MITIGTIATING SEISMIC RISK:

Building remediation behaviours

Prepared for Ministry of Business Innovation and Employment

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	Reviewed by:	Charlotte Brown

PROJECT TEAM

Manomita Das, Joint Centre for Disaster Research, Massey University. *Literature review, data collection, analysis and reporting.*

Cameron Eade, ResOrgs. *Project management, data collection, analysis and reporting.*

Charlotte Brown, ResOrgs. *Project lead, project design, stakeholder engagement, analysis and reporting*

Catalina Miranda, Joint Centre for Disaster Research, Massey University. *Data collection and analysis.*

Julia Becker, Joint Centre for Disaster Research, Massey University. *Technical lead, analysis and reporting.*

Emma Hudson-Doyle, Joint Centre for Disaster Research, Massey University. *Reporting.*

Cara Ross-Donald, ResOrgs. *Literature review and analysis.*

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SUPPLEMENTARY REPORT

ResOrgs and JCDR (2025). Mitigating seismic risk: societal willingness to pay. Report for Ministry of Business Innovation and Employment, May 2025.

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Executive summary

Background

Building owners and other key building system stakeholders across the country manage and influence seismic risk in existing buildings based on their diverse needs, resources, and behaviours. Understanding how these factors influence seismic remediation requires identifying: a) what they are, b) where they come from, and c) how they interact with each other. This MBIE-commissioned project maps the key interactions, enablers, barriers, and other crucial considerations to better understand how building owners and influential stakeholders contribute to (or not) the remediation of seismic risk in buildings. The project was commissioned to support MBIE's seismic policy review of existing buildings, including Earthquake-prone Buildings (EPBs).

Approach

We developed 12 role profiles that represent groups with different remediation needs and influences. These role profiles showcase organisational contexts, motivators, barriers, incentives, and opportunities that affect seismic remediation. We selected roles that influence the adoption of seismic remediation, including both building owners and key building system stakeholders. While these role profiles don't cover every possible end user, they represent a sample of important actors operating within the system.

We gathered information through multiple interviews with building owners and stakeholders working. The interviews set out to explore the following:

- Motivations, challenges and influences of different owners and stakeholders in adopting strengthening,
- Roles of different owners and stakeholders in taking or promoting seismic strengthening actions,
- Owner and stakeholder attitudes towards seismic strengthening, and
- Barriers for owners to undertake strengthening.

With the support of some co-funding from BRANZ, the interviews also captured seismic risk information and communication needs.

The final role profiles explore:

1. Key perspectives on building remediation, including the motivators, enablers, barriers, and opportunities to enable seismic retrofit,
2. How seismic building risk information is used and what key information is needed for different purposes, and
3. Who building owners and stakeholders have to communicate seismic building risk information to.

We analysed and themed interview data to create generalised profiles. The role profiles provide high-level representations of specific building owners and stakeholders and summarise their responses to various aspects of seismic remediation.

Building stakeholders/influencers

Stakeholders across the building system play a role in promoting and/or incentivising building owners to undertake seismic building remediation, working alongside regulatory settings.

FINANCIAL INSTITUTIONS REQUIRE HIGHER STANDARDS THAN EPB REGULATIONS:

- Lenders provide access to funds for remediation, with a preference for lending against buildings with higher seismic ratings. Meanwhile, insurers may offer favourable insurance terms against some buildings that have a higher seismic rating, including reduced premiums and/or lower excess charges for buildings remediated to a higher level.
- For both, buildings of 67%NBS and above are most favourable (though generally assessed on a case-by-case basis). This de facto push for buildings well beyond the minimum legal requirements (>33%NBS) may drive building owners towards remediation options that could be unaffordable and/or prohibitively expensive.

COMMERCIAL TENANTS AND REAL ESTATE PROFESSIONALS PROVIDE MARKET DEMAND-BASED INCENTIVES:

- Public organisations and other premium commercial tenants can and do demand higher seismic ratings using large and long-term leases as a lever to encourage building owners to upgrade their building.
- Real Estate Agents highlight market advantages of remediation, including rental rates for premium tenants and higher property values for remediated buildings, while connecting owners with tenants looking for different levels of seismic performance.

SOME STAKEHOLDERS PROMOTE REMEDIATION THROUGH THEIR ADVISORY ROLES:

- Property lawyers advise clients to undertake remediation where it is favourable for owners to reduce risk and associated compliance requirements and/or legal liability,
- Professional technical service providers (i.e., architects, project managers, quantity surveyors) offer planning support by offering informed, cost-effective, and practical remediation solutions to meet owners' needs,

SOME STAKEHOLDERS HAVE LITTLE AGENCY IN THE MITIGATION OF SEISMIC BUILDING RISK:

- Residential tenants in multi-unit buildings generally have a limited understanding of, and engagement with, seismic building risk. When faced with housing availability and affordability challenges, they have limited capacity to influence remediation and/or manage seismic risk in their homes.
- Smaller commercial tenants also have limited understanding of and engagement with seismic building risk, especially compared to larger organisations (private and public

sector) that generally have deeper knowledge and access to advice, and active participation in this space. Coupled with limited resources and influence, their agency for managing seismic risk through leasing and occupancy decisions is broadly restricted.
- This gap may create instances where stakeholders with less agency bear a disproportionate exposure to seismic risk in the buildings they use / occupy.

These industry/market-based incentives, which sit alongside regulatory settings, create conditions that can both actively encourage and discourage seismic remediation of buildings.

Building Owners

Building owners are varied in their motivations to remediate their buildings, the barriers they face, and factors that would enable them to undertake remediation.

KEY MOTIVATORS FOR BUILDING OWNERS TO UNDERTAKE REMEDIATION:

- Complying with legal obligations – including lifting the EPB status of a building, avoiding penalties for non-compliance, and removing regulatory strengthening requirements – is highlighted as a motivator across all groups.
- The economic and practical viability (including total cost and feasibility of remediation relative to owner needs) is also highlighted by all groups. The feasibility of strengthening options is particularly prominent for larger organisations with a greater focus on the long-term planning and use of their buildings.
- Choosing strengthening options that reduce potential disruption to business operations as much as possible is also highlighted, particularly among owner-occupiers and public organisations where strengthening could disrupt critical community services.
- The benefit of reducing life safety risk is also highlighted across the groups, with particular emphasis from public organisations and owner-occupiers.
- Access to past financial incentives, such as heritage grants, are noted as having motivated smaller private owner-occupier organisations to remediate.
- Maintaining and/or increasing property value, as well as realising commercial benefits, are key motivators across all private owners, with the primary focus of large owner-only organisations on marketability, tenantability and maintaining rental income.
- Large private organisation building owners highlight their confidence in engineers and contractors to implement effective remediation solutions as a key motivator, particularly where the organisations have existing relationships with preferred contractors. Those without strong existing relationships have lower trust in information and advice and this can affect their confidence to undertake strengthening.

COMMON BARRIERS THAT MAKE REMEDIATION CHALLENGING:

- Concerns relating to the total cost of remediation was highlighted by all groups:
    - Most groups (except public organisations) are interested in economic return/benefit for remediation (e.g., recovering costs, improving / maintaining

property value, tenanting) and express concerns that remediation costs might not deliver these returns.
    - Public organisations commonly cited challenges with budget prioritisation (and managing spending responsibly, as public entities).
    - Smaller owner-occupier organisations and residential owners tend to emphasise challenges accessing funds.
    - Options for accessing funding are extremely limited for some, particularly residential owner-occupiers and non-profit/charity organisations.
- Concerns that further remediation work may be required if future assessments produce a lower rating and/or regulatory requirements are changed (including as knowledge of seismic risk evolves) are explicitly highlighted by all groups except public organisations as deterrent to remediation.
- Practical implementation challenges were explicitly highlighted by all groups except residential owner-occupiers. These include managing disruption to business operations (including tenant operations) while remediation is being completed and having to navigate the logistics of staging remediation work around operations which cannot feasibly be interrupted.
- Stress and time commitment associated with navigating a complex process, often without clear or obvious guidance and/or support is emphasised by small private owner-occupiers and residential owner-occupiers.

FACTORS THAT WOULD BETTER ENABLE BUILDING OWNERS TO UNDERTAKE REMEDIATION:

- Financial support as an enabler to remediation is mentioned across all groups, although the detail of what this might look like differs:
    - Small private organisation owner-occupiers and residential owner-occupiers directly mention examples of tax exemptions or rebates for strengthening work, reduced insurance premiums post-strengthening, and access to low-interest loans to offset remediation costs (including for Body Corporates).
    - Special funding for heritage buildings (large and small private owner-occupiers and residential owner-occupiers) was cited as beneficial where heritage buildings serve as a public good.
    - More access to funding is specifically mentioned by non-profit/charity organisations, who emphasised they have limited funding avenues.
    - Public organisations also mention that more financial support for seismic strengthening would directly help to focus on competing building maintenance/improvement priorities in the context of limited budgets.
- Regulatory support to better enable remediation is also commonly mentioned:
    - Public and private owner-occupiers specify allowing seismic remediation consenting to be undertaken without triggering other upgrade requirements that may detract focus from seismic strengthening (e.g., fire safety, accessibility upgrades).

    - For owners of heritage buildings, regulatory support included access to other risk mitigation options (including demolition).
    - All groups desire greater certainty that completed remediation work will meet long-term requirements and further strengthening won't be required.
- Some groups also mention better information and support resources to enable remediation:
    - Standardised information of the retrofit process and how to navigate this (public organisations and residential owner-occupiers),
    - Education around percent new building standard (%NBS) ratings, what they mean and how they should be interpreted and used.

These factors highlight how building owners must navigate a complex environment of trade-offs when considering seismic remediation, including balancing regulatory compliance, financial constraints, and practical implementation challenges.

The role of %NBS

An integral part of how stakeholders and building owners alike make decisions about seismic retrofit, relates to the use and interpretation of percent new building standard (%NBS).[1] Alongside this MBIE-funded research, the research team are undertaking BRANZ-funded work looking at the application and interpretation of %NBS, with a view to understanding seismic risk information needs and current use of %NBS.

The results to date show that %NBS is being used for purposes beyond what was intended. %NBS is being used as a default measure for evaluating life safety risk (beyond building vulnerability, which it is intended to be used for) as well as evaluating the risk of damage and disruption post-event. There are many organisations that have embedded %NBS in their organisational processes to support decisions ranging from building occupation/leasing, property lending, insurance policy provisions and pricing, building leases and property marketing. Despite many of these processes relying on a nominal %NBS value as a policy threshold, there is a broad awareness that %NBS is imprecise. The data shows that there is a diverse web of organisations that now rely on %NBS to manage seismic risk, with multiple dependent decisions within. Thus, if %NBS was removed from the regulatory system, it is likely to still be used in a legacy form until a replacement system is generated. Building owners and tenants will likely still be required to undertake costly assessments, based on this measure for some time.

[1] %NBS refers to the minimum life safety requirements for a new building designed to current building code requirements. The metric is designed to identify the vulnerability of a building (or building parts) in respect to life safety risk, relative to minimum legal requirements. For more on %NBS, refer to *Ministry of Business, Innovation and Employment "Seismic Risk Guidance for Buildings" (2022).*

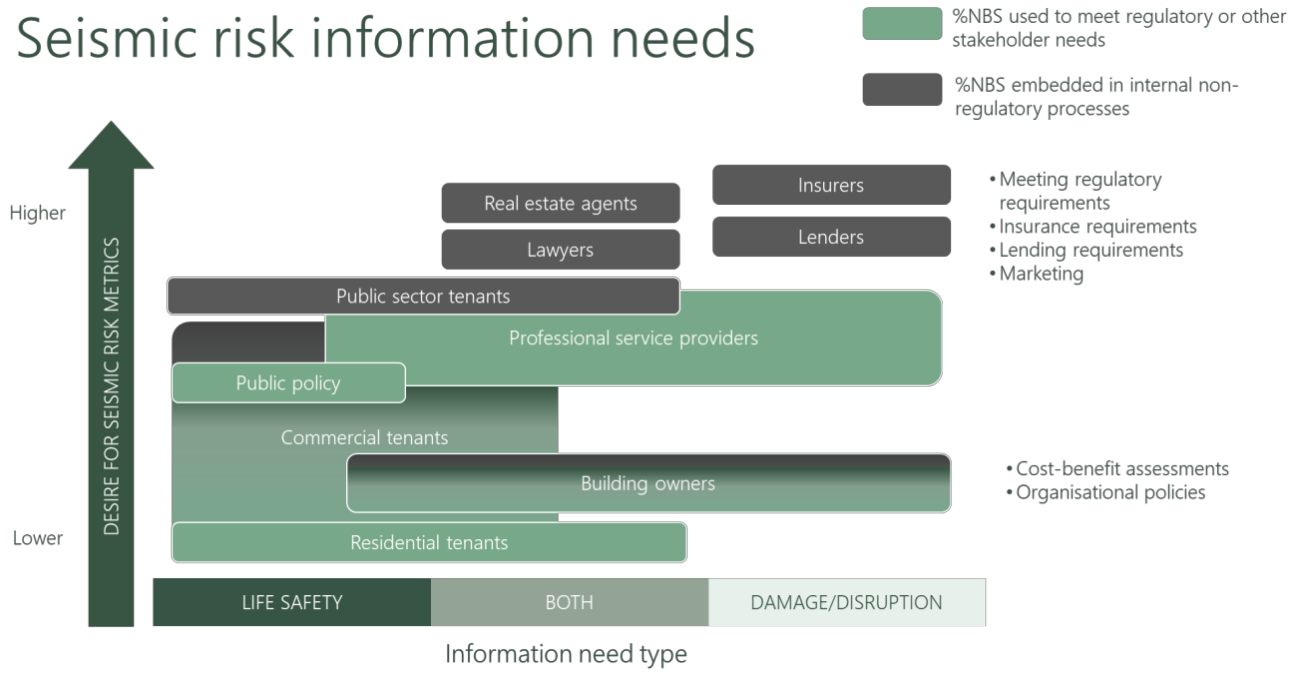

Figure i Seismic risk information needs

Key observations

FINANCIAL FACTORS DRIVE REMEDIATION DECISIONS

- Almost all groups approach remediation through a cost-benefit lens, where the cost of strengthening is assessed against the benefit(s) gained (e.g., actual risk reduction achieved and/or feasibility of remediation relative to cost; cost of remediation relative to building value).
- While improving life safety is often cited as an important– if not the primary – motivation for remediation, economic and commercial benefits feature strongly in remediation decision-making (e.g., improving a building's marketability / tenantability, maintaining or improving a building's value, reducing disruption to use of a building to maintain business income).
- Some owners are more restricted in their options to access remediation financing (e.g., charity / non-profit organisations, heritage building owners, smaller private organisations, residential owner-occupiers and Body Corporates).

Policy must be designed to enable action amongst building owners or environments where there are no or low market benefits to remediation, this includes access to financial support and or affordable financing options.

INDUSTRY AND MARKET PREFERENCES FOR SEISMIC BUILDING RATINGS OFTEN EXCEED MINIMUM REGULATORY REQUIREMENTS

- Financial institutes (banks, private insurers), as well as premium tenants (e.g., public organisations, large sophisticated private organisations) demand higher seismic ratings in

their/their clients' buildings (generally 67%NBS and above) – well beyond legal requirements in the Building Act requirement (34%NBS).

- While this can push remediation to go beyond just the minimum requirement, it can compel some building owners to remediate to levels that may not be financially viable or where increased costs are disproportionate to the increased level in actual seismic performance (e.g., the difference in risk mitigation between 50 and 67%NBS could be minimal, but the remediation cost for this additional improvement can be disproportionately high).
- This is particularly problematic for organisations that have few means to finance or recover costs of remediation.

Access to lending options, that do not require retrofits to go beyond regulatory minimum, will help reduce barriers to retrofit for residential apartment unit owner-occupiers, small private organisation owner-occupiers, and not-for-profit organisations.

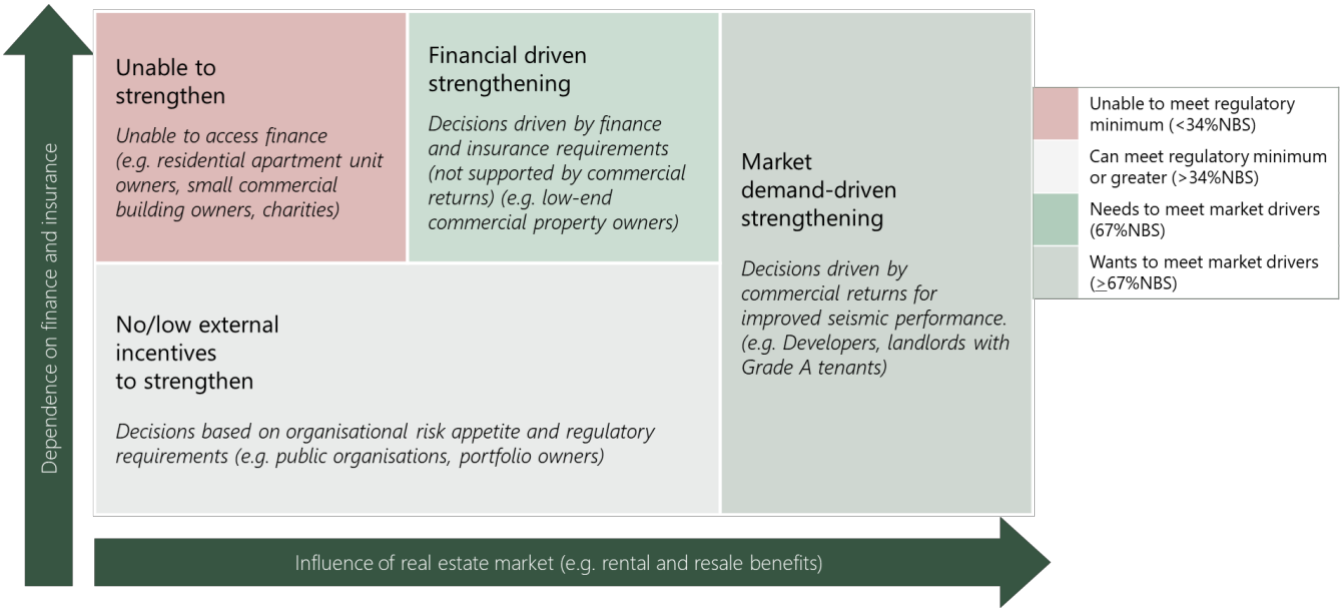

Figure ii::Seismic remediation behaviours relative: to real estate market incentives and Financial and insurance market dependence

SEISMIC BUILDING RISK IS OFTEN BORNE BY THOSE WHO HAVE LITTLE CHOICE IN THE RISKS THEY FACE

- Those with the least agency or influence (i.e., residential tenants, smaller private commercial tenants) are not able to directly undertake mitigation and often don't have the resources, information, or leverage necessary to motivate building owners to undertake remediation work.
- This can leave these actors in a more vulnerable position with fewer options for risk mitigation; larger organisations, by contrast, can generally leverage their often-superior

access to resources and professional advice to actively achieve higher safety outcomes. This is particularly challenging where property supply is constrained.

It is critical that any seismic risk policy is designed to protect those that bear the risk (through occupancy of buildings), particularly where they have little agency to mitigate that risk.

REMEDIATION TIMELINES HAVE NON-REGULATORY INFLUENCES

- Banks may require remediation to be completed much sooner than regulatory timeframes.
- Regulatory remediation timeframes can mean that seismic risk has to be managed ahead of potentially more pressing maintenance and/or risks/priorities, including providing critical services. Public organisations also emphasised they find regulatory timeframes difficult to meet due to the time it takes to secure budget.
- Many building owners want to align seismic remediation with normal building maintenance cycles for gained efficiencies, but regulatory remediation timeframes do not always enable this.

There would be value in providing discretion in regulatory timeframes to allow some building owner groups the opportunity to provide evidence of advancing / plans to advance remediation. This would allow them to better balance seismic risk with other critical building priorities.

REGULATORY AND SEISMIC ASSESSMENT UNCERTAINTY CAN CAUSE REMEDIATION INERTIA

- Building owners are concerned that despite investing in remediation, they will still encounter a situation where future engineering assessments produce a lower seismic rating and potentially trigger additional remediation requirements.
- Observations of inconsistency in seismic building ratings from engineering assessments creates a psychological barrier for owners, and potential distrust in the stability of an existing rating. Many owners are sceptical that completing remediation will be a permanent solution and fear having to retrofit again in the future.
- This uncertainty about future additional remediation drives some to go beyond just the minimum requirements (e.g., well beyond 34%NBS), in order to avoid being impacted by potential future regulatory changes and/or changes in a seismic rating from future assessments. However, this uncertainty can also create remediation hesitation even among better-resourced building owners.

