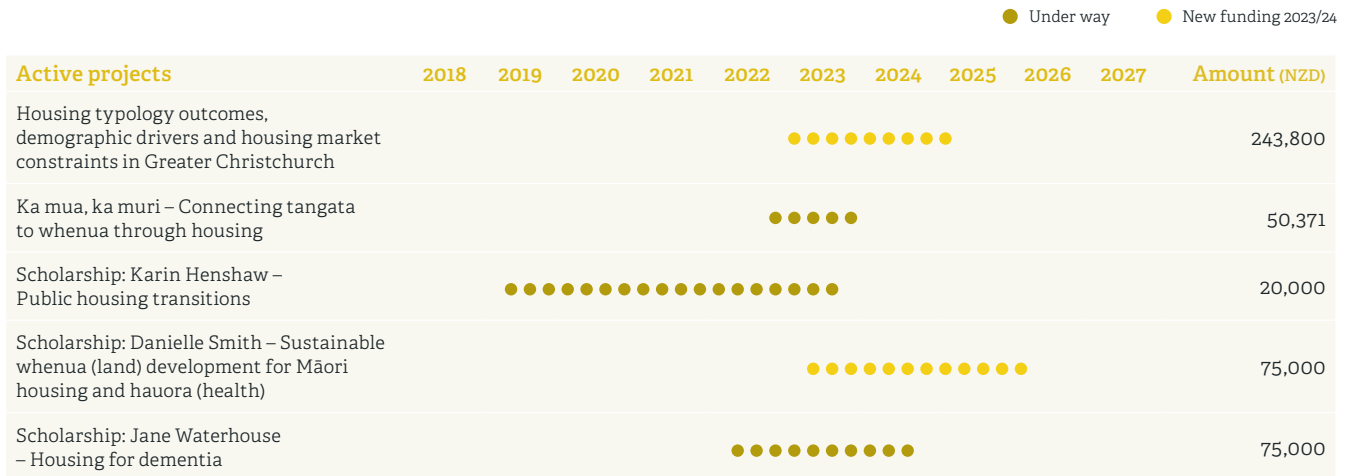
Taking an ao Māori (Māori worldview) approach and using a mātauranga Māori (Māori knowledge) framework, this research will make a clear connection between Māori hauora and Māori whenua development. It will develop insights into the facilitators that support Māori whenua development and how to encourage them. Likewise, it will also identify barriers and how these barriers can be addressed.

Working in collaboration with Waikato-Tainui iwi, Māori organisations, community members within Kirikiriroa Hamilton, Waikato and BRANZ researchers, the researchers will review data and conduct in-depth interviews and observations.

Using these insights, they will create a mātauranga Māori-based framework for preparing to develop whenua for housing. The model aims to better support organisational knowledge within the housing and health sectors to ensure Māori hauora needs are being met successfully and sustainably. It could also be used by building and construction companies and other organisations around the motu to take the guesswork out of the whenua development process.

By creating a clear model, this research aims to better support organisations involved in Māori whenua development. It will highlight the interdependence between Māori hauora and whenua sustainability and support a move towards more equitable outcomes for Māori.

## Meeting Aotearoa New Zealand's population needs investment overview

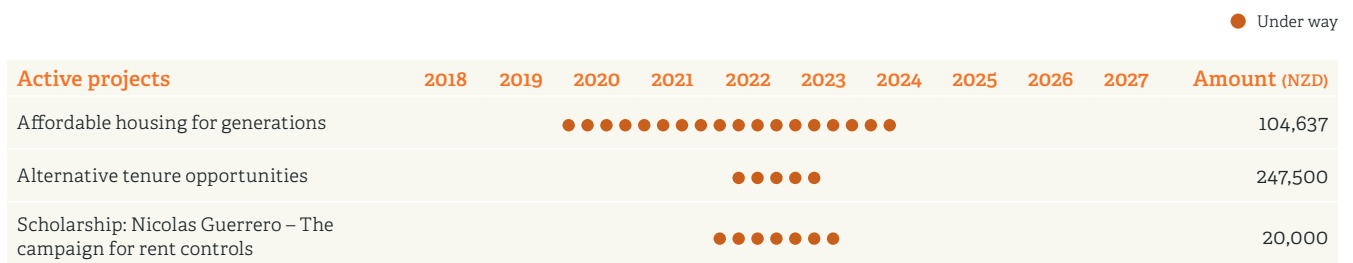


## Housing affordability investment overview

Housing affordability is a major concern for many New Zealanders. An increasing number of people have found themselves priced out of home ownership, and for many, the cost of rental housing is also challenging.

To help address this issue, BRANZ invests in expertise in economics, forecasting, social science, building system and building performance.

**There were no new housing affordability projects to receive Building Research Levy funding this round.**





# How we RE:INVEST

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## RESPONSIBLE STEWARDSHIP OF THE BUILDING RESEARCH LEVY

Under the Building Research Levy Act 1969, BRANZ Inc. is charged with effective stewardship of the Building Research Levy. We invest in industry-good research and knowledge-sharing activities that drive transformation.