Any transition to a new system will require careful communication and must provide building owners with as much certainty as is practicable about whether future code or regulation changes will affect them.

ACCESS TO INFORMATION AND ADVICE DRIVES ACTION

- Technical complexity of seismic building risk can create barriers for remediation, especially for those with less sophistication and/or access to professional advice and other information.

- Those with greater access to expert advice and information are better positioned to make informed decisions about the level to remediate buildings to. This includes 'pushing back' on remediation approaches that may be excessive and/or overly costly for what is being achieved / required.

Quality and easy to understand information and advice must be available to all building owners enable right-sized remediation decision making.

1. Introduction

Seismic risk presents a significant challenge in New Zealand. The Earthquake-Prone Building (EPB) system was introduced to improve seismic risk management in the existing building stock in the country. The system aims to identify and manage buildings with the greatest risk of causing harm from future earthquakes by establishing clear regulatory expectations for building performance and remediation, ensuring a consistent approach to seismic risk management. However, gaps in compliance with EPB regulations persist.

As part of Ministry of Business Innovation and Employment (MBIE)'s review of the management of seismic risk in existing buildings (the Review), MBIE commissioned a number of research projects. ResOrgs and the Joint Centre for Disaster Research, Massey University (JCDR) were commissioned to undertake a research project focused on remediation behaviours.

This report explores the factors that influence building owners' decisions and actions to remediate seismic building risks, as well as the role of various stakeholders in promoting, incentivising or inhibiting this process. Specifically, it investigates:

- What motivates, challenges and influences actions of building owners and different stakeholders?
- What roles do different stakeholders play in taking or promoting seismic strengthening actions?
- What are different stakeholders' attitudes towards strengthening? and
- What are the barriers to action?

An exploratory case study method was adopted. Interviews were held with a broad range of building owners and stakeholders who engage in the seismic risk management of existing buildings in New Zealand. The findings document how building owners and stakeholders interact, and identify key motivators, barriers, enabling conditions, and contextual factors that influence seismic strengthening efforts. These insights aim to inform the ongoing review of the EPB system and the development of future seismic building policy. The report begins with a literature review, followed by a description of the methodology adopted. Then the findings are presented in two sections: the first outlines the stakeholders in the EPB system, their motivations, enablers, barriers and challenges, the second focuses on the same factors for building owners. This is followed by a discussion and way forward section.

2. Literature

Key stakeholders in seismic remediation include building owners, professionals (engineers, architects, contractors), government stakeholders (policymakers, local governments), industry groups (NZSEE, ICNZ), insurers, lenders, property market stakeholders (real estate agents, developers) and, tenants (Egbelakin et al., 2015). The main motivators for seismic retrofitting among building owners include regulatory compliance, and property value increase. Most owners are driven by the need to meet regulatory requirements (Egbelakin et al., 2017). Owners also consider benefits in return on investment, securing insurance, or maintaining demand in property market (Egbelakin et al., 2011). Even in heritage buildings, along with heritage preservation and extending building life, the above factors encourage action (Egbelakin et al., 2022). Personal or community experiences with earthquakes often increase risk awareness and interest in earthquake remediation, however that alone does not trigger action (Miranda et al., 2021). Market based incentives and creating value for remediated building in the property market is recommended by some to promote earthquake remediation behaviour (Egbelakin et al., 2011; Egbelakin et al., 2015).

Barriers include financial constraints, knowledge gaps, risk perception issues and systemic barriers. Financial constraints arising from lack of funding availability, high retrofitting costs, and an unfavourable insurance sector are often the most significant barriers (Egbelakin et al., 2016; Egbelakin et al., 2014; Greer et al., 2020). Additionally, retrofit costs are often overestimated and return on investment is uncertain, which leads to hesitance. Uncertainty about earthquake likelihood and retrofit effectiveness, low risk perception, particularly in low seismic zones, and a fatalistic outlook create further barriers (Egbelakin et al., 2011). Knowledge gaps arise because often owners and broader stakeholders lack an understanding of building codes or technical reports, requiring further interpretations (Blake et al., 2021). The poor availability of contextualised actionable information, process complexity, logistical challenges and lack of clarity on responsibilities of different stakeholders cause impediments in undertaking building remediation (Lindell & Whitney, 2000). Additionally, distrust in engineering advice, regulatory agencies and potential for future building code updates further discourages action (Rabinovici, 2012; Solberg et al., 2010).

Effective communication is central to improving seismic risk awareness and driving retrofitting action. Yet, many building owners and stakeholders lack access to clear, consistent information about seismic risk, retrofitting processes, and the expected benefits of seismic remediation. Technical engineering reports are often found to be difficult to understand and there is a need for plain language interpretation of reports including implications for safety or usability (Egbelakin et al., 2011). Disparities in information provided by different engineers and lack of certainty on retrofit outcomes, contribute to a sense of uncertainty and lack of trust (Miranda et al., 2023). Researchers have suggested that to address these issues, communication strategies can focus on standardisation, transparency, building trust, ensuring local relevance, and clarity, and improving coordination between different stakeholders, such as councils, building owners, and professionals (Egbelakin, 2013). Public education efforts to address knowledge gaps and

misperceptions, and wider promotion of information related to benefits and incentives of seismic remediation is necessary (Egbelakin et al., 2022).

Our review indicates that three critical gaps persist in the existing literature on seismic retrofitting and remediation behaviours.

- First, most studies focus on building owners without differentiating between the various building owner types. This fails to capture the distinct characteristics of different building owner groups that has implications on seismic remediation decisions and actions.
- Secondly, different stakeholder groups, such as real estate agents, financial service providers, technical service providers, and tenants influence remediation processes and often depend upon each other's decisions and actions. Yet most studies focus on specific groups, such as engineers or tenants. A holistic understanding of the interactions between different stakeholders and the collective impact on remediation behaviour remains missing.

This report aims to address these gaps by examining the factors, motivators, barriers and stakeholders influencing strengthening decisions and actions among different groups of building owners. By focusing on the interactions of these profiles with the earthquake-prone building (EPB) system, the report aims to identify both the commonalities and differences across different groups of building owners and stakeholders. The findings will help in developing more targeted and customized strategies for engaging with these groups and supporting their seismic strengthening actions.

GUIDING THEORETICAL FRAMEWORK

The protective action decision model (PADM) is used as the guiding theoretical framework for this study (Lindell & Perry, 2012). The model outlines stages through which people move through when deciding whether to adopt protective behaviours, in this case earthquake prone building remediation behaviour. The stages are:

- *information processing* where people acquire risk information by interpreting social and environmental cues;
- *pre-decision processes* during which individuals comprehend the information, form risk perceptions, and appraise threats, potential actions, threats, and involved stakeholders;
- *protective action decision making* where people choose whether or not to adopt a protective behaviour; and
- *behavioural response* where people undertake the chosen action, which is influenced by situational facilitators and impediments. This process determines the success (or not) of the protective behaviour adoption.

In this study, PADM offered a structured lens to study the variation in the factors influencing seismic risk remediation behaviour across different groups.

3. Method

This study adopts an exploratory case study design (Yin, 2009) to examine the information needs, motivations, enablers, and barriers related to seismic strengthening among building owners and stakeholders interacting with the EPB system in New Zealand.

To identify interview participants, a long list of building owners and building system stakeholders was generated. Building owners were categorised based on three criteria - i) owner-occupancy status (owner only, owner-occupied), ii) building criticality (critical and non-critical functions, vulnerable occupants, buildings with occupants mandated to use the building (e.g. schools and prisons)) and iii) organisational context (size, public/private/residential). Stakeholders were categorised based on i) organisational context (public/private individual), and ii) familiarity with building system. To shortlist the profiles we used two parameters to score each group i) the participant's potential influence on the EPB system (with a preference for high influence), and ii) existing knowledge gaps in our understanding of the participant's needs (with a preference for where there is low knowledge).

Based on the shortlist scoring process, following some adjustments to ensure a good balance across building owner and stakeholder categories, and review by MBIE and our advisory panel, the following groups were selected:

BUILDING OWNERS

- Large private organisation building owners,
- Large private organisation building owner-occupiers,[2]
- Small private organisation building owner-occupiers,
- Residential apartment owner-occupiers,
- Public building portfolio managers.

STAKEHOLDERS

- Professional technical service providers (architects, project managers, quantity surveyors)
- Real estate agents (involved in sale, purchase and leasing of buildings and property management for clients),
- Property lawyers (consulting on seismic strengthening related legal matters),
- Private insurance providers,
- Lenders (banks working in property investments and developments),
- Public organisation tenants.

[2] Initially this group was spilt into organisations with critical functions, non-critical functions, and those serving vulnerable populations. However, these were later merged as the majority of the characteristics within the profiles were the same across the groups. There were some specific behaviours associated with organisations providing critical functions and/or serving vulnerable populations (e.g. aged care) and these are captured in the analysis.

- Residential apartment tenants typically in multi storied buildings.[3]

The researchers reached out through their networks and snowballed to recruit participants. Two to six participants were interviewed for each group (refer Table 1 for participant profiles). Participants were recruited from across New Zealand representing a range of urban and regional settings, seismic zones, building size, and building criticality; as well as capturing heritage and non-heritage building owners.

Forty-six interviews were held face to face or via video conferencing (Teams) between February and March 2025, each lasting 60 to 90 minutes. Table 1 shows the number of interviewees within each profile, and Appendix A provides more detailed information about the perspective of each participant. The interviews were recorded with the participant's consent. A structured interview questionnaire was used that included both open-ended, closed, and ranking questions (Appendix B). It covered topics such as participant or their agency's role in the EPB system, motivations for taking action to reduce earthquake risk (e.g. through retrofitting) and/or their attitudes towards strengthening (for stakeholders), desired performance (life safety/other), and opportunities and barriers for acting. In addition, we asked participants about their use and preferences for seismic risk information in support of our aligned project funded by BRANZ.

Drawing on the literature, the research questions and the theoretical framework (PADM), a coding framework was developed. The interview data was transcribed and tabulated using the coding framework. Within and cross case analysis was conducted across the groups to understand the commonalities and contrasts in the data. This process enabled the identification of behavioural patterns, decision-making processes, and underlying themes related to seismic risk management and retrofit decision-making. As well as the general identification of patterns, processes and themes across the data as a whole, the analysis was organised according to the participant profiles identified as part of the interview process, i.e. building owners and building system stakeholders. In this way we could see whether interactions within the EPB system differed between the various profiles. These profiles, which incorporate the interview data, are referred to as 'profiles' in this report. Member checks of the profiles were conducted with participants to ensure the analysis represented their perspectives.

A Low Risk Ethics Notification for the research was submitted and secured from Massey University (Ethics Notification Number: 4000030044). Ethical standards as per the University guidelines were maintained.

[3] Interviews with developers and policy makers were conducted and included in the data analysis. However, due to inconsistencies in data, profiles of these two groups were not developed.

Table 1 - Interviewees

Participant role	**No.**	**Code**
Building owners		
Large private organisation building owner only	3	LPrivOOnly_suffix
Large private organisation building owner-occupiers	6	LPrivOO_suffix
Small private organisation building owner-occupiers	2	SPriv_suffix
Residential apartment unit owner-occupiers	5	ResO_suffix
Public building portfolio managers	3	PubP_suffix
Stakeholders		
Professional technical service providers	6	Tech_suffix
Real estate agents	3	Rea__suffix
Property lawyers	3	Law_suffix
Private insurers	2	PrIns_suffix
Lenders	3	Lend_suffix
Public organisation tenants	3	PubT_suffix
Residential apartment tenants	2	ResT_suffix
*Additional interviews**		
Developers	2	Dev_suffix
Policymakers	3	Pol_suffix

(* Developers and policymaker interviews were not suitable to create the profiles. The interview input however have been used to inform the analysis.)

4. Stakeholders

4.1 Stakeholder mapping

Remediation decisions by building owners are influenced by the actions of a range of stakeholders. To fully understand building owner remediation behaviour it is useful to understand the stakeholders that support, advise, and place constraints on building owners. In this study we included:

- Professional technical service providers (e.g. architects, project managers, quantity surveyors involved in seismic risk management). *Note that this group does not include engineers as they are covered in another MBIE-funded project within the Review.*
- Real estate agents (involved in the sale, purchase, leasing, and property management of buildings for clients)
- Property lawyers (experienced in advising clients on legal matters relating to seismic risk)
- Private insurance providers (commercial, industrial, and residential properties)
- Property finance lenders (banks)
- Public organisation tenants
- Residential apartment unit tenants

Full descriptions for each profile are included in Appendix C. This section provides an overview of the role of each of the stakeholders, their perceptions of seismic risk and interest in mitigating it, how they interact with and influence buildings owners, and other demands and pressures affecting the signals they send to building owners.

Figure 1 demonstrates when each stakeholder interacts with the seismic remediation process. A decision to retrofit can begin with a building owner understanding whether they need to do anything. Lawyers provide legal advice on building owner responsibilities in relation to managing seismic risk. This can include the influence of regulations and legislation such as the Building Act and Health and Safety at Work Act. Thus, they provide informational cues to building owners to act on the regulatory requirements for seismic remediation. Next, building owners need information to assess the relative benefits of the retrofit to them. Real estate agents, professional technical service providers, insurers, and tenants engage in the next stage where building owners appraise the threats (regulatory requirement, seismic risk, property market impact) against the benefits of remediation to decide on desirable action. In the last stage where building owners undertake remediation actions, professional service providers, insurers and lenders interact with building owners to determine the feasibility of remediation and the desired degree of retrofit (where applicable).

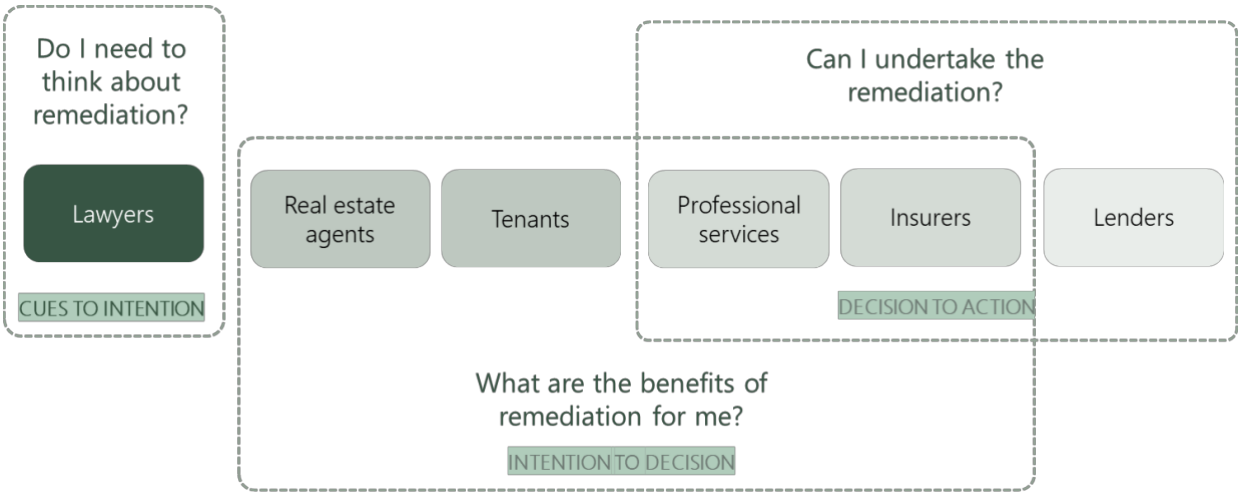

Figure 1 – Stakeholders' influences on building owners seismic strengthening decisions

Figure 2 shows the interactions amongst various stakeholders in the seismic remediation system, as a 'influence map'. At the centre of the diagram are different types of building owners—developers, large private organisations, small private organisations, public organisation portfolio managers, and residential apartment unit owners—while the surrounding shaded ellipses represent each of the stakeholder profiles included in this study and the nature of their influence on the building owners. Other stakeholders not included in this study, but critical to the system, are shown in white ellipses. We note it is also possible there are some other influences not portrayed in Figure 2, but the diagram represents the findings from our research.

Figure 2 illustrates the complex interactions and influences facing building owners. Some stakeholders, such as real estate agents influencing the system (and consequently building owners) in a number of different ways. The diagram also demonstrates that some stakeholders sit outside the influence of market and/or regulatory cues. Residential property tenants and small commercial tenants, often don't have the resources or information necessary to mitigate their exposure to seismic building risk and the risk they are exposed to is dependent on decisions by others.

> "From a landlord point of view, like, they immediately feel, 'Oh, is [the tenant] gonna complain [if the] building's not up to the standard?' … instead of thinking, 'oh, there is an actual risk to life and property?'"
> *Residential apartment unit tenant*

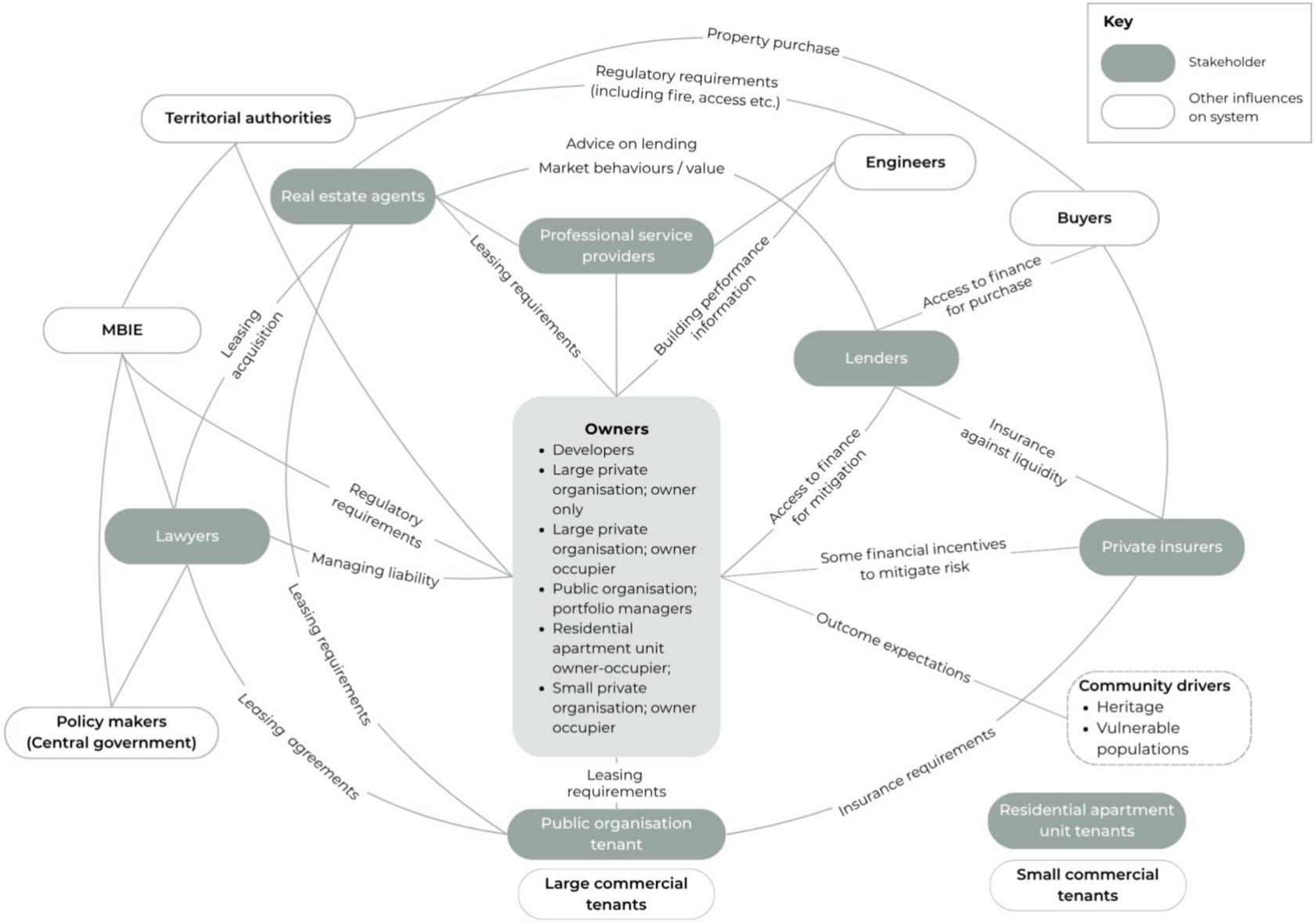

Figure 2 – Influence map illustrating key stakeholders in the EPB system.

4.2 Building performance priorities

Most stakeholders consider reducing life safety risk as a top priority in building performance. Preventing loss of life or injury is a regulatory requirement and improving safety for building users is important (particularly where tenants, for example, have a responsibility under the Health and Safety at Work Act). Property loss and continued use of building functions were valued almost as important. In many cases, participants conflated improved life safety with reduced damage and disruption, assuming that a higher %NBS would result in reduced building damage / disruption following an earthquake.

From the data it is evident that building performance priorities are influenced by regulatory requirements and stakeholders' interest in and use of the building: some stakeholders are more focussed on life safety, while others are focused on reducing damage or disruption. For example, financial stakeholders, such as lenders and private insurers, prioritise minimising property loss and damage and continued use of buildings rather than mitigation of life safety risks, due to their interest in reducing their financial exposure[4], and maintaining economic stability. For residential apartment unit tenants, while life safety risk was top priority, continued use of a building consistently was second priority.

Some participants also highlighted the need for buildings to be resilient to reduce the likelihood of demolition after an event to minimise environmental impact and carbon footprint.

4.3 Incentives for risk mitigation

Stakeholders can influence building owners through policies and systems that favour seismically strengthened buildings.

Policies and requirements of finance sector stakeholders, such as lenders and insurers, often nudge building owners towards seismic strengthening for indirect financial benefits. For example, lenders often require buildings to meet certain standards, such as a 67% NBS (or higher) rating, or require clear plans for improvement, before approving loans. They also generally require remediation to be undertaken in timeframes that are significantly shorter than regulatory timeframes.

> "We don't have a set of rules that everybody must adhere to, because all customers are different. But… in general, a guideline for… looking at a building to take a security to lend against… ideally, the NBS rating would be greater than 67 percent… if it's less, that's where judgement starts to kick in"
>
> *Lender*

Insurers also restrict cover for some buildings under 67%NBS. Insurance providers may adjust policy terms, based on the condition and seismic resilience of a building, or they may refuse cover if a building is lower than 67%NBS. For example, buildings that have been strengthened above 67% NBS threshold may attract lower excess fees. Similarly, insurance products like

[4] For example, insurers might want to avoid paying out on damage claims or providing loss of rent or business interruption cover after an event

business interruption insurance often carry higher premiums for high-risk assets, creating financial incentives to invest in seismic strengthening. Insurers and lenders are required to make prudent decisions to reduce their exposure to risk, which indirectly nudges property owners toward risk mitigation.

Public sector tenants have internal policies that prefer or require the leasing of buildings with higher seismic ratings, generally favouring above 67% NBS. Public sector organisations are considered 'premium' tenants and tend to favour long-term arrangements, which can be used as leverage for remediation by offering owners long-term leases in exchange for the remediation of buildings to greater seismic ratings.

> "[some tenants] won't occupy anything less than 80%NBS, even though the MBIE guidelines are 67%NBS; they just have a policy that if they're going to put their staff in something, it's got to be 80%NBS".
>
> *Large private building owner*

> "We dangled a new long-term lease in front of the building owner... We sat down and engaged really openly and honestly with the building owner. We said, 'hey, look, we feel your pain, we know it's an expensive exercise to remediate the building. But look, if you remediate this building, we're happy to sign a [multi-year] lease extension".
>
> *Public organisation tenant*

Real estate agents play a key role in promoting seismic risk remediation through the way properties are marketed and how tenants are matched to properties. They advise owners/prospective purchasers on property marketability and match clients with appropriate properties that meet their specific needs. They also advise clients on potential bank insurance requirements; and the commercial viability of strengthening (e.g., cost vs building value).

Other stakeholders can promote seismic risk mitigation through advisory and support functions. For instance, lawyers, architects, project managers, and other professional service providers assist clients by offering technical guidance and helping them make informed decisions to address perceived and/or actual seismic risks. Quality and trusted professional advice can support building owners to confidently undertake building remediation.

4.3 Perceived benefits of seismic retrofit

Stakeholders consider a variety of perceived benefits of seismic retrofit including:

- improved life safety,
- reduced impacts on building stock,
- regulatory compliance (with Building Act and the Health and Safety at Work Act),
- property value retention/uplift such as ensuring buildings meet market standards, improving tenantability, boosting rental income, securing long-term leases, increasing asset valuation, increasing asset liquidity, and attracting more investment in the property market,
- client-focused benefits (such as balancing risk in asset management, meeting client requirements, improving organisational reputation, and generating content for marketing),

- broader economic benefits (such as maintaining a resilient outlook of New Zealand, maintaining the financial stability of organisations post-earthquake, reducing losses and damages, and minimising business disruption due to building inoperability after an earthquake),
- heritage preservation,
- reduced carbon emissions (since demolishing buildings creates more emissions than retrofitting), and
- less disruption (allowing continued use of the building).

Among these, the most frequently cited benefits were improved life safety, property value retention/uplift, and client-focused benefits.

The data also reveals distinct priorities for different stakeholder profiles. Professional service providers primarily valued client benefits and life safety improvements, though some also considered property market benefits. They also perceived a reputational benefit to themselves in being associated with buildings that performed well. Lenders focused on property market benefits and the reduced risk to their asset portfolio. Similarly, private insurers see retrofitting as a mechanism to reduce their exposure to losses. Residential apartment unit tenants considered life safety improvements as the main benefit.

Perceived benefits of retrofit are tempered by stakeholders' opinions on the effectiveness of seismic retrofitting. Some stakeholders highlighted its importance in reducing risks and saving lives, and most agreed on its need for high risk buildings. However, some stakeholders were concerned about the cost, the challenges of assessing long-term benefits, and unreliability of engineering advice leading to over engineering. Stakeholders questioned its justifiability considering the high cost, time consuming process, disruption caused and uncertainty over future standards because of evolving seismic knowledge and policy changes. They argued for a pragmatic perspective on seismic retrofitting that balances safety, cost, and societal expectations for seismic performance.

4.4 Other demands and pressures

There are a range of contextual demands and pressures that influence how stakeholders manage, influence or provide advice on seismic building risk. These pressures operate at two levels: those affecting stakeholders directly in their professional roles, and those affecting their clients which shape how receptive clients may be to advice.

Pressures on stakeholders that affect their ability to advise or incentivise seismic remediation include:

- Risk literacy and risk tolerance of their organisation and individuals within their organisation (risk maturity, risk tolerance levels, inconsistency in risk-related thinking across agencies, and risk averse nature),
- Reputational concerns (the risk to an organisation's public image)
- Experience with past seismic events (personal experiences or experiences of someone within the organisation)

- Communication challenges (difficulty explaining uncertainty and/or complex/technical information to some clients – also influenced by stakeholders' own risk understanding and tolerance levels, with inconsistency in risk-related thinking across agencies)

Pressures on clients that can affect their receptiveness to stakeholder advice include:

- Regulatory requirements (Building Act and the Health and Safety at Work Act)
- Budget pressures of clients (lack of funding to remediate buildings, high costs, resource constraints)
- Client risk literacy and risk tolerance (varying understanding and acceptable of seismic risk)
- Competing priorities (e.g., retrofitting may conflict with other beneficial / necessary projects or critical service delivery needs, such as healthcare)
- Fear of liability (e.g., perceived liability under Health and Safety at Work Act obligations)

Public organisation tenants, private insurance providers, technical service providers, property lawyers and real estate agents all considered **budget pressures** a key factor influencing both their organisation's and their clients' ability to manage seismic building risk (including limited funds and resource constraints). Property finance lenders are also influenced by asset security considerations and their management of lending risks.

Most stakeholders noted that varied **risk literacy and risk tolerance** among organisations and individuals also influences their seismic risk management approaches. Real estate agents, technical service providers, private insurance providers and property lawyers all have to adjust their seismic risk management advice strategies based on clients' risk literacy and risk tolerance, while private insurance providers, property finance lenders, and residential property tenants are also guided by the risk tolerance and understanding of their own organisations. For example, insurance providers with lower risk tolerance are more likely to limit insurance coverage, increase premiums, or exclude high-risk properties to reduce their financial risk and exposure. Residential property tenants, on the other hand, are influenced by their own risk tolerance, where they might need to find a balance between their level of seismic risk acceptance and their need for housing.

Clients' needs (or perceived needs) to meet **regulatory requirements** (both Building Act and the Health and Safety at Work Act) also influences stakeholders' involvement in seismic risk management, particularly technical service providers and public organisation tenants.

Experience of past seismic events influences private insurance providers' and property lawyers' risk perceptions and decision-making (e.g., private insurers setting specific thresholds to reduce exposure to high-risk assets). Considerations of other priorities, and communication challenges, such as difficulty in obtaining seismic risk information, are other contextual factors affecting stakeholders' influences around seismic risk management.

5. Building owners

5.1 Profiles explored

The following building owner types were explored:

- Large private organisation building owners
- Large private organisation building owner-occupiers
- Small private organisation building owner-occupiers
- Residential apartment unit owner-occupiers
- Public building portfolio managers.

Full descriptions for each profile are included in Appendix C. This section provides an overview of information needs, their perceptions of benefits of retrofit, motivations, barriers and enablers for undertaking retrofit, and other demands and pressures affecting seismic risk remediation decision making.

5.2 Seismic remediation communication

COMMUNICATING WITH STAKEHOLDERS

Building owners predominantly get their seismic building risk information from engineers. Some building owners also seek information from in-house experts, architects and professional technical service providers (project managers, quantity surveyors, builders). The information sought generally includes potential remediation/retrofitting options, cost implications and feasibility. Insurers are occasionally involved, mainly to inform about insurance options and potential impacts on insurance cover of different remediation options and to confirm remediation is completed.

INFORMATION NEEDS

Across all building owners, two pieces of information were consistently identified as critical for informing remediation decisions: impact on life safety risk, and cost to retrofit. Apart from these, participants' information needs included:

- the insurability of the property such as information on potential changes in insurance cover, premium, excess etc. after seismic strengthening,
- the construction process and timeline,
- impact on the functionality or usability of the building during and post retrofit,
- the likely business interruption if the building becomes unusable after an earthquake, and
- other information such as impact on the building's aesthetics, effects on heritage fabric, potential increases in rental return or property value, and operational cost implications such as maintenance rates.

Most participants sought a clear roadmap for undertaking retrofits including information on responsibilities under legislative requirements, potential actions, construction process, timeline, and cost implications. Information on functionality and usability of the buildings during retrofit and after an earthquake was important for large private organisations (owner only), small private organisations and residential apartment unit owner-occupiers. Public portfolio managers required information on construction timelines as remediation work might affect their operational continuity.

Cost-benefit information, such as comparisons between seismic strengthening costs and potential gains in rental returns, property value, and reductions in insurance premiums were also mentioned as information needs. Large private organisations (owner only) and residential apartment unit owner-occupiers, in particular, required information on the impact on the insurability of the property.

INFORMATION QUALITY

Participants had varying experiences with remediation information quality with smaller organisations facing greater challenges than larger organisations. In general, large private organisations, who generally have greater resource / capacity to understand seismic risk information, found the information adequate and clearly presented. However, some acknowledged that while the available information is good, it is often time-consuming to obtain and uncertainty in the information is a challenge.

Public portfolio managers and residential apartment unit owner-occupiers faced challenges with engineering advice. Public portfolio managers appreciated the input from engineers but noted that it often falls short of meeting all their needs - describing the information as conservative, costly to obtain, and lacking in detail about the implications of low seismic ratings. As a result, they often rely on additional consultants or in-house expertise to fill these gaps. Residential apartment unit owner-occupiers, on the other hand, highlighted inconsistencies in engineering assessments and a lack of confidence in the advice received. They also reported a lack of adequate and credible information and a lack of clarity on insurance implications.

5.3 Perceived benefits of retrofit

Participants identified a range of perceived benefits from undertaking earthquake retrofit, including:

- Regulatory compliance (increasing %NBS, lifting an EPB sticker)
- Reducing potential for liability (meeting EPB requirements, deferred maintenance)
- Improved building safety (reducing life safety risks for occupants and people outside the building, improving well-being of building occupants)
- Improved certainty of post-earthquake building performance (reduced building downtime, less stress in the post-earthquake period, increased certainty about how the building would perform in an earthquake, less damage and disruption, continued operation post-earthquake)

- Commercial and property value benefits (ability to attract and retain tenants, ensure rental return, maintain or enhancing property value)
- Insurability of building (confidence in the building's insurability, keeping coverage, reduced insurance premium)
- Opportunity to do improvements

Of these perceived benefits, most participants considered improved occupant safety, increased certainty around seismic performance, regulatory compliance, and greater confidence in insurability as major benefits.

All participants who occupy their buildings, such as residential apartment unit owner-occupiers, large private organisation owner-occupiers, small private organisation owner-occupiers and public building portfolio managers considered improved safety for occupants as important as it had direct implications on their and other occupants' safety. Public building portfolio managers and large private organisations, both owner-occupier and owner only, saw improving certainty on building performance in future earthquakes as a benefit. The perception is that a higher seismic rating will ensure business continuity after an event, which is crucial for public organisations that rely on reliable and time-critical public services, and for private organisations to maintain revenue streams. Large private organisation owner-occupiers, public building portfolio managers and residential apartment unit owner-occupiers also found regulatory compliance as a benefit. For small private business owner-occupiers and residential apartment unit owner-occupiers, greater confidence in insurability was another important consideration.

5.4 Motivations for undertaking retrofit

The strongest motivators for all building owners were the need to meet regulatory requirements (complying with Building Act EPB requirements, as well as Health and Safety at Work Act obligations, particularly for larger organisations) and cost related considerations (such as availability of funding, financial viability of the retrofit, cost benefit consideration in comparison to other priorities in the organisation). This was consistent across the data.

Realising the **benefits of remediation**, such as reducing life safety risk, increasing property value, increasing %NBS of the building, meeting regulatory requirements (see Section 5.3), also motivates participants to undertake seismic remediation. This serves as a main driver for large private owner only organisations and small private owner occupier organisations.

Apart from these, **feasibility** of undertaking the retrofit (whether it is practically implementable, whether that suits the organisation priorities), confidence in engineers and contractors (trust in engineering advice, ability of contractors to complete the retrofit), and availability of advice and assistance (third party consultation/advice beyond engineering advice) also motivate remediation. Public portfolio managers and large private organisation building owners indicated feasibility as an important driver.

"I've never met a property owner that said, 'I'm going to upgrade my building from 50 to 80%NBS because I'm worried about the life safety risk'. It's purely a commercial decision. That's not to say they're not worried about life safety risk, but it's not the primary [focus]."

Real estate agent

5.5 Barriers for undertaking retrofit

The barriers considered by participants when making decisions about seismic strengthening includes cost, fear of future regulation changes, lack of access to good engineering advice, lack of information on potential issues, poor availability of contractors to complete work, implementation challenges beyond engineering advice, poor trust in outcomes and benefits, ability to recover costs in future property market, stress associated with the retrofitting process, disruption in normal life, and other priorities (e.g., too busy).

Almost all profiles considered remediation cost as a barrier, highlighting high costs and challenges accessing funds for remediation as major concerns. Small private organisation owner-occupiers, large private owner-occupier organisations (non-profits/charities), and residential apartment unit owner-occupiers all identified access to funding (and/or potential servicing of loans) as particularly challenging. Where organisations have low income and limited opportunity to recover remediation costs through their operations, capital to fund remediation can be difficult to raise; and this is exacerbated by nominal 67%NBS threshold for lending imposed by banks. There are some non-bank lenders that are offering funding but at very high interest rates.

"There are finance companies which are now offering finance to body corporates, which, you know, in principle starts solving the issue right. But guess what the interest rate they're going to charge is? It's about 20%… so everybody is kind of taking advantage of the situation".

Residential apartment unit owner

Considerations around budget prioritisation, whether funds are better allocated to more urgent needs and balancing the cost-effectiveness of strengthening (in terms of economic return and investment benefits of retrofitting existing structures versus rebuilding) also emerged as an issue. This issue was especially relevant for public portfolio managers who are required to prioritise a range of priorities within a constrained budget.

Additionally, all profiles except public portfolio managers highlighted fear of future regulatory changes as a barrier. Perceptions of a changeable system have been previously documented as a challenge (Ferner, 2018; Macdonald, 2022; MBIE, 2021). The uncertainty surrounding the evolving nature of building codes/standards and seismic regulations was identified as a significant issue, with participants, particularly residential building owners, worried that retrofitting might not remain sufficient in future, leading to reluctance in committing to costly, long-term investments.

Large private organisations with vulnerable occupants and public portfolio managers highlighted the disruption to services caused by the retrofit works as a major barrier. e.g. the noise and disturbance caused by retrofitting work to occupants, needing to decant buildings and operate from separate facilities were some issues highlighted. Disruption to services is particularly

problematic for institutions providing critical services like hospitals, where operational disruptions will have immediate negative impacts on the patients, and hence the need to maintain operational continuity is often prioritised over the need to remediate seismic risk.

Both small private organisation owner-occupiers and residential apartment unit owner-occupiers emphasised stress associated with the retrofitting process as a key challenge. These groups struggle with navigating the complexities of the retrofitting process and personal time investment over a long period. For example, small private organisation owner-occupiers often struggle to balance retrofitting alongside the demands of running their business. The emotional aspect of it being their home or livelihood source adds another layer of stress.

> "You get this assessment done and you're like, we're done. But oh no, now you've got to get another assessment done and you're like, are we done? Now get this concept design - okay, I've got that, are we done? Now you've got to spend a lot more and get this detailed design, and then you've got to go through the whole process of it… You have to go quite a long way and spend quite a lot of money and it's very tedious"
>
> *Small private organisation owner-occupier*

Public portfolio managers and residential apartment unit owner-occupiers highlighted lack of good engineering advice (cost-effective optimal solutions) as another barrier. Some felt that over-engineered solutions often led to unnecessary expenses without proportional benefits.

Across all groups, some participants found remediation intentions were impacted by a limited availability of contractors and implementation challenges beyond engineering advice. While most participants, particularly large private owners of buildings, viewed seismic strengthening as effective for enhancing the safety of building occupants, some expressed concerns about the execution, quality, and integrity of the work. In particular, participants voiced concerns based on past instances where buildings up to standards performed poorly in real earthquakes.

When building owners chose not to proceed with retrofitting, their alternative actions included selling the property, demolishing the building, continuing to use it as-is, or deferring retrofit work with the intention to address it in the future.

> **"**We've got to show that we are making wise investments for our money, and so that largely comes down to cost – is it more expensive to build new, or is it actually a good investment to strengthen the building… and the timeline is important because one of the challenges that we've got with operational [facilities] is undertaking some of this work is quite challenging because it's noisy, it's disruptive**"**. ***Public organisation building portfolio manager***

5.6 Enablers for undertaking retrofit

Several enablers were identified that building owners believed might help them (or had already helped them) undertake remediation. These included:

- Financial support, including tax incentives, grants, low-interest loans, or partial funding assistance. This was considered important by all building owners. Large private building owners, particularly not for profit organisations owning buildings with vulnerable

occupants considered it important to have financial support in the form of grants as they have limited funding streams. Public portfolio managers, on the other hand, stated that they have limited budgets and other priorities, and would prefer financial support for retrofitting projects so that funding for other urgent needs is not impacted. Residential apartment unit owner-occupiers preferred financial support in the form of loans and reduced insurance premiums to tackle the high upfront cost of retrofitting, given their limited access to capital. It is noteworthy that small funding support can also act as a nudge to remediate a building. For example, one small owner-occupier indicated that a small grant from Heritage New Zealand was just enough of a helping hand to encourage them to proceed with seismic strengthening of their commercial building.

> "[The heritage grant] was helpful and I'd say it kind of motivated me… it wasn't a huge part of it, but it was enough to go, 'Yeah, this is cool, this is an incentive, let's get things going'… I think it's worth revisiting [the grant] because… you spend money, but you get money back… [Now] I'm not gonna do [strengthening] this year like I would have done if the funding was there". *Small private building owner*

- Regulatory support, including:
    - Creating a dedicated pathway for strengthening that does not trigger additional works (e.g., accessibility and fire safety upgrades), so to not add financial burden that might inhibit seismic strengthening work.
    - Certainty about whether future code or regulation changes will affect building owners in relation to remediation obligations.

  The need for regulatory support was consistently highlighted as important by public portfolio managers, as they are heavily influenced by regulatory requirements. Certainty on future requirements was highlighted as important by all groups. There is a strong desire for assurance that completed remediation work will meet long-term standards, and that no further strengthening will be necessary after significant costs and efforts have been invested in the remediation process.