The Building Research Levy investment creates a trusted, independent and impartial evidence base to support enduring system change. A key driver of the Levy investment is ensuring that research is designed with the needs of the industry and all New Zealanders in mind.

The amount of Levy received by BRANZ Inc. is directly linked to the levels and values of building consents. Our long-term Levy Utilisation Policy, which is based on a 20-year model, creates a stable and sustainable platform for BRANZ to invest the Levy effectively through the ups and downs of economic cycles.

Through responsible and responsive Levy stewardship and purposeful investment, BRANZ delivers research that provides practical solutions.

## INVESTING THE BUILDING RESEARCH LEVY

Investing the Building Research Levy demands robust decision-making processes, a commitment to transparency and disciplined management. The BRANZ Inc. Board determines how much of the Levy is spent on research and knowledge dissemination.

The BRANZ Levy Investment Portfolio Statement outlines the high-level investment signals around existing and new priority areas for Levy investment. It is an open and transparent mechanism through which BRANZ Inc. sets out its investment priorities and invites proposals seeking Levy funding. To ensure research is of a high quality, all investment proposals undergo a rigorous quality assessment and due diligence process.

BRANZ Inc. invests the Building Research Levy through a range of mechanisms:

- Investments that target work initiated and contracted with **BRANZ Ltd.** This involves co-designing research with industry and external researchers and regularly includes subcontracts with external providers.
- Investments that target work initiated and contracted with **external providers.** This can include subcontracts with BRANZ Ltd.
- **Scholarships** to support the next generation of researchers and help support capability in Aotearoa New Zealand's tertiary education institutions.
- Agile investments that **respond to distinct industry needs** or take advantage of opportunities that may emerge outside of investment rounds.
- **Strategic initiatives** that invest in significant activities beyond BRANZ's baseline of research investment.
- **Investments in infrastructure** to develop and maintain building research capability.



### **BRANZ Ltd**

BRANZ Ltd is Aotearoa New Zealand's primary building research provider and is nationally and internationally recognised as a centre of building science expertise. A wholly owned subsidiary of BRANZ Inc., BRANZ Ltd carries out industry-good research and co-develops solutions to address systemic industry issues.

Research proposals put forward by BRANZ Ltd are reviewed by the Levy Allocation Advisory Group (LAAG). This group of independent assessors is made up of experts drawn from the Building Research Advisory Council and the wider building and construction industry. The group provides independent expert advice that can give confidence to the BRANZ Inc. Board on the focus and quality of BRANZ Ltd research.

### **External research providers**

Collaborating with other providers is an important part of how BRANZ strives to deliver best value from the Levy. There is significant expertise within universities, Crown research institutes and independent research providers to complement BRANZ-based specialist teams.

One of the ways external research proposals are sought is through a **prospectus**. This is sent to industry and the research community to seek proposals to help deliver on research priorities as outlined in the **Levy Investment Portfolio Statement**.

Levy funding is also invested in outstanding **postgraduate scholars** to work on industry issues. This supports the next generation of researchers and builds on our ties to tertiary education institutions, helping support their capability.

### **Distinct industry needs**

While most research investments are delivered through annual funding rounds, we recognise that new research opportunities may be driven by insights or events throughout the year. We use agile investment to act quickly to support research proposals that address emerging building and construction industry issues. Both BRANZ Ltd and external researchers are invited to use this mechanism.

### **Strategic initiatives**

BRANZ also invests the Levy in strategic initiatives beyond the core baseline investment in research. These are typically focused on national strategic opportunities and are approved by the BRANZ Inc. Board. BRANZ's strategic investments have ambitious goals and aim to have long-term, positive and far-reaching outcomes.

### **Infrastructure**

BRANZ Inc. invests Levy funding in developing and maintaining building research capability at its campus. This research infrastructure is a key national asset, and capital investment in property, plant and equipment is undertaken at BRANZ through a cyclical process targeting progressive improvement. By understanding the value and quality of existing assets and identifying future needs, we develop a programme of capital requirements and understand investment priorities. We are working on an exciting campus development that will deliver new research and testing capabilities for Aotearoa New Zealand.



# Collaborating with us

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**As we look to the future, BRANZ remains committed to an enduring collaborative effort with a range of system players.**

We will continue to listen, learn and share information, expertise and research to explore new ideas and find practical solutions.

If you are interested in collaborating and finding out more about our research investment, please visit **[branz.co.nz/investing-research](https://branz.co.nz/investing-research)**.

For any questions about potential research collaboration, please get in touch: **[researchinvestment@branz.org.nz](mailto:researchinvestment@branz.org.nz)**.

Ngā mihi nui, we look forward to hearing from you.



**BRANZ Inc.**

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» [branz.co.nz](http://branz.co.nz)