- Information support in the form of easy to understand and standardised information, including:
    - easy to understand explanations of regulatory obligations, including for owners who have not yet received an EPB notice
    - information focused not only on achieving a specific %NBS rating, but also on reducing seismic vulnerability
    - clear information on current state of building and the level of strengthening that can be achieved within certain cost limitations
    - clear information on cost of strengthening
    - clarity on process/actions to assess buildings and undertake strengthening work
    - guidance on assessing risks compared to other priorities
    - clarity on timelines and potential disruptions

Residential apartment unit owner-occupiers, public organisation portfolio managers and less well resourced organisations emphasised the importance of informational support. This likely stems from the fact that, unlike other large private organisations that may have dedicated teams of professionals offering reliable advice, these groups often lack access to clear and dependable information. This is partly due to financial constraints, which limit their ability to hire technical service providers and consultants. As a result, their need for informational support increases.

5.7 Other demands and pressures

There are a range of contextual factors that influence how building owners make decisions around management of seismic risk. These include:

- regulatory requirements (Building Act and the Health and Safety at Work Act,),
- budget pressures (lack of funding to remediate buildings, high costs, resource constraints, limited budget and prioritisation of a more beneficial project instead of retrofitting work),
- risk literacy and risk tolerance of organisations and individuals (risk understanding of organisations, varying risk tolerance levels, inconsistency in risk-related thinking across agencies, and risk averse nature, risk averse nature due to personal experience with seismic events either firsthand or experienced by others within the organisation),
- fear of liability (for the organisation itself or tenants), and
- reputational concerns (fear of damage to reputation because of non-compliance, building failure).

Among these, regulatory requirements, budget pressures, and risk appetite and understanding were the most cited factors influencing seismic risk management. Regulatory requirements related to the Building Act, along with considerations of meeting legislative deadlines and avoiding additional building work triggered during the consent process for structural changes, represent important contextual pressures faced by large private organisations, public building portfolio managers, and small private organisations. Additionally, participants raised concerns about uncertainty in the regulatory environment and anticipated future changes to regulations or building standards that could necessitate further remediation. This uncertainty has led to hesitation in undertaking expensive remediation work among some participants. Some participants also expressed concerns over the disproportionate focus on costly structural remediation, especially where certain remediation levels may produce diminishing returns relative to costs and these costs may prevent other critical priorities from being undertaken.

Risk appetite and risk literacy of organisations, as well as individuals, influences seismic risk management decisions, particularly for public portfolio managers, residential apartment unit owner-occupiers and large private organisation owner-occupiers. For example, body corporate members often have varying levels of risk awareness and tolerance, which may lead to disagreements over the urgency, scope, or cost of necessary upgrades - ultimately influencing remediation strategies. Some organisations, particularly public entities, have a low-risk appetite

and often (arbitrarily) prefer buildings with a higher %NBS without necessarily a sound understanding of the relative benefits.

Budget pressure is another key constraint for large private organisation owner-occupiers and residential apartment unit owner-occupiers. For example, non-profit/charity organisations – who have extremely limited access to funding for seismic remediation among other priorities – reported high costs of seismic upgrades posed a financial threat to their operations, that could potentially shut them down. Other participants, including public building portfolio managers and large private organisation owner-occupiers, also mentioned concerns around reputational impacts in relation to public perception of managing seismic risk decisions as well as potential consequences if something were to happen in a seismic event. Among all building owner profiles, residential apartment unit owner-occupiers reported experiencing nearly all the contextual pressures described above as affecting their seismic risk management decisions.

6. The role of %NBS

An integral part of how stakeholders and building owners make decisions about seismic retrofit, relates to their use and interpretation of %NBS. Alongside this MBIE funded research, the research team are undertaking BRANZ funded work looking at the use and interpretation of %NBS. This work seeks to understand seismic risk information needs, current uses and applications of %NBS and how alternative rating systems would meet the needs of, and be interpreted by, other stakeholders.

It is widely acknowledged that the intended use of %NBS has gone beyond what was originally intended (Ferner, 2018). The system is useful for many reasons, such as identifying poorly performing buildings and serving as a comparison tool between buildings. However, it has also been widely misunderstood and misapplied (Ferner, 2018; Ministry of Business Innovation and Employment, 2022). This misunderstanding has led to unnecessary building closures, stress for building owners and tenants, and poor investment in aspects of seismic strengthening.

%NBS, as the most widely available seismic risk metric in New Zealand and has been adopted because of its perceived clarity, simplicity, standardisation, and tangibility that aids in organisational decision-making (Ferner, 2018). However, the metric is often perceived as being more accurate and precise than it is (Brunsdon, 2024; Ferner, 2018). People also assume that it is a linear scale and that the relative benefit of improvements from 34-50%NBS is the same as 50-67%NBS, which is not the case. %NBS is also often interpreted as a life safety metric (Ferner, 2018; MBIE 2022) rather than a building vulnerability metric.

People find it challenging to understand that building assessments focus solely on the risk to life, and do not take into account aspects like, disruption, continued occupancy, and the extent of the damage (Ferner, 2018). Many do not investigate the goals set out in the building code and assume that a higher %NBS means the building will be undamaged and able to be used again immediately (Ferner, 2018). Abeling et al. (2023) also found discrepancies between public expectations and the actual objectives of the New Zealand building code. For instance, people expected buildings to return to full functionality soon after an earthquake. This finding is reflected in Miranda et al. (2023) work which highlighted the gap between homeowners'

expectations and the actual performance standards set by building codes. These studies suggest a general public misunderstanding or misinterpretation of government regulations and objectives when it comes to seismic risk and rating systems.

Our interviews confirmed that %NBS is currently used for purposes beyond its intended purpose: for those evaluating life safety risk as well as damage and disruption. Figure 3 illustrates that there are many organisations that have embedded %NBS in their organisational decision processes. %NBS supports decisions ranging from building occupation/leasing, property lending, insurance policy provisions and pricing, building leases and property marketing. Despite many of these processes relying on a particular %NBS as a policy threshold, there is a broad awareness that %NBS is imprecise but that it is the best tool available. Some directly conflate a higher %NBS rating with the perception that a building is likely to be functional after an earthquake. While others - despite acknowledging %NBS is limited by a primary life safety focus - still apply the metric to damage and disruption risk assessments, in light of no other appropriate metric being available. The data shows that there is a diverse web of organisations that now rely on %NBS to manage seismic risk and if %NBS was to be removed from the regulatory system, it is likely to still be used in a legacy form until a replacement system is generated.

> "We use [%NBS] all the time and understand it pretty clearly… The issue that we have as an insurance industry is it more defines what the risk to human life is rather than what the outcomes are to a building. So… we use it more as a guide rather than a hard rule on how we do stuff."
>
> *Insurance underwriter*

> "Having a number to point to is essential when you've got two parties both with different rights and responsibilities and risks… Without that number, it's almost impossible to have a meaningful framework to determine rights and responsibilities, and over a long period of time, particularly after an earthquake, that might affect the structural integrity of the building. In other words, having NBS there lets you compare apples with apples at any given time."
>
> *Lawyer*

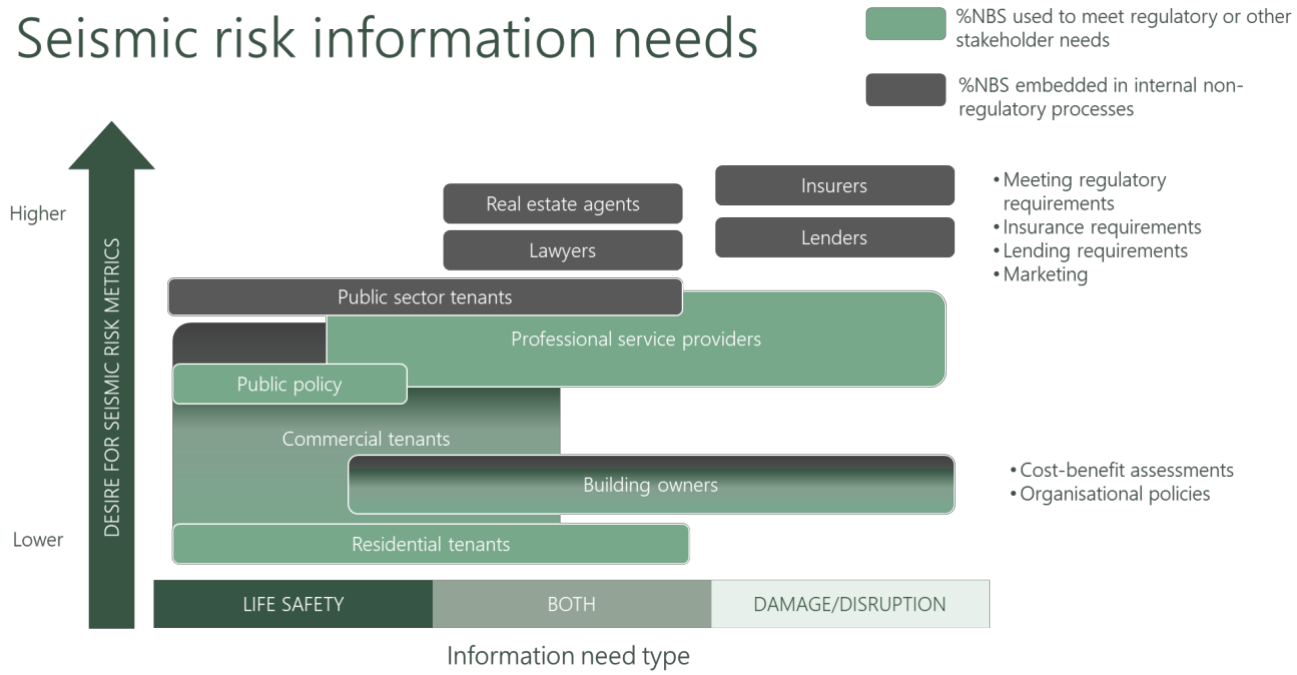

Figure 3 Seismic risk information needs of building owners and stakeholders

7. Discussion

This research documents building owner and stakeholder behaviours related to the seismic remediation of building in New Zealand. It documents:

1. The role of different stakeholders in influencing the remediation process, their operational contexts, influences, challenges and enablers, and
2. Building owners, their information needs, motivators, barriers, enablers and pressures that affect their seismic remediation behaviours.

7.1 Stakeholders

This study explored seven stakeholder profiles that influence building owners' remediation decision-making: professional technical service providers (including architects, project managers, and quantity surveyors), real estate agents, property lawyers, private insurance providers, property finance lenders (banks), public organisation tenants, and residential apartment unit tenants. The findings show a complex ecosystem of stakeholders operating with different measures and levels of influence, providing building owners with both aligned and sometimes conflicting remediation pressures.

Some stakeholders incentivise seismic risk mitigation indirectly through internal policies and market mechanisms rather than direct financial support. Lenders and insurers have perhaps the most direct influence by tying crucial financial support/mechanisms to seismic performance; including requiring buildings to meet minimum strength standards (e.g., ≥67% NBS) for loan approvals or linking insurance pricing or availability to %NBS. Similarly, public sector tenants encourage strengthening upgrades by favouring buildings with higher %NBS ratings through leasing behaviours and policies, thereby creating market demand for seismically improved buildings.

Real estate agents play a key role as information intermediaries, by translating seismic risk information into market-relevant communications. They match seismic performance needs and requirements with tenants and purchasers and balance the competing interest of buyers and sellers alike. Other stakeholders support building owner decision making through advisory roles, including property lawyers and professional technical service providers (e.g., suggesting remediation, or to a certain level, to manage legal and/or physical risks) .

Life safety considerations, regulatory requirements, and financial considerations are the main factors driving stakeholders' interest in seismic remediation. Contextual pressures influencing stakeholders' involvement in seismic remediation include budget constraints of client and stakeholder organisations alike, varying levels of risk literacy and risk tolerance of different organisations and individuals, fear of liability and reputational damage. These challenges manifest differently across stakeholder profiles – for example, property lawyers emphasised organisational risk aversion and financial pressures of clients, lenders focused on institutional risk tolerance, technical professionals cited budget and liability concerns, and public-sector tenants prioritised life safety and regulatory compliance.

Combined, these industry and market-driven incentives – alongside regulatory settings for remediation – create conditions that can actively encourage and discourage remediation decisions for building owners.

7.2 Building owners

Five building owner profiles were explored in this study: large private organisation building owners, large private organisation building owner-occupiers, small private organisation building owner-occupiers, residential apartment unit owner-occupiers, and public building portfolio managers. Like stakeholders, these groups demonstrated varied motivators, enablers, and barriers to remediation based on their organisational needs, resources, and operating constraints.

The key motivators for remediation across all building owner profiles included meeting regulatory requirements (compliance with Building Act and the Health and Safety at Work Act obligations) and cost considerations (funding availability, financial feasibility of retrofits, and cost-effectiveness). This trend was consistent across the data, however the relative weight of these motivators varied based on owner type and operational context.

All groups were also motivated by improvements to life safety, though this was more prominent among owner-occupiers and public organisations – who have direct responsibility for building users – compared to owner-only groups. Additional motivators included the benefits of retrofitting (increased building value and the opportunity for other maintenance work), the retrofit's feasibility (practical implementation), confidence in engineers and contractors (trust in expertise and execution), and the availability of external advice (third-party consultations beyond engineering). Large private organisations particularly emphasised the importance of having established relationships with trusted engineers and other contractors, while smaller owner-occupiers generally struggled more with access to and/or funding of comparable professional support and resource. Among large private owner-only organisations, commercial considerations were far more prominent, including maintaining rental income, attracting and retaining tenants, and meeting market expectations (e.g., %NBS thresholds of different tenants). Public organisations balanced life safety with operational continuity, particularly for important and/or critical public services, while residential owner-occupiers focused strongly on regulatory compliance (removing regulatory requirements, reducing liability for non-compliance, and maintaining insurance cover).

Main barriers for building owners to undertake seismic retrofit included high cost and the possibility of future regulatory changes, followed by disruption in normal life (regular business operation, noise from remediation work, logistical challenges), limited access to good engineering advice, and availability of contractors. However, these barriers differed based on resources and operational requirements. For instance, large private organisations were concerned about return on investments and the ability to recover remediation costs through rent and/or property values, while public organisations emphasised struggles with budget prioritisation and pressure to justify efficient spending of public money. Smaller owner-occupiers, residential owners, and non-profit/charity organisations emphasised affordability concerns and access to funding. Concerns over future regulatory changes or reassessments

producing lower ratings was particularly prominent among private building owners, and less prominent for public organisations who were generally more accepting of potential evolving requirements. Large and small private owners, as well as public organisations, also emphasised challenges in relation to managing remediation alongside continuing business operations, with small owner-occupiers and residential unit-owner occupiers also commented on the personal time commitment and stress associated with navigating remediation.

Enablers for retrofit included a supporting regulatory environment. Owner-occupiers wanted seismic strengthening consenting that wouldn't trigger other building upgrade requirements, while heritage building owners sought more flexibility for remediation, including demolition as a last resort (i.e., where funding is not available or feasible). All groups expressed desire for greater certainty around whether completed retrofit work would meet long-term requirements and future strengthening would not be required. Clear, standardised information offering guidance on regulatory obligations, strengthening process, costs, timelines, and potential disruptions was also considered important, especially among owner-occupiers (smaller private, and residential units) who generally had less access to support and advice compared to larger organisations and public entities. Across all building owner profiles, financial support was considered the most important enabler, this included tax incentives, grants, low-interest loans, or partial funding assistance.

7.3 Market influences on remediation behaviours

The real estate market and the financial (insurance and lending) market both encourage seismic remediation for some organisations as well as create a barrier to remediation for others. Figure 4 shows how these markets impact different building owner types. The X axis represents the influence of the real estate market on building owners, and the Y axis represents the dependency of organisations on third party finance and insurance. Within this framework, there are four broad groups of building owner behaviours:

1. **Building owners driven by market conditions** such as developers, landlords with premium tenants. Decisions about seismic retrofitting are influenced by the potential commercial returns of implementing remediation. This group are driven by the real estate market conditions. There is high interest in meeting market drivers and achieving a desirable %NBS rating (currently this is >67%NBS).
2. **Building owners driven by the financial sector** such as low-end commercial property owners. Here, the decision to retrofit is influenced by financing and insurance requirements and not commercial returns. This may result in remediation to a level that is beyond what is necessary or economically sound (67 %NBS).
3. **Building owners with no or low external incentives to strengthen** such as public building portfolio managers. Remediation decisions are based on organisational risk appetite and regulatory requirements. This group is generally able to meet regulatory minimum or higher standards as they can self-fund but this must be balanced against other funding priorities (> 34 %NBS).

4. **Building owners unable to strengthen due to affordability of, or access to, financing** such as residential apartment unit owner-occupiers, small private organisation building owner-occupiers and charity/non-profit organisations. This group has higher dependence on third party finance and insurance and there are low resale returns for investment in seismic remediation. They often cannot even meet minimum strengthening requirements (34%NBS) because lenders or insurers are requiring strengthening to 67%NBS (putting loans out of reach) or other financing options are prohibitively expensive .

For the last group, unless financial assistance is provided, they will continue to struggle to meet regulatory requirements.

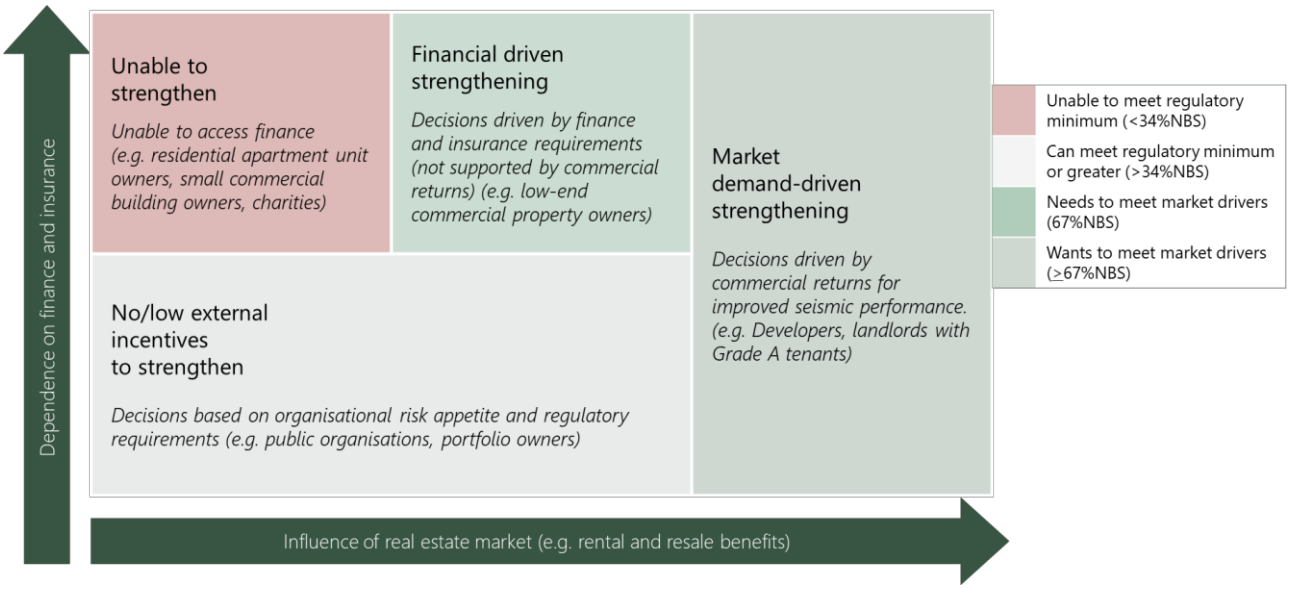

Figure 4 – Typology of strengthening behaviours observed among building owners

7.4 Implications for policy/recommendations

Almost all groups approach remediation through a cost-benefit lens, where the cost of strengthening is assessed against the benefit(s) gained (e.g., actual risk reduction achieved and/or feasibility of remediation relative to cost; cost of remediation relative to building value). While improving life safety is often cited as an important– if not the primary – factor for remediation, economic and commercial benefits feature strongly in remediation decision-making (e.g., improving a building's marketability/tenantability, maintaining or improving a building's value, reducing disruption to use of a building to maintain business income). This means that remediation will likely not occur unless the market conditions are favourable; and policy must be designed to enable action amongst building owners or environments where the market is failing.

For many large private organisations, the motivators to remediate buildings currently, predominantly, sit outside the EPB system. They also have fewer barriers to action. Larger private organisations often have access to professional expertise, sufficient financial resources (or access to resources) to absorb temporary losses, and/or mechanisms to recover their investments and spread their risk across multiple buildings. For most of these organisations, the implementation

of seismic strengthening measures does not compromise their core operations or service delivery and in fact, it can sometime enhance their operations.

Similarly public organisations, have the means, resources and access to technical support to enable seismic remediation. They are, however, constrained by competing priorities within their organisation and the current regulations provide a useful impetus to prioritise funding and remediate poorer performing buildings.

On the other hand, residential apartment unit owner-occupiers, small private organisation owner-occupiers, and not-for-profit organisations struggle to afford the retrofit or, in some cases cannot even access funding. The financial pressure is exacerbated by the high standard imposed by lenders. To help more building owners to bring their buildings above the earthquake prone threshold, these market barriers need to be addressed. Access to funding (that does not require retrofits to a higher standard than the regulatory minimum) and/or financial support is critical to help these building owners.

Organisations that handle critical services or work with vulnerable occupants such as healthcare facilities, retirement villages, and public housing struggle with the practical implementation of retrofit works. For these entities, undertaking seismic strengthening or shutting down buildings could jeopardise the safety and well-being of their occupants. A consideration of relative risks (life safety from suspension of critical services vs life safety due to earthquake risk) is needed for these organisations to enable them to operate effectively with minimal impact on their occupants; and/or options to remediate that minimise disruption to building occupants/services.

Related, some organisations, particularly public building portfolio managers, find that the remediation timeframes imposed by the current EPB regulations leads to difficult decisions where seismic risks are sometimes mitigated ahead of other pressing risks/needs. Other organisations find that the remediation timeframes do not align with their normal building maintenance timeframes. These organisations, that are diligently managing risks, would benefit from more flexibility around remediation timeframes.

Owners of heritage buildings have unique challenges. Their risk remediation options are limited because of restrictions on remediation options such as demolition, while remediation may also be more expensive due to requirements for minimising impacts on a building's heritage fabric. Heritage building owners would value more options for remediating the risk, including demolition, as a last resort where other options are unaffordable / uneconomic, and low cost retrofit options that preserve heritage fabric. Heritage building owners commonly highlighted the community and/or social value provided by community buildings, and associated this with justification for further financial support to be provided for undertaking heritage building retrofit work.

While this research has largely focussed on building owners and their remediation behaviours, it is important to note that there are a range of building users that are exposed to the risk posed by these buildings. Some building users, such as public organisation tenants, have agency to mitigate seismic risk by paying higher rents and/or offering long-term lease options. There are others however, such as small organisation tenant and residential apartment tenants, that may not have the means or option to seek out higher performing buildings. It is critical that any

policy is designed to protect those that bear the risk (through occupancy of buildings), particularly where they have little agency to mitigate that risk.

%NBS has been adopted well beyond its intended scope of use. While this has raised the awareness and active management of seismic risks in buildings, it has not always resulted in the proportionate management of risk due to a misunderstanding of what %NBS represents. Many organisations have set arbitrary values of %NBS requirements in their policies and processes which has raised the bar beyond what the EPB regulations intended – creating better outcomes for some and creating barriers to remediation for others. %NBS is now well-integrated into many organisations' risk management processes. It provides a useable yardstick, to support policy, contract and decision making process design. If %NBS were ever to be dismantled, an alternative measure would likely be needed to fill the void. Otherwise %NBS (and the associated costs of assessing it) would likely continue to be used in the absence of an alternative . Whether %NBS remains or a new system replaces it, effort will be needed to improve understanding to ensure it is clearly integrated across sectors and to improve its effectiveness and encourage appropriate application and scope of use. .

Finally, there is a pressing need for clarity in regulations and policies related to seismic risk management. Easy to understand and standardised information are required, including to provide clarity around when buildings should and/or need to be assessed outside the EPB process. Additionally, greater clarity for building owners is needed around whether undertaking strengthening could result in future strengthening work – either through building code changes and/or new assessments producing a lower seismic rating. For example, clarity over whether a strengthened building will be exempt from future work (and for how long) would help to improve the confidence of building owners to undertake remediation. Addressing these complexities will help reduce uncertainties for all stakeholders involved in seismic risk management.

The data indicates that groups such as valuers, developers, and general building users are other important stakeholders that influence seismic risk remediation decision making. Future research exploring these roles/profiles would be beneficial to gain a greater understanding of the EPB system. Similarly greater insight into the needs and behaviours of heritage building owners, differences in regional and urban perspectives, and differences in behaviours between EPB and non-EPB remediation decisions would be useful. Other areas that would add to our understanding of remediation behaviours include how perceptions of liability and risk perception impact behaviours.

7.5 Limitations

Some limitations exist in our study. First, due to the rapid timeline of this work to fit in with the regulatory review, we had to limit the scope of groups we profiled. This reduced the number of participants within each case, constraining the diversity of perspectives captured. Profiles of some stakeholder groups who were originally targeted, such as policymakers, and developers, could not be developed due to difficulties in participant recruitment and/or diversity in perspectives.

Second, due to the nature of participant recruitment, there is potential for self-selection bias, where those more interested/opinionated on the topic may have been more likely to participate impacting the generalisability of the findings. Given the research topic is about regulatory compliance and the research instrument was an interview where participants self-reported about their preferences, perceptions, or actions, there is potential for social desirability bias in the data. This may have influenced our findings (e.g. people report on what they perceive is the approved activity, rather than what they actually do). Additionally, due to the short timelines, interviews were used as the sole data source, and data source triangulation (through document review, observations, etc.) could not be achieved.

Third, while efforts were made to ensure geographic diversity across different seismic zones and urban-rural contexts throughout New Zealand, most participants were located in urban areas with some representation from provincial centres (but not rural). Thus, the study provides context specific understanding, however, it is not necessarily generalisable to the population. Additionally, the study did not explore broader socio-cultural factors that potentially influence seismic remediation behaviour.

7.6 Way forward

This research highlights the importance of understanding how the whole building system influences seismic remediation outcomes and the unique needs and constraints of different building owner groups. The research identifies a number of key policy priorities:

- Policy must be designed to enable action amongst building owners or environments where there are no or low market benefits to remediation, this includes access to financial support and or affordable financing options.
- Access to lending options, that do not require retrofits to go beyond regulatory minimum, will help reduce barriers to retrofit for residential apartment unit owner-occupiers, small private organisation owner-occupiers, and not-for-profit organisations.
- It is critical that any seismic risk policy is designed to protect those that bear the risk (through occupancy of buildings), particularly where they have little agency to mitigate that risk.
- There would be value in providing discretion in regulatory timeframes to allow some building owner groups the opportunity to provide evidence of advancing / plans to advance remediation. This would allow them to better balance seismic risk with other critical building priorities.
- Any transition to a new system will require careful communication and must provide building owners with as much certainty as is practicable about whether future code or regulation changes will affect them.
- If %NBS is removed from the system, an alternative metrics will likely be needed to support the organisations that have embedded %NBS in their policies, processes and contractual arrangements.

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Appendix A: Participant profiles

Interviewee Code	Profile Group	Stakeholder type	Summary information	Seismic zone	Urban/ Provincial/ Rural	Building height	Building type	Heritage/ Non heritage	Individual /Portfolio of buildings	Building occupants type – Vulnerable /no higher needs
DEV_CE	Developers, on-sale short term interest; Resale (Commercial / Residential)	Building owner	Owner of a construction/ investment firm with civil engineering background, specialising in existing/heritage buildings.	High;	Urban;	Both	(Not specified)	Both	Individual buildings;	Both
DEV_CM	Developers, on-sale short term interest; Resale (Commercial / Residential)	Building owner	Director of a development company focused on new builds and renovating older buildings.	High; Medium	Urban;	High rise (e.g., 3 or more storeys);	All types	Both	Both	Both
LPrivOOH_CE	Large private org; Owner-Occupier (Heritage)	Building owner	General manager of a statutory trust managing property/assets for ministries; oversees building maintenance/insurance.	High; Medium	All		Stone, masonry, wood, concrete	Both	Portfolio of buildings;	Vulnerable
LPrivOOnly_CE	Large private org; Owner-Only (Non-critical, 3)	Building owner	Managing Director of a mixed-use property portfolio (retail/industrial/residential) .	All	All	Both	(Not specified)	Mostly Non-heritage;		Both

LPrivOOnly_CM	Large private org; Owner-Only (Non-critical, 3)	Building owner	Commercial landlord (200 tenants) with residential sales; owns 44 buildings (old/new), rebuilt post-earthquake.	Medium;	Urban; Provincial;	Both	Mixed types	Both	Portfolio of buildings;	no comments
LPrivOOnly_MD	Large private org; Owner-Only (Non-critical, 3)	Building owner	National Asset Manager for a property firm handling land development and investment portfolios.	High; Medium;	Urban;	Both	All types	Both	Portfolio of buildings;	No higher needs
LPrivOOP_CE	Large private org; Portfolio Owner-Occupiers (Non-critical, 3)	Building owner	Development Manager overseeing NZ property projects (hotels, refurbishments).	High; Medium;	Urban;	Low rise (e.g., less than 3 storeys);	(Not specified)	Non-heritage;	Portfolio of buildings;	Both
LPrivOOV_CE_1	Large private org; Owner-Occupier (Critical, 1)	Building owner	General Manager of a private school managing property for 180+ boarders.	High;	Urban;	Low rise (e.g., less than 3 storeys);	Mixed brick/concrete/timber	Non-heritage	Portfolio of buildings;	Vulnerable
LPrivOOV_CE_2	Large private org; Owner-Occupier (Critical, 1)	Building owner	Aged care Facility Manager; manages infrastructure for a non-profit.	Medium	Rural	Low rise (e.g., less than 3 storeys);	Brick/plaster on piles	Non-heritage	Individual building	Vulnerable
LPrivOOV_MD	Large private org; Owner-Occupier (Critical, 1)	Building owner	Head of Development for aged care villages, leading new builds and land procurement.	All	All	Both	Timber, concrete, structural steel	Non-heritage;	Portfolio of buildings;	Both
LPrivOOV_MD_2	Large private org; Owner-Occupier (Critical, 1)	Building owner	General manager of a charity providing social services; oversees	High;	Urban;	Both	Brick, concrete, steel, timber	Non-heritage;	Portfolio of buildings;	Both

			corporate/property operations.							
PubP_CE_1	Public org; Portfolio Managers	Building owner	Social housing policy advisors managing 75,000 homes and EPB policy reforms. 2 interviewees present.	All	All	Both	Wide range (1940s+, timber to high-rise)	Both	Portfolio of buildings;	Both
PubP_CE_2	Public org; Portfolio Managers	Building owner	Chief Exec for school property, government official	All	All	Both	All types	Both	Portfolio of buildings;	Both
PubP_MD	Public org; Portfolio Managers	Building owner	Government engineering advisors developing seismic policies for schools. 2 interviewees present.	All	All	Low rise (e.g., less than 3 storeys);	Concrete, timber, steel mixes	Both	Both	Both
ResO_CE_1	Residential property; Individual ownership	Building owner	Apartment owner and Body Corp chair for a mixed-use heritage building.	High;	Urban;		(Not specified)			
ResO_CE_2	Residential property; Individual ownership	Building owner	Owner-occupier and Body Corp leader in a 31-unit mixed-use heritage building.	High;	Urban;	Both	Mixed 1900s (brick, steel, concrete)	Heritage;	Individual buildings;	Both
ResO_CE_3	Residential property; Individual ownership	Building owner	Apartment owner driving EPB remediation work via Body Corp.	High	Urban	High rise	1963 lift-slab construction	Non-heritage	Individual	
ResO_CM	Residential property; Individual ownership	Building owner	Apartment owners impacted by earthquake costs/insurance crises. 2 interviewees present.				1904 four story masonry			

ResO_MD	Residential property; Individual ownership	Building owner	Former apartment owner involved in Body Corp.	High;	Urban;	High rise (e.g., 3 or more storeys);	1929 reinforced concrete/ brick	Non-heritage;	Individual buildings;	Both
SPrivOOCrit_CE	Small private org; Owner-Occupier (Critical, 1)	Building owner	Dentist operating in an EPB; also owns/renovated a heritage club building.	Medium;	Urban;	Low rise (e.g., less than 3 storeys);	Mostly brick/masonry/concrete	Heritage;	Individual buildings;	Both
SPrivOONC_CM	Small private org; Owner-Occupier (Critical, 1)	Building owner	Owner of a restored heritage coworking space.	High;	Urban;	High rise (e.g., 3 or more storeys);	Brick and mortar	Heritage;	Individual buildings;	Vulnerable
		DO					Steel frame, dycore, some timber			
LAW_CE	Lawyer	Other stakeholder	Commercial property lawyer with 35 years' experience.	All	Urban; Provincial	High rise (e.g., 3 or more storeys);	All types	Non-heritage;	Individual buildings;	Vulnerable
LAW_CM	Lawyer	Other stakeholder	Property lawyers with 13+ years' experience in commercial real estate. 2 interviewees present.	High; Medium;	Urban;	Low rise (e.g., less than 3 storeys);	All types	Both	Both	Both
LAW_MD	Lawyer	Other stakeholder	Law firm partner specialising in commercial property transactions.	All	Urban; Provincial;	Both	All types	Both	Both	Both
LEND_CE_1	Lender	Other stakeholder	Banking supervisor monitoring seismic risks for lenders/insurers.	All	All	Both	All types	Both	Both	Both

LEND_CE_2	Lender	Other stakeholder	Bank property finance head funding large-scale developments.	All	Urban; Provincial	Both	(Not specified)	Both	Both	Both
LEND_CM	Lender	Other stakeholder	Construction finance specialist funding developer projects.	All	Provincial; Urban;	Both	All types	Both	Both	No higher needs
POL_CE	Policymaker (central govt)	Other stakeholder	Government structural engineer advising on building code/seismic policy.	High	Urban	Both	All types	Non-heritage	Individual buildings	
POL_CM	Policymaker (central govt)	Other stakeholder	Hazard risk policy advisor focused on emergency building management.	All	Urban; Provincial;	Both	Various (glass, pre-cast, metal)	Both	Portfolio of buildings;	Both
POL_MD	Policymaker (central govt)	Other stakeholder	Policy advisor on health and safety regulations.	High;	Urban;	High rise (e.g., 3 or more storeys);	(Not specified)	Both	Both	Both
PrINS_CE	Private insurer	Other stakeholder	Insurance underwriter setting terms for EPB-related risks.	All	All	Both	(Not specified)	Both	Individual buildings;	Both
PrINS_CM	Private insurer	Other stakeholder	Commercial insurance brokers managing property portfolios.	All	All	Both	Mixed masonry/ concrete/ etc.	Both	Both	Both
PROF_CE	Professional technical service provider (non-engineer)	Other stakeholder	Project Manager (engineering background) advising on seismic remediation.	High	Urban	Both	Various (no industrial/ pre-cast)	Both	Both	No higher needs

PROF_CE2	Architect	Other stakeholder	Architecture firm director specialising in heritage/strengthening projects.	Medium ; High;	All	Low rise (e.g., less than 3 storeys);	Structural steel/RC	Both	Individual buildings;	Both
PROF_CM	Professional technical service provider (non-engineer)	Other stakeholder	Quantity Surveyor/Project Manager for seismic construction projects.	Medium ; High;	Urban;	Both	(Not specified)	Both	Individual buildings;	Both
PROF_CM2	Architect	Other stakeholder	Construction cost consultants (residential/commercial).	All	Urban;	Both	Timber, concrete, steel mixes	Both	Portfolio of buildings;	No higher needs
PROF_MD	Professional technical service provider (non-engineer)	Other stakeholder	Client-side Project Manager for property developments.	All	Urban; Provincial;	Both	(Not specified)	Both	Individual buildings;	No higher needs
PROF_MD2	Architect	Other stakeholder	Architecture director focused on healthcare/government projects.	All	Urban	Both	Mixed (URM, brick, steel, etc.)	Both	Both	Both
PubT_CE	Public org; Tenant (Critical, 1)	Other stakeholder	Government property manager leasing 23 seismic-risk buildings nationwide.	All	All	Both	Any kind	Non-heritage;	Portfolio of buildings;	
PubT_CM	Public org; Tenant (Critical, 1)	Other stakeholder	Government asset strategist developing property capability.	All	All	Low rise (e.g., less	All types	Both	Individual buildings;	No higher needs

						than 3 storeys);				
PubT_MD	Public org; Tenant (Critical, 1)	Other stakeholder	Public health property strategist overseeing land/assets.	All	All	Both	Mostly concrete/ steel frame	Both	Portfolio of buildings;	Both
REA_CE	Real estate agent	Other stakeholder	Corporate property director managing seismic remediation projects.	All	Urban; Provincial	Both	Single-level industrial	Both	Both	No higher needs
REA_CM	Real estate agent	Other stakeholder	Commercial leasing agent (industrial/retail).	Medium ;	Urban; Provincial;	Low rise (e.g., less than 3 storeys);	Concrete, tilt-slab, timber	Non-heritage;	Individual buildings;	No higher needs
REA_MD	Real estate agent	Other stakeholder	Real estate Managing Director managing commercial sales/body corporates.	Medium ; Low;	Urban; Provincial;	Both	(Not specified)	Both	Both	Both
ResT_CM	Residential property; Tenant	Other stakeholder	Apartment resident.	Medium ;	All	Both	Mixed concrete/ wood	Non-heritage;	Individual buildings;	No higher needs
ResT_MD	Residential property; Tenant	Other stakeholder	Apartment resident.	High;	Urban;	High rise (e.g., 3 or more storeys);	Previously stayed in mix of concrete wood, combination of concrete and wood	Non-heritage;	Individual buildings;	No higher needs

Appendix B: Interview questionnaire

Contextual Information

1. Could you please describe:
    a. What your **organisation** does, and your own **role** within the organisation? (i.e., owner-only/owner-occupier/tenant; job title, responsibilities, professional background, how success is measured)
    b. When it comes to managing seismic risk in buildings, what geographic settings are you most familiar with?
        i. High, Medium or Low seismic hazard zone?
        ii. Rural, Provincial or Urban environment?
    c. When it comes to managing seismic risk in buildings, what type of buildings areyou most familiar with?
        i. Low rise (e.g., less than 3 storeys or high rise (e.g., 3 or more storeys?
        ii. Building materials (e.g. masonry vs concrete)?
        iii. Heritage or non-heritage?
        iv. Individual buildings or portfolios of buildings (and risk)
        v. Buildings with vulnerable / higher needs occupants

Seismic Risk Information (to inform aligned BRANZ funded research)

2. In your role, would you say that seismic building risk information is useful to you?
3. For what purposes do you use and/or need seismic risk information about buildings?
        i. Building occupancy decisions
        ii. Building acquisition decisions
        iii. Building leasing decisions
        iv. Building retrofit decisions
        v. Provision of insurance
        vi. Property marketing
        vii. Regulatory risk screening
        viii. Communicating with staff
        ix. Enterprise risk management
        x. Other
4. For each purpose above (or most common two, if multiple): How do you use this seismic risk information to inform these purposes?
    a. (if above question not relevant): Do you have any seismic risk policies within your organisation? If so, please explain.
5. For each purpose above (or most common two, if multiple): What are your seismic building risk information needs?
    a. How important are each of the following dimensions of seismic building performance to you (place in order of importance)
        i. Reducing life safety risk
        ii. Reducing property loss/damage
        iii. Continued use/function of a building
    b. What is your preference for the seismic building risk information you receive?
        i. Technical descriptions of seismic building risk (e.g., quantitative language)
        ii. Non-technical descriptions of seismic building risk (e.g., qualitative language)
    c. What is your preference for the seismic building risk information you receive?
        i. Assessment of risk to a building
        ii. Risk to occupants/property loss/building function
    d. What is your preference for the seismic building risk information you receive?

i. Complex descriptions of risk (e.g., extensive detail)
ii. Simple descriptions of risk (e.g., simple detail)

e. How important to you is "precision of information" versus "cost for assessing risk information"? Which of the following do you prefer?
i. Seismic risk information with high degree of certainty at a high cost to assess
ii. Seismic risk information with moderate degree of certainty at a moderate cost to assess
iii. Seismic risk information with low degree of certainty at a low cost to assess

f. If you deal with multiple types of buildings within your role, which buildings are most important to understand seismic risk information about (and why)?

g. Where / from who do you get seismic risk information about your building/your stakeholder's buildings from (and why)?
i. Landlord
ii. Building owner
iii. Engineering professionals
iv. Territorial Authorities (i.e., Council)
v. Other

h. Thinking about uncertainty in the seismic building risk information you are familiar with, do you have any preferences for how this uncertainty should be communicated?

i. Do you seek of have you ever sought clarity about the seismic building risk information you receive? If so, from who and what about (and why)?

6. Have you used and/or dealt with the %NBS (percent new building standard) metric before?
a. Could you please describe your understanding of what %NBS is?
b. Which of the following best describes what %NBS means to you?
i. Precise measurement of seismic risk or imprecise measurement of seismic risk
ii. Assessment of building collapse risk or assessment of life safety risk
iii. A measure of acceptable risk or a tool to help make risk-based decisions
c. What are your experiences with interpreting / using %NBS and information about %NBS?

7. In your role, do you convey / communicate seismic building risk information to others?
a. To whom do you convey / communicate seismic building risk information to?
b. For each group, what are their information needs?
c. For each group, what is your understanding of how they use this information?
d. For each group you convey / communicate seismic building risk information to, what are the challenges you do and/or have experienced in communicating seismic building risk information? (Choose top 3)
i. Perceptions of risk
ii. Literacy / understanding of risk
iii. Trust in information
iv. Fear of liability
v. Understanding of technical jargon
vi. Reputation fear
vii. Inconsistency in seismic engineering reports
viii. Dealing with / understanding uncertainty
ix. Other

8. For each group you convey / communicate seismic building risk information to, what are the challenges you do and/or have experienced in communicating seismic building risk information? (Choose least experienced) (*same list as above*)

EPB Remediation Decisions

(Building Owners only)

9. Have you ever considered whether or not to remediate an EPB?
a. Tell us about your experience in making the decision to retrofit or not.
b. If not, what did you do (continue using, vacate, demolish, sell)?

10. Have you ever undertaken a seismic retrofit of a building?
    a. If so, did you interact with the EPB system? If so, please explain your experience.

11. Of the information you have / would use to decide how to manage an earthquake prone building, which of the following is *most important* for you to have and why?
    a. Choose top three:
        i. Impact on life safety risk
        ii. Estimates of reduced losses
        iii. Impact on aesthetics of building
        iv. Impact on heritage fabric
        v. Impact on functionality / usability of building
        vi. Likely business interruption if the building is unusable after an earthquake
        vii. Insurability of the property
        viii. Cost to retrofit
        ix. Likely rental return/property value increase
        x. Operational cost impacts (maintenance, rates)
        xi. Construction process
        xii. Construction timeline (including disruption to tenants)
    b. Where/who do you get this information from? (and why)
    c. What are your perspectives on this information? (e.g., availability, credibility, detail of information, etc.)
    d. Choose least important:
        i. Impact on life safety risk
        ii. Estimates of reduced losses
        iii. Impact on aesthetics of building
        iv. Impact on heritage fabric
        v. Impact on functionality / usability of building
        vi. Likely business interruption if the building is unusable after an earthquake
        vii. Insurability of the property
        viii. Cost to retrofit
        ix. Likely rental return/property value increase
        x. Operational cost impacts (maintenance, rates)
        xi. Construction process
        xii. Construction timeline (including disruption to tenants)

12. When it comes to seismic retrofit of a building:
    a. What do you consider to be the greatest benefits to you/your organisation? (*Please choose the top 3*):
        i. Increasing the %NBS rating of the building
        ii. Ability to attract future tenants to the building
        iii. Ability to retain current tenants in the building
        iv. Ensure rental return / maintain property value
        v. Improve the safety of building occupants
        vi. Improve wellbeing of staff in the building (including reducing potential anxiety)
        vii. Lift an existing earthquake-prone sticker
        viii. Improve confidence in building insurability (access to, or cost)
        ix. Reduced building downtime following an earthquake
        x. Reduced building losses/repair costs after an earthquake
        xi. Realising sustainability benefits (e.g., reduced waste after an earthquake)
        xii. Reduced potential for liability (please specify)
        xiii. Increased certainty of how your building should perform in an earthquake
        xiv. Improve / support community resilience
        xv. Reduce stress post-earthquake
        xvi. Other (please specify)

b. What do you consider to be of *least* benefit to you/your organisation?
    i. Increasing the %NBS rating of the building
    ii. Ability to attract future tenants to the building
    iii. Ability to retain current tenants in the building
    iv. Ensure rental return / maintain property value
    v. Improve the safety of building occupants
    vi. Improve wellbeing of staff in the building (including reducing potential anxiety)
    vii. Lift an existing earthquake-prone sticker
    viii. Improve confidence in building insurability (access to, or cost)
    ix. Reduced building downtime following an earthquake
    x. Reduced building losses/repair costs after an earthquake
    xi. Realising sustainability benefits (e.g., reduced waste after an earthquake)
    xii. Reduced potential for liability (please specify)
    xiii. Increased certainty of how your building should perform in an earthquake
    xiv. Improve / support community resilience
    xv. Reduce stress post-earthquake
    xvi. Other (please specify)
c. How effective do you think seismic strengthening is?
d. When retrofitting a building how have you / would you decide the level to strengthen it to? (e.g., no deaths, stays standing, can still use, limited damage, etc.)

13. What are the challenges or barriers you have / do face when considering undertaking a retrofit project? (Please choose the top 5):
    a. Trust in outcomes/benefits
    b. Cost
    c. Stress associated with process
    d. Fear of future regulation changes
    e. Availability of contractors to complete work
    f. Access to good engineering advice
    g. Future property market (and ability to recover costs)
    h. Lack of actionable information
    i. Efficacy beliefs
    j. Implementation challenges beyond engineering advice
    k. Disruption in normal life
    l. Other priorities
    m. Other

14. (For those that have undertaken a retrofit) When considering whether to retrofit a building, what were your main drivers to undertake the retrofit? Please rank the following considerations:
    a. Cost
    b. Feasibility
    c. Benefits (as above, Q11a)
    d. Others I know of / have heard about have done it
    e. Advice or assistance provided
    f. Meeting regulatory requirements in Building Act
    g. Confidence in engineers/contractors
    h. Other (please specify)

15. What would make undertaking a retrofit easier for you / help you to undertake retrofit?
    a. Information needs (please specify)
    b. Regulatory levers (please specify)
    c. Financial support (please specify)
    d. Organisational support (please specify)
    e. Professional advice (please specify)
    f. Other (please specify)

(Stakeholders only)

16. What is your interest in the seismic retrofit or remediation of buildings?
    a. Who / what are you interested in? (e.g. types of building owners or building functions)
    b. For each group: What type (and level) of building performance is important to you / for the groups you are interested in?
        i. Life safety risk - yes/no, level
        ii. Property loss - yes/no, level
        iii. Impact on building function - yes/no, level
    c. Do you / does your organisation incentivise risk mitigation?
        i. If so, what (and how)?
17. When it comes to seismic retrofit or remediation of buildings:
    a. What do you think the benefits are to you/your organisation?
    b. How effective do you think seismic strengthening is?

18. Do you communicate with others (internally or externally) around seismic retrofit?
    If yes:
    a. Please describe who you communicate with and what you do to communicate with them.
    b. For each group, what works well?
    c.For each group, what is challenging?
    d. For each group. what would help to improve communication?

19. Are **there any pressures or demands** within or outside your organisation that influence how you manage seismic building risk? Or any **personal factors?**
    a. *Choose the top 5 from the following items*:
        i. Budget pressures
        ii. Risk tolerance of organisation
        iii. Risk literacy of organisation
        iv. Risk tolerance of individuals
        v. Staff demands
        vi. Regulatory requirements (please specify)
        vii. Resource constraints
        viii. Communication challenges
        ix. Personal experience of seismic events (yourself or others in your organisation)
        x. Fear of liability
        xi. Reputational fear
        xii. Other priorities (please specify)
        xiii. Lack of trust (please specify)
    b. *Choose least affected by*:
        i. Budget pressures
        ii. Risk tolerance of organisation
        iii. Risk literacy of organisation
        iv. Risk tolerance of individuals
        v. Staff demands
        vi. Regulatory requirements (please specify)
        vii. Resource constraints
        viii. Communication challenges
        ix. Personal experience of seismic events (yourself or others in your organisation)
        x. Fear of liability
        xi. Reputational fear
        xii. Other priorities (please specify)
        xiii. Lack of trust (please specify)

20. Do you have **any other comments** you'd like to share?

Appendix C: Role profiles

STAKEHOLDERS:

OWNERS:

Building System Stakeholder Remediation and Communication Profiles

These profiles have been developed to help identify the factors that affect seismic remediation of buildings in New Zealand. They were developed through a small number of interviews with personnel working in relevant roles between February and March 2025.

The profiles were created with funding from the Ministry of Business, Innovation and Employment and the BRANZ research investment levy.

PROPERTY LAWYER

My role is to advise clients on property-related legal matters, including lease negotiation and contractual issues. I also provide counsel on seismic remediation obligations, helping clients understand their legal responsibilities and optimise building marketability through compliance.

My seismic remediation priorities

My **interest** in remediation includes:

- Advising clients faced with building strengthening decisions/requirements
- Guiding clients on obligations/risks of occupancy (including during/after retrofit)
- Helping clients understand strengthening consequences, including advising on typical %NBS levels sought by different types of tenants.

I **believe** seismic remediation:

- **Can be effective** (but building performance in past events can influence perceptions of this)
- **Can be good for improving building marketability** (putting clients in more favourable market position by strengthening)
- However, strengthening measures might evolve as seismic risk knowledge progresses (generally effective for present day, but goalposts might change in future)
- **Needs to be balanced against cost and other risks** (putting it in context of the relative benefits)

My role in remediation decisions

I influence:

- **Clients** (providing legal advice on what is needed and/or considerations of what should be done)

Ways we **promote** risk mitigation include:

- **Removing/mitigating perceived or actual legal risks** (e.g., recommending remediation to a certain level / action to reduce risks to put clients in a favourable position)

Barriers to promoting this include:

- **Advisory role only** (I can advise clients, but I am not the decision-maker)

The biggest **pressures/demands** our clients face when managing seismic risk include:

- **Organisational resource constraints** (resource constraints, budget pressures)
- **Risk appetite and understanding** (risk tolerance and literacy of clients and client organisations)
- **Experience and prioritisation factors** (other priorities, experience of past events)

Other themes:

- Having a measurable metric like %NBS is very useful for quantifying contractual rights and obligations in leases

"Having a number to point to is essential when you've got two parties both with different rights and responsibilities and risks… Without that number, it's almost impossible to have a meaningful framework to determine rights and responsibilities, and over a long period of time, particularly after an earthquake, that might affect the structural integrity of the building. In other words, having NBS there lets you compare apples with apples at any given time."

I use seismic risk information for:

Building leasing decisions

I advise clients on seismic provisions in commercial leases and assess landlord/ tenant obligations

I need:

- Seismic risk rating/level (for compliance and market)
- Life safety risk information
- Methodology/assumptions made in risk assessment/building rating

Regulatory risk screening

I guide clients through EPB regulations, interpret statutory obligations, and advise on compliance timeframes for remediation

I need:

- Legal compliance metric
- Assessment of the building's seismic risk in relation to Health & Safety obligations

Enterprise risk management

I help organisations develop seismic risk policies

I need:

- Seismic risk rating/level (for compliance and market)
- Life safety risk information
- Methodology/assumptions made in risk assessment/building rating

Building acquisition decisions

I support client due diligence and assess the compliance status of buildings

I need:

- Seismic risk rating/level (for compliance and market)
- Life safety risk information
- Methodology/assumptions made in risk assessment/building rating

Building occupancy decisions

I advise clients on occupancy risks and interpret seismic information for occupier liability

I need:

- Seismic risk rating/level (for compliance and market)
- Life safety risk information (including Health & Safety compliance needs)

Building retrofit decisions

I advise clients on legal strengthening requirements, occupancy options during/ after remediation, and the lease implications of retrofit work

I need:

- Key risks to occupants (life safety)
- Mitigation strategy (what level – seismic rating post-retrofit; timeline for work)

I communicate seismic risk information to:

Clients (and counterparties if relevant)

Their information needs include:

- Understanding practical/legal implications of %NBS ratings, including effect on building leasing/insurance cover
- Legal obligations (e.g., strengthening EPBs; HSWA; contractual responsibilities)
- Contextualising of seismic building risk with other risks (risk appetite).
- Contextualising of economic trade-offs in commercial decisions (e.g., building 50%NBS, but reflected through lower rent)

They use this information for:

- Lease navigation/negotiation (ongoing or new)
- Navigating new seismic assessment report/EPB obligations, including helping clients think about making decisions related to occupancy, commercial decisions, remediation, etc.

What works well:

- %NBS a useful reference point providing current point of comparison for seismic performance discussions
- %NBS is useful for contracts because it is quantifiable

What can be challenging:

- Limited understanding and comprehension of risk (perceptions of risk; literacy/understanding of risk; dealing with/ understanding uncertainty)
- Inconsistency in seismic engineering reports
- Client liability concerns for occupying "lower" rated buildings, informing decision-making
- Explaining complex strengthening information to clients and demonstrating benefits of options

Building System Stakeholder Remediation and Communication Profiles

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PROPERTY FINANCE LENDER (BANKING)

My role at the bank is to evaluate lending opportunities for property investments and developments across primarily urban and provincial areas of the country. I assess the risks and value of buildings as security for loans, with seismic risk being a key consideration in this process.

My seismic remediation priorities

My **interest** in remediation includes:

- **All buildings we have lending against** (especially those with higher seismic risk and/or are individual assets rather than buildings within a portfolio)
- **Protecting bank security** (ensuring the saleability of assets)
- **Reducing property loss/damage and continued building function** (maintaining revenue stream for loan servicing, where insurance can't/won't cover losses; my primary interest as a lender is the asset)
- **Risk evaluation by seismic risk area** (generally greater concern for lower-rated buildings in areas of high seismic risk)

I **believe** seismic remediation:

- **Improves building liquidity** (better enabling enforcement of bank's security if necessary)
- **Improves tenantability** (more attractive in market, increasing likelihood of income)
- **Higher %NBS ratings reduce concerns of above factors** (preference for 67%NBS and above as general guide; lower rating might create greater more lending restrictions/conditions)

My role in remediation decisions

I influence:

- **Borrowers (prospective)** (by providing loans for building acquisition)
- **Borrowers (current)** (by requiring risk mitigation plan to continue loan funding, where buildings identified as EPB)

Ways we **promote** risk mitigation include:

- **Lending / continued lending for higher rated buildings** (e.g., loans unlikely to be provided if the bank isn't comfortable with seismic remediation plans for remediation of higher-risk buildings, or if clients are disinterested in this)
- **Lending for remediation** (providing access to funding to complete strengthening works)

Barriers to promoting this include:

- **Limited direct financial incentives** (e.g., no reduced interest rates for strengthened to higher ratings, for buildings with existing loans)
- **Conflicting demands between legislative timeframes and lending requirements** (regulatory deadlines may allow several years for remediation, while banks generally require more immediate action – leading to potential complications for owners who are compliant with regulation but may face lending constraints)

The biggest **pressures/demands** I face when managing seismic risk include:

- **Managing risk and asset security** (balancing acceptable lending risk and preserving building security)

> *"We don't have a set of rules that everybody must adhere to, because all customers are different. But… in general, a guideline for… looking at a building to take a security to lend against… ideally, the NBS rating would be greater than 67 percent… if it's less, that's where judgement starts to kick in."*

I use seismic risk information for:

Lending decisions for building acquisition

I decide whether to provide lending for borrowers to acquire buildings (or the conditions to apply to lending), including consideration of a building's seismic risk profile.

I need:

- Information related to the potential for building damage/loss of function (a metric to apply for provision of insurance coverage)
- Building characteristics (e.g., age, construction materials, seismic risk area, heritage)
- If less than 67%NBS – work required to get it to that level or above; cost of those works; plan to carry out these works *(e.g., timeframe, funding plan*)
- The higher the value of a building (and the lower rated it is), the more detailed information of its seismic risk profile I need
- Proof of building insurability (certificate of currency from insurers)

Regulatory risk screening

I require owners with existing lending to notify us if their building is subsequently identified as earthquake-prone (and a plan of action on how they plan to mitigate this risk).

I need:

- Information related to the potential for building damage/loss of function (a metric to apply for provision of insurance coverage)
- Building characteristics (e.g., age, construction materials, seismic risk area, heritage)
- If less than 67%NBS – work required to get it to that level or above; cost of those works; plan to carry out these works *(e.g., timeframe, funding plan*)
- The higher the value of a building (and lower rated it is), the more detailed information of its seismic risk profile I want
- Proof of building insurability (certificate of currency from insurers)

Building retrofit lending decisions

I provide lending to owners for undertaking seismic retrofit of their buildings, including EPBs and non-EPBs.

I need:

- The building's current and target seismic rating (%NBS)
- Costing of work (QS may be required if large project)
- Professional advice and reporting about retrofit work
- Certification of completed work from engineering professionals

Building System Stakeholder Remediation and Communication Profiles

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PRIVATE INSURANCE PROVIDER

My role is to determine insurance terms, rates, and coverage for a range of commercial buildings across the country. I manage property insurance and make decisions about earthquake coverage and policy restrictions based on seismic building risk information.

My seismic remediation priorities

My **interest** in remediation includes:

- **Reducing our exposure to loss/damage** *(my primary interest as an insurer is the asset itself)*
- **Reducing our exposure to business interruption losses from clients**

I **believe** seismic remediation:

- **Can be economically beneficial** *(including reducing financial implications for insurance companies, and post-event cascading national economic implications)*
- **Is important for national resilience** *(helps to improve NZ's standing with international reinsurers)*

My role in remediation decisions

I influence:

- **Building owners seeking insurance** (by providing coverage or not, and setting rates based (in part) on seismic risk)

Ways we **promote** risk mitigation include:

- **Providing greater access to coverage with higher seismic ratings** *(67%NBS and above is generally favoured)*
- **Potentially lowering commercial building premiums for reduced seismic risk** *(incentivising higher %NBS ratings)*
- **Potentially reducing excesses for reduced seismic risk** *(lower excesses may be offered on case-by-case basis, particularly where older, high-risk buildings are strengthened)*
- **Continuing earthquake coverage** *(earthquake coverage restrictions / exclusions may apply to higher risk buildings)*
- **Providing access to post-remediation insurance coverage** *(for uninsured properties)*

The biggest **pressures/demands** I face when managing seismic risk include:

- **Risk tolerance of our organisation** *(balancing coverage with exposure to events)*
- **Risk literacy of clients** *(some clients can find it difficult to understand our reasoning for making insurance coverage decisions in relation to seismic risk)*
- **Budget pressures** *(insurance company and client organisations)*
- **Personal experience of past events** *(influences risk perception of the organisation)*

> *"We use [%NBS] all the time and understand it pretty clearly… The issue that we have as an insurance industry is it more defines what the risk to human life is rather than what the outcomes are to a building.*
>
> *So… we use it more as a guide rather than a hard rule on how we do stuff".*

I use seismic risk information for:

Provision of insurance

I decide whether to provide coverage for a building by understanding the seismic risk of a building, making risk-based decisions around insurance coverage levels, policy restrictions, and set levels/pricing for policy excess/premiums.

I need:

- Information related to the potential for building damage/loss of function (i.e., a metric to apply for provision of insurance coverage)
- Building characteristic information (e.g., age, construction make, seismic risk area, secondary hazards, etc.)

I communicate seismic risk information to:

Clients (Building Owners / Tenants)

Their information needs include:

- Why their insurance is structured in a particular way based on seismic risk
- How strengthening may improve policy conditions

They use this information for:

- Understanding cost/coverage implications
- Decision-making about remediation

What can be challenging:

- Clients can make property decisions without adequately understanding the seismic risk implications and then encounter problems when later trying to obtain insurance (i.e., I can have a more detailed understanding of a building's risk than what clients perceive)

Brokers

They use seismic risk information for:

- Engaging with clients about insurance policies

What works well:

- Generally, understanding of seismic risk is *better* understood by brokers in areas of high seismic risk (higher degree of engagement)

What can be challenging:

- Generally, understanding of seismic risk is *less* understood by brokers in areas of low seismic risk (less engagement in the system)

Building System Stakeholder Remediation and Communication Profiles

These profiles have been developed to help identify the factors that affect seismic remediation of buildings in New Zealand. They were developed through a small number of interviews with personnel working in relevant roles between February and March 2025.

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REAL ESTATE AGENT

My role is to facilitate the sale, purchase, and leasing of buildings, and to provide advisory services to clients, including related to seismic risk information.

My seismic remediation priorities

My **interest** in remediation includes:

- **Ensuring the commercial viability of buildings for clients** (buildings meeting market/industry standards for sale/leasing to different owner and tenant groups)

I **believe** seismic remediation:

- **Enhances market value of properties** (access to wider market for owners and tenants; maintains or increases property value)
- **Attracts/maintains tenants** (higher ratings attract more premium tenants)
- **Improves commercial viability** (I assist clients to see beyond just the cost of strengthening and focus on the commercial benefits)
- **Mitigates life safety concerns** *(important for building occupants and Boards)*

My role in remediation decisions

I influence:

- **Building owners/landlords** (market opportunities/commercial implications of remediation)
- **Tenants** (understanding organisational needs and matching to properties)

Ways we might **promote** risk mitigation include:

- **Providing advisory services** *(communicating commercial implications/benefits of strengthening)*
- **Facilitating transactions** *(connecting owners with tenants based on seismic requirements and preferences)*

Barriers to promoting this include:

- **Influenced by market demand** *(high market demand means low supply and presents fewer property options for clients)*

The biggest **pressures/demands** clients face when managing seismic risk include:

- **Risk appetite and understanding** *(variance in seismic risk tolerance / literacy of client organisations)*
- **Organisational resource constraints** *(budget pressures / resource constraints)*

"I've never met a property owner that said, 'I'm going to upgrade my building from 50 to 80%NBS because I'm worried about the life safety risk'. It's purely a commercial decision. That's not to say they're not worried about life safety risk, but it's not the primary [focus]."

I use seismic risk information for:

Building occupancy decisions (for clients)

I assist clients in building occupancy decisions based on %NBS ratings and/or existing client organisation policies

I need:

- %NBS rating and context (e.g., ISA or DSA, assessment methodology used)
- Specific building vulnerabilities (organisation-dependent)

Property marketing

I contextualise the marketability of buildings based on seismic risk

I need:

- Compliance with regulations
- Market preferences of seismic ratings for different users

Building acquisition/leasing decisions (linked with retrofit decisions)

I advise owners/prospective purchasers on property marketability and match clients with appropriate properties that meet their specific needs, potential lending / insurance requirements, and the commercial viability of strengthening (e.g., cost vs building value)

I need:

- %NBS rating (including preferences by different tenants/purchase groups) and context (e.g., ISA or DSA, assessment methodology used)
- Specific building vulnerabilities (organisation-dependent)
- Remediation plans (where relevant)
- Understanding of commercial benefits of strengthening, beyond just strengthening costs

Advice on insurance

I advise on potential insurance requirements

I need:

- %NBS rating

I communicate seismic risk information to:

Building owners/landlords (and purchasers)

Their information needs include:

- %NBS rating
- What a rating means
- Overview of building risks (and commercial implications)

They use this information for:

- Decision-making regarding their organisational needs (e.g., minimum viable occupation; marketable to desired tenants)

What works well:

- Presenting complex information in a simplified way
- Providing context for practical terms of /market perceptions of %NBS ratings

What can be challenging:

- Inconsistency in assessment reports
- Fear of liability (HSWA)
- Risk understanding/comprehension (risk perceptions; risk literacy/understanding; understanding technical jargon) *(e.g., boards setting 'arbitrary' %NBS thresholds)*

Tenants

Their information needs include:

- %NBS rating – what it means for life safety/lease requirements

They use this information for:

- Decision-making regarding their organisational needs (e.g., minimum viable occupation)

What works well:

- Presenting complex information in a simplified way
- Providing context for practical terms of/ market perceptions of %NBS ratings

What can be challenging:

- Inconsistency in assessment reports
- Fear of liability (HSWA)
- Risk understanding/comprehension (risk perceptions; risk literacy/understanding; understanding technical jargon) (e.g., linking %NBS to safety; high rating as elimination of risks, i.e., 100%; boards setting arbitrary %NBS thresholds)

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PUBLIC ORGANISATION TENANT

My role is to manage a range of leased properties across the country within a public organisation that provides essential services. This includes decision-making related to managing seismic risk in our property portfolio.

My seismic remediation priorities

My **interest** in remediation includes:

- **Mitigating life safety risk** (protecting staff and occupants)
- **Continued building function** (continuity of services, particularly post-EQ essential services)
- **Compliance with regulatory requirements** (making buildings not EPB)

I **believe** seismic remediation:

- May reduce disruption from needing to relocate (and associated costs)
- Can remove compliance burden to enable focus on other priorities (meeting seismic strengthening requirements increase ability to focus on other strategic priorities)

My role in remediation decisions

I influence:

- **Building owners** (signing/renewing lease only if building compliant/meets organisational requirements)

Ways we **promote** risk mitigation include:

- **Long-term lease commitments** (providing certainty of premium government organisation tenancy)

Barriers to promoting this include:

- **Balancing life safety risk against risk of disrupting critical services** (harm from disrupting important services may outweigh risks of occupying buildings with seismic vulnerabilities)

The biggest **pressures/demands** I face when managing seismic risk include:

- **Budget pressures** (limited funds to remediate buildings while also managing other costs)
- **Public accountability** (ensuring responsible spending of taxpayer money)
- **Other priorities** (balancing remediation needs with ongoing continuity of crucial services)

"We dangled a new long-term lease in front of the building owner… We sat down and engaged really openly and honestly with the building owner. We said, 'hey, look, we feel your pain, we know it's an expensive exercise to remediate the building. But look, if you remediate this building, we're happy to sign a [multi-year] lease extension".

I use seismic risk information for:

Building occupancy decisions

I evaluate the seismic risk of buildings to determine occupancy.

I need:

- Risk to life safety
- Risk to continuity of critical services

Building leasing decisions

I sign up to/negotiate lease conditions for tenanting buildings

I need:

- Risk to life safety
- Risk of potential disruption/inability to continue critical services post-earthquake

Enterprise risk management

I maintain oversight of seismic risk among the buildings my organisation tenants, and identify buildings that may cause issues (e.g., EPBs).

I need:

- Risk to impacts on operational continuity and life safety

Regulatory risk screening

I understand the seismic risk of buildings in the organisation's portfolio and associated legal obligations/implications.

I need:

- Legal obligations and action necessary to satisfy these

Building retrofit decisions

I determine the desired retrofit level of buildings for occupation.

I need:

- Impacts on / potential disruption to critical services

I communicate seismic risk information to:

Building users (including staff/occupants)

Their information needs include:
- Risk to life safety
- Mitigation measures taken/being taken to reduce life safety risk to them

They use this information for:
- Become informed about existing risks and understand subsequent action

What works well:
- Involving engineers in risk assessment conversations, to facilitate any Q&A

What can be challenging:
- Risk understanding and comprehension (varied perceptions, literacy, and understanding of seismic risk)

Building owners/landlords

They use seismic risk information for:
- Considering and making decisions about remediation

What works well:
- Communicating the business case/benefits for undertaking seismic remediation

What can be challenging:
- Can be varied interest in engaging with/producing seismic risk building assessment

Senior leadership/boards

Their information needs include:
- Risk to life safety
- Strategic implications of mitigation options/decisions

They use this information for:
- Assessing regulatory compliance
- Managing risk, both for buildings and the organisation

What works well:
- Clear summaries of key information related to the consequences of taking certain action – or not – which include relevant engineering and legal advice, alongside mitigation options

What can be challenging:
- Fear of liability (e.g., decisions often driven by Health & Safety liability concerns)

Building System Stakeholder Remediation and Communication Profiles

These profiles have been developed to help identify the factors that affect seismic remediation of buildings in New Zealand. They were developed through a small number of interviews with personnel working in relevant roles between February and March 2025.

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RESIDENTIAL PROPERTY TENANT

I rent a residential unit in an urban area, typically within a multi-storey building or other buildings that fall within the earthquake-prone building regime. I'm primarily concerned about my safety, and have limited control over the structural aspects of the building I live in.

My seismic remediation priorities

My **interest** in remediation includes:

- **Improving life safety** (ensuring the safety of me and other tenants)
- **Reducing damage** (maintaining use of my house)

I **believe** seismic remediation:

- **Is necessary to improve safety** (it makes me feel safer in my home)
- **Is generally effective** (I trust in engineers and other professionals)

My role in remediation decisions

I influence:

- **Landlords/property managers** (deciding to lease a property or not)
- **Friends and family/other tenants** (sharing experiences and understandings of seismic risk)

Barriers to promoting seismic risk mitigation include:

- **Tenant-Landlord power dynamic** (my ability to promote remediation is influenced by rental supply and demand trends)

The biggest **pressures/demands** I face when managing seismic risk include:

- **Risk tolerance of individuals** (balancing risk with the need for housing)
- Limited housing options *(supply issues)*
- **Communication challenges** (difficulty obtaining seismic risk information from landlords)

Other themes:

- I don't often engage with or have experience using %NBS
- I would like better access to simple information about the life safety risk from buildings and what it means for me
- If information is too technical, it can make conversations about seismic building risk inaccessible to me

> *From a landlord point of view, like, they immediately feel, 'Oh, is [the tenant] gonna complain [if the] building's not up to the standard?' … instead of thinking, 'oh, there is an actual risk to life and property?'"*.

I use seismic risk information for:

Building leasing decisions

I decide whether to sign onto and/or renew a lease based on the seismic risk of a building and try to avoid future rental properties that are high seismic risk (or be aware of this risk, if they are).

I need:

- Simple, non-technical descriptions of seismic risk (primarily life safety)
- Access to informally-source expertise who have experience dealing with seismic risk (e.g., colleagues, friends, family) to get risk information or ask questions I have

I communicate seismic risk information to:

Landlords/Property manager

Their information needs include:

- I need to know from landlords/property managers the seismic safety of the property

What can be challenging:

- Seismic risk information about my building is not readily available/ accessible from my landlord
- My landlord might be concerned about complaints being raised about the building's safety level by my asking for this information

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PROFESSIONAL TECHNICAL SERVICE PROVIDER

My role is to provide specialist technical expertise to building projects primarily in urban and provincial areas across the country, including in relation to seismic risk management (i.e., architecture, project management, construction finances). I often serve as an intermediary between engineering professionals and clients / building owners.

My seismic remediation priorities

My **interest** in remediation includes:

- **Providing and actioning remediation guidance, tailored to client needs and priorities** (balancing technical requirements, cost-effectiveness, and preservation considerations while translating complex information into actionable remediation solutions)
- Interest in maintaining / integrating building aesthetic / preserving heritage elements into retrofit, where possible *(e.g., architects)*
- Interest in project implementation and delivery, including economic viability and practicality *(e.g., project managers/quantity surveyors)*

I **believe** seismic remediation:

- **Is effective but not often optimised** (remediation can be effective at improving safety, but solutions can be over-engineered and expensive)
- **Is often driven more by client fear than understanding** (clients can make decisions based on fear rather than a clear comprehension of risk and what is being improved with remediation)
- **Is a market differentiator** (it can create significant value by enhancing building marketability to attract tenants/buyers)
- **Reflects my professional reputation** (successful projects improve my organisation's industry reputation)

My role in remediation decisions

I **influence**:

- **Clients (Owners; Tenants)** (advising on approaches and benefits of each) *(planning and decision-making stages)*
- **Engineers** – advocating for appropriate, cost-effective, functional and practical measures *(design and implementation stages)*

Ways we **promote** risk mitigation include:

- **Providing thoughtful planning** (advising on solutions that are practical and cost-effective, relative to the actual risk)
- **Providing detailed client briefings** (facilitating discussions around expected performance of building elements and serviceability)

Barriers to promoting this include:

- **Advisory role only** (not decision-makers)
- **Fatigue of requirements** (some owners struggle with path forward and reject risk)

The biggest **pressures/demands** I face when managing seismic risk include:

- **Client organisation resource constraints** *(budget pressures; resource constraints)*
- Varied risk appetite and literacy *(organisations and individuals)*
- **Regulatory requirements** (clients meeting compliance standards)
- **Legal and reputational concerns** (client liability; organisational reputation)

I use seismic risk information for:

Supporting building retrofit decisions

I translate technical seismic assessments into practical plans / design solutions.

I advise on appropriate strengthening levels (including cost implications).

I balance retrofit design options with regulatory compliance and practicality.

I need:

- Detailed seismic assessment information regarding life safety risk (and damage limitation / functionality, particularly for some larger, premium clients)
- Remediation options with costs, implementation requirements, and commentary on life safety, serviceability, and the ability to repair damage post-event
- Design implications
- Cost-benefit for different strengthening approaches

"There seems to be, perhaps understandably, a real aversion to risk in relation to human life… but I do wonder whether that gets out of proportion in relation to the amount of money going into strengthening buildings, or choosing to demolish buildings, considering the relative low loss of life or personal injury compared to the costs of those remediations or the cost of losing, probably relatively good buildings."

Supporting building occupancy decisions

I interpret seismic risk assessment information to inform clients about occupancy decisions.

I assess building suitability for intended client use based on seismic performance.

I need:

- Detailed information on key building vulnerabilities and implications for life safety
- Occupancy risk assessments
- Impacts on spatial planning/operational requirements of the client organisation

Supporting building acquisition decisions

I analyse occupancy risk/retrofit options (and costs) to inform client acquisition decisions.

I need:

- Detailed information about building condition/seismic performance
- Potential retrofit options, including costs and requirements for implementation
- Client planning and future-use considerations of buildings

I communicate seismic risk information to:

Clients (Building owners/tenants)

Their information needs include:

- Primarily risk to life safety (non-technical /simple descriptions) *(primary focus of occupants)*
- Property damage reduction/building function (client/building-dependent – includes business continuity information and repairability information) *(most like the idea, but many struggle to understand, i.e., associate high %NBS rating with this)*
- Cost implications of approaches balanced against material risk reduction value

They use this information for:

- Making informed decisions about their options (e.g., occupancy, remediation, acquisition)
- Communicating risk information/ remediation plans to staff/occupants/ public
- Post-event planning and decision-making

What works well:

- Contextualising risk (e.g., risk comparisons; practical examples/stories; visualisation of effect on building from retrofit options)
- Commentary from engineers contextualising seismic risk against other risks

What can be challenging:

- Client decisions driven by limited understanding of risk and/or fear of liability
- Inconsistency in seismic engineering reports, including changes in assessment results following updates to (non-regulatory) assessment guidelines / standards (etc.) (causes confusion)
- Explaining complex strengthening information to clients and demonstrating benefits of options
- Life safety discussions highly emotive

Engineering professionals

Their information needs include:

- Seismic risk assessment of buildings (i.e. engineers provide this information to us)
- Needs of clients (e.g., use of building, desired performance)

They use this information for:

- Advising clients (e.g., engineering solutions for remediation, risk to occupants from building and key elements).
- Working with us to revise engineering solutions as necessary

What works well:

- Generally consistent application of well-understood measures and tools for building assessment (including seismic ratings)
- Using robust engineering peer-review processes

What can be challenging:

- Working to get engineers to revise approaches where needed (e.g., impractical/conservative/costly solutions)
- Variance in capability of engineers to effectively communicate technical information in non-technical way
- Lack of guidance for engineers to answer questions that users commonly want to know answers to (e.g., *"Is my building safe?"*)

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LARGE PRIVATE ORGANISATION OWNER-OCCUPIER

My organisation owns and occupies a diverse portfolio of properties (including commercial, industrial, residential, and community buildings) across the country, including a mixture of heritage and non-heritage buildings. The uses for our buildings include both critical and non-critical services, and they are occupied by a mixture of more vulnerable and less vulnerable users.

My remediation perspectives

I think the greatest **benefits** of seismic remediation are:

- **Safety and wellbeing of people** *(improve building occupant safety; improve wellbeing of staff in buildings)*
- **Regulatory compliance and risk rating** *(increase the %NBS rating of buildings; lift existing EPB stickers)*
- **Post-earthquake performance and resilience** *(increased certainty of how buildings should perform in an earthquake; reduced building downtime following an earthquake)*

My main **drivers** for remediation:

- **Meeting regulatory requirements in the Building Act** *(addressing & removing legal EPB requirements*)
- **Cost considerations** *(whether remediation is economic)*
- **Feasibility** *(practicality of work; consideration of future building need/use in context of business needs)*
- **Secondary considerations** *(benefits; confidence in engineers/contractors)*

I **believe** seismic remediation:

- Is generally effective for improving safety in existing buildings; however, this can vary and is influenced by trust in engineers and some perceptions of "over-engineered" remediation options
- Can be expensive without adding any value to a building or 'futureproofing' its use *(perception of a lot of cost for potentially little benefit beyond occupation of a building)*

My remediation decision process

I determine the **level to remediate** a building by:

- **Aiming to have a higher seismic rating** where appropriate *(generally a desire for 67%NBS+)*
- **Balancing strengthening with operational continuity** (selecting %NBS levels that maximise life safety improvements while minimising disruption to services)
- **Considering strategic plans for buildings** (potentially remediate to higher levels if intentions for long-term use of a building; potential alternative plans if there is a lesser need or desire to retain a building)
- Complying with regulatory requirements (i.e., above EPB threshold)
- **Balancing practical implementation with cost and access to funding** (identifying the %NBS level that delivers optimal value for money; and/or factoring in what funding is available to complete remediation (particularly for non-profit organisations))

The **information** I use to determine my remediation decisions includes:

- Safety and risk reduction (impact on life safety risk)
- Economic and business impacts (cost to retrofit; insurability of a property; likely business interruption if a building is unusable after an earthquake; the desire/need to retain a building; availability of funding for remediation)

My biggest **barriers** to remediation:

- **Cost** *(including access to funding for non-profits/charities)*
- **Practical implementation barriers** *(availability of contractors to complete work; disruption to operations/business and logistics of staging; implementation challenges beyond engineering advice)*
- **Confidence in implementation and outcomes** *(access to good engineering advice; trust in outcomes and/or benefits)*
- **Fear of future regulation changes** *(e.g., future assessment producing lower rating, triggering remediation needs)*

Remediation would be easier with:

- **Financial support**
  - Grants/other funding access, particularly for non-profit/charity organisations *(extremely limited or prohibitively expensive funding streams for strengthening; challenges obtaining/paying back loans)*
  - Support for heritage buildings *(particularly where community value/interest in preserving)*
- **Regulatory support**
  - Dedicated consenting pathways for seismic strengthening *(enable strengthening without triggering other work, e.g., fire safety/accessibility; modifying 'change of use' strengthening requirements)*

Contextual factors

Other **pressures/demands** when managing seismic risk:

- **Organisational resource constraints** *(budget and/or funding pressures; resource constraints)*
- **Risk appetite and understanding** *(risk literacy/tolerance of organisations and individuals; expectations from community relative to cost and practicality for remediation)*
- **Regulatory requirements** *(meeting legislative deadlines; concern of future code changes and/or change in building ratings)*

> *"I don't think [our organisation], with its long-term vision, would ever go to the bare minimum… [we] value those properties and they feature strongly on the balance sheet… [as] a long-term property owner… [we] want buildings that will last".*

> *"[We asked] can we actually achieve 67 percent… and keep the business running? The answer was no – we'd have to close [the building]. But then… what if we can get it to 50 percent – can we keep the business running? The answer was yes. So one leads to the other."*

I use seismic risk information for:

Building retrofit decisions

I evaluate the cost-benefit and practicality of different retrofit options.

I need:

- Level of disruption to operations/building users during retrofit
- Cost of retrofit work, including evaluation of cost-benefit for different strengthening levels
- Information to consider whether retrofit is the only / best option for the business

Enterprise risk management

I maintain oversight of seismic risk among buildings within the organisation, and identify buildings that may cause issues (e.g., EPBs).

I need:

- Risk to life safety
- Potential impact on businesses post-event

Building occupancy decisions

I check that organisational requirements for occupancy are met.

I need:

- Life safety rating

Regulatory risk screening

I identify any compliance obligations with regulatory requirements (Building Act; Health & Safety) and advise potential action to address this.

I need:

- %NBS building rating

Provision of insurance

I keep insurers informed of seismic building risk to obtain/maintain coverage.

I need:

- Seismic performance rating

Property marketing

I market building performance to different clients and users of our buildings (where relevant).

I need:

- Life safety rating

I communicate seismic risk information to:

Boards/Executive Leadership

Their information needs include:

- Umbrella view of building risk, including life safety and potential consequences for business operations

They use this information for:

- Strategic decision-making for asset management and planning
- Governance and risk oversight
- Meeting regulatory obligations for the organisation

What works well:

- Summary of key information, in plain language
- Involving engineers to explain concepts

What can be challenging:

- Varied comprehension/understanding of seismic risk
- Explaining potential inconsistencies in seismic ratings from different engineering reports
- Decisions are driven by legal responsibilities and duties, which may lead to more risk-averse decisions
- (For non-profits) Making decisions in the context of no commercial income and no available funding to address unacceptable seismic risk

Building occupants/users (non-staff)

Their information needs include:

- Risk to them/their safety (and of other users)

They use this information for:

- Becoming informed of existing risks
- Understanding safety and making decisions about occupancy based on this information
- Understanding needs and options for remediation and occupancy

What works well:

- Simple explanations of life safety risk and what it means for them / their use of buildings

What can be challenging:

- Varied comprehension/understanding of seismic risk

Organisation employees

Their information needs include:

- Risk to users/occupiers around their safety and business operations (potential impact on this)

They use this information for:

- Understanding decisions that have been made (risk mitigation, occupancy, retrofit, etc) and why
- Communicating with other staff and building users
- Communicating and making recommendations to Boards

What works well:

- Contextual communications which account for the main issues and are framed to suit the capabilities of end users' needs / level of understanding

What can be challenging:

- Varied comprehension/understanding of seismic risk
- Explaining potential inconsistencies in seismic ratings from different engineering reports

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SMALL PRIVATE ORGANISATION OWNER-OCCUPIER

I operate a small business from an earthquake-prone heritage building that I own and occupy. I need to balance managing the remediation process while also operating my business.

My remediation perspectives

I think the greatest **benefits** of seismic remediation are:

- **Improved safety** *(for building occupants and those outside)*
- **Continued operation of my business**
- **Commercial & property value benefits** *(Improving confidence in building insurability; maintaining property value; having the bank recognise my equity)*

My main **drivers** for remediation:

- **Realising the benefits** *(as previous)*
- **Complying with the Building Act** *(EPB requirements)*
- **Financial incentives** *(e.g., heritage grants)*
- **Reducing business disruption risk** *(peace of mind for continuing operations)*

My remediation decision process

I determine the **level to remediate** a building by:

- Meeting regulatory requirements (>34%NBS)
- Trying to meet / get as close as practicable to industry preferences for seismic ratings (e.g., 67% NBS preferred by insurance/banks)
- Evaluating the cost-benefit of remediating to higher %NBS levels, and considering what level is most economical relative to the actual risk it mitigates

The **information** I use to determine my remediation decisions includes:

- **Impacts to potential business disruption** *(functionality)*
- **Life safety impacts**
- **Insurability of my building**
- **Retrofit costs**
- **Construction timeline** *(including any potential disruption to my business)*

My biggest **barriers** to remediation are:

- **Cost** *(total expense required; challenges obtaining funds in one go, rather than staged over time)*
- **Stress associated with the process** *(personal commitment while operating a small business)*
- **Concerns of future regulation changes** *(i.e., the potential for more strengthening work required in the future if my building rating / regulatory requirements change)*
- **Practical implementation barriers** *(disruption in normal life; availability of contractors to complete work)*

Remediation would be **easier** with:

- **Financial support** *(e.g., even modest heritage grants are a real motivator; tax-rebate/exemption to recognise retrofit work)*
- **Regulatory streamlining** *(current system complex, time-consuming and difficult to manage while running my business)*
- **Opportunities to enhance benefits** *(combining renovations/improvements with strengthening to manage costs and efficiency)*

Contextual factors

Other **pressure/demand** when managing seismic risk:

- **Regulatory requirements** *(EPB regulations; consenting processes for structural work may trigger other building work requirements)*

> *"[The heritage grant] was helpful and I'd say it kind of motivated me… it wasn't a huge part of it, but it was enough to go, 'Yeah, this is cool, this is an incentive, let's get things going'…*
>
> *I think it's worth revisiting [the grant] because… you spend money, but you get money back… [Now] I'm not gonna do [strengthening] this year like I would have done if the funding was there".*

I use seismic risk information for:

Building retrofit decisions

I evaluate retrofit options to identify an approach that is both feasible and economical for my business.

I need

- Options for retrofitting to different seismic rating levels and the cost-benefit of these
- Cost of retrofit options (and available funding streams)
- Impact on/disruption to business operations

Getting/maintaining insurance

I keep insurers informed of seismic building risk to obtain/maintain coverage.

I need

- Seismic building rating (%NBS)
- Confirmation of completed retrofit work (where relevant)

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LARGE PRIVATE ORGANISATION OWNER ONLY

I own and manage a diverse portfolio of primarily commercial and industrial properties across urban and provincial areas throughout the country, with a goal of maintaining assets and generating rental income from them.

My remediation perspectives

I think the greatest **benefits** of seismic remediation are:

- **Commercial and property value benefits** *(ability to attract future/retain current tenants; ensure rental return/ maintain property value)*
- **Post-earthquake performance and resilience** *(reduced building downtime following an earthquake; increased certainty of how a building should perform in an earthquake)*

My main **drivers** for remediation:

- **Realising the benefits** *(as previous)*
- **Complying with the Building Act** *(EPB requirements)*
- **Economic and practical viability of remediation** *(cost; feasibility)*
- **Confidence in implementation** *(confidence in engineers / contractors to deliver)*

I **believe** seismic remediation:

- Is generally effective for reducing life safety risk
- Can sometimes lead to "over-engineered" solutions that may be excessive relative to actual risk posed

My remediation decision process

I determine the **level to remediate** a building by:

- **Responding to market/industry preferences for seismic ratings** (e.g., 67%NBS and above favoured by banks, insurance; even higher for more premium tenants)
- **Balancing economic considerations (cost, value return) against benefits** (i.e., considering whether the outcomes are worth the cost / where the cost exceeds the practical benefit of different levels)

The **information** I use to determine my remediation decisions includes:

- **Economic / business impacts** *(cost to retrofit; insurability of the property; disruption if building is unusable)*
- **Impact on life safety risk** *(to occupants/users)*

My biggest **barriers** to remediation:

- **Concerns that future seismic assessment might lead to lower rating** *(perception of potential wasted investment if future strengthening required)*
- **Economic and financial concerns** *(cost of retrofit; future property market, including ability to recover costs)*
- **Disruption to tenant operations**

Remediation would be **easier with**:

- **Financial support**
- **Access to expert professional advice** *(ensuring the right outcomes are reached)*

Contextual factors

Other **pressures/demands** when managing seismic risk:

- **Regulatory requirements** *(Building Act; Health & Safety obligations)*
- **Influence of individuals' personal experiences of past seismic events**

> *"[some tenants] won't occupy anything less than 80%NBS, even though the MBIE guidelines are 67%NBS; they just have a policy that if they're going to put their staff in something, it's got to be 80%NBS".*

I use seismic risk information for:

Building retrofit decisions

I evaluate the cost-benefit/practicality of retrofit options

I need:

- Requirements for strengthening options and associated costs.

Building acquisition decisions

I consider seismic risk when purchasing buildings, in relation to attracting different tenant groups, accessing funding, and considering the potential for any remediation that might be required (and costs of this)

I need:

- Seismic rating for the bank (preference for lending to 67%NBS+)

Enterprise risk management

I maintain oversight of seismic risk among the organisation's building profile, including identifying any buildings that could cause issues (e.g., EPBs)

I need:

- Seismic rating of building
- To know where buildings do/don't meet legal and/or tenant requirements and needs

Building occupancy decisions

I make sure tenant expectations for life safety are met

I need:

- Risk to life safety of occupants (matched with both legal and tenant requirements)

Property marketing to attract tenants

I provide seismic performance information based on tenant needs/requirements to attract them into lease agreements

I need:

- Seismic rating of buildings
- Life safety risks

Regulatory risk screening

I identify compliance needs and ensure any regulatory requirements are addressed (Building Act; Health & Safety)

I need:

- Currently, this is %NBS

Engaging with banks

I inform banks about the seismic rating of buildings to source lending against them

I need:

- Seismic rating of buildings

I communicate seismic risk information to:

Tenants

Their information needs include:

- Seismic rating of a building
- Simplified descriptions of life safety risk from building(s) (some, larger tenants may want more detailed risk information)

They use this information for:

- Whether to tenant and/or occupy a building
- Negotiating lease conditions for tenanting

What works well:

- Plain language summaries of engineering assessment reports and key (relevant) information related to risks
- Explaining specific aspects affecting a building's seismic rating
- Larger tenants tend to be more engaged/sophisticated with seismic building risk and more focused on it

What can be challenging:

- Some tenants (particularly smaller tenants) have limited understanding / comprehension of seismic risk and information provided in seismic assessment reports
- Trust and credibility concerns around technical information, related to inconsistency of seismic ratings from engineering reports
- Limited risk understanding can lead to decisions to vacate buildings even where engineers have said it's okay to occupy (from a life safety perspective)
- Some tenants have policies around %NBS ratings and building occupation, despite having limited understanding of what %NBS means

Executive Leadership

Their information needs include:

- Seismic rating of a building
- Simplified descriptions of life safety risk from building(s), and operational risks
- Estimated cost of remediation works

They use this information for:

- Comprehending risk to buildings
- Approving/making remediation and acquisition decisions (including budget approvals)
- Balancing remediation options against business needs/risks

What works well:

- Plain language summaries of engineering assessment reports and key (relevant) information related to risks
- Explanations of specific vulnerabilities that are affecting a building's seismic rating

What can be challenging:

- Varied understanding and comprehension of seismic risk (including technical terms)
- Concerns related to inconsistency in seismic ratings from engineering reports

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BRANZ Funded from the Building Research Levy

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

PUBLIC ORGANISATION PORTFOLIO MANAGER

My role is to manage and maintain assets for a public organisation, including managing seismic risk for a large building portfolio across the country.

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JOINT CENTRE FOR DISASTER RESEARCH

My remediation perspectives

I think the greatest **benefits** of seismic remediation are:

- Improved safety and wellbeing of staff/occupants
- **Regulatory compliance** (increasing %NBS; lifting an EPB notice)
- Improved certainty of post-earthquake building performance (reduced downtime & stress, increased performance certainty)

My main **drivers** for remediation are:

- Economic and practical feasibility *(cost; feasibility*)
- **Benefits** (as previous)
- **Regulatory compliance** (meeting Building Act requirements; %NBS)

I **believe** seismic remediation:

- Is generally effective but needs to be targeted to avoid excessive strengthening solutions.
- Efficiencies could also be gained by combining it with other end-of-life building maintenance, rather than separately.

My remediation decision process

I determine the **level** to remediate a building by:

- Getting above legal requirements (if EPB)
- Seeking cost-effective, feasible options to reach as close to 67%NBS or above, while weighing whether higher levels justify additional cost for the material benefit
- Considering post-event functionality (where providing critical and/or emergency services)

The **information** I use to determine my remediation decisions includes:

- **Cost to retrofit** (cost effectiveness; responsible spending)
- **Impact on building function/use** (continuity of service delivery, especially for critical services)
- **Impact on life safety risk** (in relation to %NBS; also understanding key building vulnerabilities to manage)
- **Construction timeline/process** (i.e., staged work to minimise disruption)
- **Other economic and/or business impacts** (operational cost impacts; maintenance/rates; impact on regional service delivery, if multiple buildings require remediation)

My biggest **barriers** to remediation are:

- **Cost** (budget prioritisation; funding constraints)
- **Practical implementation barriers** (disruption in normal operations; availability of contractors to complete work; implementation challenges beyond engineering advice)
- **Confidence in implementation & outcomes** (access to good engineering advice)
- **Competing strategic priorities** (other priorities; difficulty prioritising other building risk and maintenance needs with regulatory strengthening requirements)

Remediation would be **easier** with:

- **Financial support** (i.e., reducing conflict with other building priorities)
- **Regulatory support** (ability to do seismic strengthening without triggering need for other work, such as fire & accessibility upgrades)
- **Information** (i.e., more standardised information, including around %NBS education; strong government mandate for balancing seismic risk relative to other risks)

Contextual factors

Other **pressures/demands** when managing seismic risk:

- **Regulatory requirements** (meeting strengthening timelines while balancing other priorities)
- **Budget pressures**
- **Risk appetite and understanding** (risk tolerance of organisation/individuals)
- **Legal and reputational concerns** (liability concerns; reputational fear)
- **Communication challenges**
- **Remediation logistics** (managing alternative decanting requirements during seismic remediation to continue services, or staging work around services)

We've got to show that we are making wise investments for our money, and so that largely comes down to cost – is it more expensive to build new, or is it actually a good investment to strengthen the building… and the timeline is important because one of the challenges that we've got with operational [facilities] is undertaking some of this work is quite challenging because it's noisy, it's disruptive".

I use seismic risk information for:

Building occupancy decisions

I identify life safety risks to buildings our organisation occupies and make decisions / advise users on continued occupancy.

I need:

- Seismic risk rating and building vulnerability information (risk to life)
- Relative risk ratings to support triaging and prioritisation
- Engineering risk review to advise suitability for continued occupation

Provision of insurance

I provide seismic risk rating information to ensure insurance coverage of buildings across our portfolio.

I need:

- Seismic risk information (including current %NBS and date of previous seismic assessment of buildings)
- Building typology information
- Policies or processes for managing seismic risk (if relevant)

Building retrofit decisions

I assess the need for and feasibility of retrofit options, including how to complete work around continued operation of buildings.

I need:

- Retrofit options, including supporting information around cost, feasibility, and practical implementation of work and impact on functionality of the space
- Relative risk ratings to support triaging

Building leasing decisions

I meet government agency leasing goals/policies for lease renewals or new leases (67%NBS+ is the preferred target by Government, though lower ratings okay in short-term if there are remediation plans).

I need:

- Seismic risk information (including %NBS rating, seismic assessment report, any proposal for planned future works)

Regulatory risk screening

I ensure regulatory obligations are identified and met (e.g., Building Act; Health & Safety).

I need:

- Seismic risk rating, including the existing %NBS rating
- Key dates associated with legal obligations (assessment, remediation)

Building acquisition decisions

I assess the relative seismic risk of buildings the organisation is considering purchasing.

I need:

- Seismic risk information (including %NBS rating, seismic assessment report, any proposal for planned future works)

I communicate seismic risk information to:

Organisation leadership (SLT; Boards)

Their information needs include:

- Plain language summary of key risks (to people and buildings), options for action (e.g., short-term and permanent remediation, and timeframe), consequences of potential action (or in-action); and relative risk compared to other day-to-day activities

They use this information for:

- Supporting/making decisions on building use (e.g., occupying; retrofitting; leasing; acquisition), with an understanding of associated risks and obligations related to PCBU responsibilities

What works well:

- Engagement/interactions with professionals and experts (e.g., engineers) to support communication of seismic risk

What can be challenging:

- Making complex topics accessible and understandable to non-experts can be extremely difficult
- Board decisions are often driven by Health & Safety liability concerns, and broader community perceptions of seismic risk
- Tendency for prompt decision-making to avoid perceptions of taking too long to address risk
- Understanding the nuance of %NBS and perceived risk versus actual risk (e.g., 30% versus 40%, real risk might not be too different)

Building users (staff; tenants; occupants

Their information needs include:

- Plain language summary of decisions that have been made (including why and how), whether a building is safe to occupy, and (where relevant) key benefits of remediation and a timeline of the process.
- What action has or will be taken to mitigate risk

They use this information for:

- Informing themselves about the building they use/work in, including risk to their safety and what is being done to address this risk (if relevant)

What works well:

- Pro-active and transparent communication about any risks and mitigation approaches
- Engagement/interactions with professionals and experts (e.g., engineers) to support communication of seismic risk on paper
- Contextualising seismic risk relative to other common risks

What can be challenging:

- Commonly fixated on %NBS ratings – and associate this with building safety.
- Understanding the granularity of %NBS and actual difference between levels (e.g., 30% vs 35%)
- Varied understanding and tolerances of seismic risk.
- Commonly fixated on %NBS ratings – and associate this with building safety.
- Communicating seismic risk often evokes concern, particularly relative to other comparable risks

Building Owner Remediation and Communication Profiles

These profiles have been developed to help identify the factors that affect seismic remediation of buildings in New Zealand. They were developed through a small number of interviews with personnel working in relevant roles between February and March 2025.

The profiles were created with funding from the Ministry of Business, Innovation and Employment and the BRANZ research investment levy.

RESIDENTIAL APARTMENT UNIT OWNER-OCCUPIER

I am an owner-occupier of a residential unit within a multi-storey earthquake-prone apartment building in an urban centre of high seismic risk. I may help to navigate seismic compliance and strengthening needs with other unit owners through my building's Body Corporate.

My remediation perspectives

I think the greatest **benefits** of seismic remediation are:

- **Improved safety for occupants** *(life safety risk reduction a top priority, particularly where structural flaws)*
- **Lifting an existing EPB sticker** *(removing regulatory requirements)*
- **Reducing potential for liability** *(EPB requirements and deferred maintenance)*
- **Maintaining building insurance** *(keeping coverage)*
- **Opportunity to do improvements alongside** *(cost effective)*

My main drivers for remediation are:

- **Compliance with Building Act requirements** *(avoiding penalties, lifting EPB status, and 'moving on')*
- **Feasibility** *(finding an achievable solution)*
- **Cost** *(balancing benefits against costs)*

My remediation decision process

I determine the **level** to remediate a building by:

- Meeting regulatory requirements (>34%NBS)
- Affordability relative to building value
- Feasibility of getting to certain levels, relative to the cost involved
- Improving future saleability (i.e., higher %NBS), where possible

The **information** I used to inform my remediation decisions includes:

- **Economic impact** *(cost of retrofit; impact on property value)*
- **Insurability of the property** *(how the risk will impact my insurance)*

My biggest **barriers** to remediation are:

- **Fear of future regulation changes** *(concern future strengthening will be required if future assessments produce a lower seismic rating)*
- **Limited economic return for work** *(potentially unaffordable strengthening costs relative to the property value; continued high insurance costs post-strengthening)*
- **Stress associated with process**
- **Access to good engineering advice**
- **Potentially limited options to sell** *(low property value (EPB) but high retrofit cost)*

Remediation would be **easier** with:

- **Financial support** *(low-interest loans for Body Corporates; reduced insurance premiums; GST/tax rebates;, support for heritage buildings (as public goods); assistance to support navigating requirements under Unit Titles Act)*

- **More remediation process information and support** *(roadmap of retrofit process and/or supporting entity offering guidance for navigating the remediation process)*
- **Guarantee for completed strengthening work** *(assurance further strengthening not required)*

Contextual factors

Other **pressures/demands** when managing seismic risk:

- **Budget pressures** *(affordability for individual owners)*
- **Financial stress** *(purchased compliant homes but later determined earthquake-prone, without access to financial assistance)*
- **Varied risk tolerance of individuals**
- **Regulatory requirements** *(managing Building Act requirements)*
- **Collective buy-in from other owners within Body Corporate structure** *(different options requiring majority or unanimous support from other owners)*
- **Commitment of time/effort** *(unpaid labour; stress managing other owner concerns and interests)*
- **Deferred maintenance** *(focus and money spent on EPB requirements raises challenges to maintain other building aspects)*
- **Limited insurance coverage options** *(insurance requirements under the Unit Titles Act)*

> *"There are finance companies which are now offering finance to body corporates, which, you know, in principle starts solving the issue right. But guess what the interest rate they're going to charge is? It's about 20%... so everybody is kind of taking advantage of the situation".*

I use seismic risk information for:

Building retrofit decisions

I make decisions about strengthening options through the Body Corporate arrangement.

I need:

- Life safety risk (incl. key vulnerabilities)
- Cost of retrofit options (including cost-benefit)
- Financing options
- Impact of options (what doing, why, disruption)
- Impact of retrofit on unit / building value

Regulatory risk screening

I identify whether my building is earthquake-prone and navigate how to make my building compliant.

I need:

- Accessible information on how to make my building compliant (i.e., navigating the process from start to finish)

Obtaining insurance

I inform insurers of strengthening plans (where my building is earthquake-prone) and inform decisions around affordability of insurance coverage during any strengthening work.

I need:

- EPB status (including %NBS rating of the building)
- Plan of remediation works (including resulting %NBS to be strengthened to)

I communicate seismic risk information to:

Fellow unit owners within my building (including through the Body Corporate)

Their information needs include:

- Clear, non-technical descriptions of key risks and requirements
- Proposed options for managing EPB (including risk(s) of not acting, cost, disruption during, long-term outcome
- Insurance implications of different options

They use this information for:

- Understanding what the risks are and what the options to mitigate these risks are
- Agreeing on how to proceed (i.e., proposed remediation plan, financing options, etc.)

What works well:

- Simple, layperson explanations of life safety risk and requirements/options for remediation
- Engineers answering questions and clarifying/explaining technical concepts (i.e., the "so what")

What can be challenging:

- Limited understanding and comprehension of risk
- Fear of liability (consequence of deferred maintenance / not meeting strengthening deadlines; potential H&S risks to public)
- Concerns of trust and credibility (e.g., inconsistency in seismic assessment report outcomes)
- Highly emotive topic (life safety; dealing with options that affect our lives and livelihoods)