

# New Zealand emergency management of built heritage: Insights and recommendations from a gap analysis study.

*C. Caponi*

Egis-Group, Christchurch, New Zealand.

*A.E. Ohs*

Christchurch City Council, Christchurch, New Zealand.

*C.M. Whybrew*

Heritage New Zealand Pouhere Taonga, Christchurch, New Zealand.

*A.J. Macauley, P.A. Cummuskey*

Ministry of Business, Innovation & Employment/ Hīkina Whakatutuki, Christchurch, New Zealand.

*M.C. Smith*

The Heritage Practice, Wellington, New Zealand.

## ABSTRACT

To enhance New Zealand's emergency co-ordination system, the Ministry of Business, Innovation and Employment (MBIE) set up a Building Management in Emergency (BMiE) Technical Working Group (TWG) in 2021. The group mandate was to review the national emergency management framework, provide recommendations, and work collaboratively with MBIE on the continuous improvement of emergency policies. As BMiE TWG identified a lack of procedures specific to built heritage, a new technical subgroup was established in 2023 to focus on the emergency management of heritage buildings.

As a first step, the BMiE Heritage Technical Working Subgroup (Heritage Subgroup) undertook a gap analysis to identify key areas for improvement. The review was informed by meetings with national and local agencies, and feedback from stakeholders with first-hand ("on-the-ground") experience of emergencies. Particular attention was given to lessons learned from the Canterbury Earthquake Sequence (2010-2011) – as the most recent disaster with significant impact on built heritage in New Zealand.

This paper reveals insights from the Heritage Subgroup's initial work and outlines possible short, medium and long-term solutions to bridge gaps in the New Zealand regulatory framework. It demonstrates how developing effective response procedures for the emergency management of built heritage is a crucial factor to minimise the loss of built heritage following future seismic events. If safeguarded, the built heritage retained can in turn foster the resilience of the communities impacted by a disaster and promote a faster urban regeneration in the recovery stage (Caponi et al., 2024).

## 1 INTRODUCTION

The Building Act 2004 and the Civil Defence Emergency Management Plan Order 2015 identifies the Ministry of Business, Innovation and Employment (MBIE) as the lead agency for managing building safety – including in case of emergencies. MBIE's roles and responsibilities include (Campbell et al., 2024) (MBIE, 2024), but are not limited to:

- Supporting and advising the Government, the National Crisis Management Centre (NCMC) and the National Emergency Management Agency (NEMA) on building safety matters.
- Co-ordinating the training, registration, mobilisation, and demobilisation of the building professionals who carry out Rapid Building Assessments (RBA) during emergencies.
- Co-ordinating and leading rapid building assessment activities during and after emergencies.
- Supporting territorial authorities and Civil Defence Emergency Management (CDEM) groups when requested.
- Facilitating consultation of 'required parties' (MBIE, 2024) for the full or partial demolition of heritage buildings.
- Advising the Government after an emergency on the efficient and effective recovery of building stock and functions.

The legislation also requires MBIE to work in consultation with 'agencies, professional bodies, and members of the private sector that have roles, responsibilities, and interests in this regard' (NCDEMPO 2015). This is typically put into effect through the establishment of technical working groups, such as the Building Management in Emergency (BMiE) Technical Working Group (TWG) established in 2021. Specifically, the BMiE TWG's mandate was to review the national emergency management framework, provide recommendations, and work towards the continuous improvement of national emergency policies. The BMiE TWG included representatives from engineering technical societies, territorial authorities (TAs), Government and Crown agencies such as the National Emergency Management Agency (NEMA), Fire and Emergency New Zealand (FENZ), and Heritage New Zealand Pouhere Taonga (HNZPT).

Recognising a lack of procedures specific to built heritage, in 2023 the BMiE TWG established a technical subgroup focused on improving the emergency management of heritage buildings. The initial work of the BMiE Heritage Technical Working Subgroup (Heritage Subgroup) was to undertake gap analysis and identify key-areas of improvement in the emergency management of built heritage.

The purpose of the paper is to:

- Present insights from the gap analysis.
- Share and outline possible short, medium and long-term solutions.
- Gather feedback from those involved in disaster risk management in Aotearoa New Zealand.

## 2 BACKGROUND

The emergency response to a natural disaster is a challenging activity for local and national authorities. They must act quickly and effectively to avoid delays and mistakes that could cost lives and prolong recovery time. The success of the emergency response relies on clear regulation, well-established procedures, and the availability of trained personnel (Caponi et al., 2024).

Information gathering is one of the first essential steps when coordinating an emergency response in the aftermath of a disaster. Standard types of assessments help government and local authorities to form an early picture of the situation and, after an earthquake event, they can include:

- **Rapid Impact Assessments (RIAs)**

RIAs provide an immediate reconnaissance of affected areas. They are used to confirm the extent and severity of damage, and to identify welfare needs of communities. CDEM groups typically pre-prepare rapid impact assessment plans and assessments are carried out by emergency services, local authorities, infrastructure providers, and technical experts (CDEM, 2013).

- **Rapid Building Assessments (RBAs)**

RBAs are used to quickly establish whether buildings can be used or occupied following an earthquake event (MBIE, 2024). MBIE maintains a register of trained inspectors (MBIE, 2025a) who can be deployed during emergency to undertake RBA. The assessment outcomes are usually summarised using a three-colour placard system:

- White placard: No restrictions on access. Building can be used as usual.
- Yellow placard: Access is restricted to part(s) of the building (Y1), or only short-term entry is allowed (Y2).
- Red placard: Entry is prohibited due to intrinsic damage (R1) or an external hazard (R2).

Both RIA and RBA are crucial to plan the initial stages of the response activities, direct resources, identify welfare needs, and provide data to facilitate recovery. Any advancement made at this level could lead to significant improvements in overall outcomes of the emergency response.

## 3 GAP ANALYSIS

### 3.1 Format and objective

The first step for the Heritage Subgroup was to carry out gap analysis of the current system to establish issues and identify opportunities for improvement. The work was informed by meetings with national and local agencies, and through feedback from stakeholders with first-hand experience “on-the-ground” following emergency events. Particular attention was given to the lessons learned from the Canterbury Earthquake Sequence (2010-2011) – as the most recent disaster with a significant impact on built heritage in New Zealand.

The project was a unique opportunity to gather experts, listen to varying perspectives, discuss improvements, and reach consensus on possible short, medium and long-term solutions. Interviewees included heritage engineers, local authority heritage and building consent staff, HNZPT heritage advisors, CDEM and MBIE representatives.

### 3.2 General observations

Retrospective post-disaster analysis demonstrates that some response procedures can have a detrimental effect on built heritage that exceeds the damage from the disaster itself (Stevens 2015). This was the case for

Christchurch, where hundreds of historic buildings were demolished in the emergency response following the 2010-2011 earthquake sequence (Caponi et al. 2024) (Shrestha et al. 2022). Based on data provided by the Christchurch City Council (CCC), a total of 242 District Plan scheduled heritage buildings were demolished as a result of the Canterbury Earthquake Sequence (CES). A breakdown of the demolition data is provided in Table 1.

*Table 1: Heritage items lost in Christchurch as a result of the CES*

| Locations                     | Number of District Plan scheduled heritage buildings demolished | Number of District Plan scheduled heritage items) | Percentage of Demolitions |
|-------------------------------|-----------------------------------------------------------------|---------------------------------------------------|---------------------------|
| <b>By District Plan area:</b> |                                                                 |                                                   |                           |
| Christchurch City             | 207                                                             | 588                                               | 35%                       |
| Banks Peninsula               | 35                                                              | 334                                               | 10%                       |
| In total                      | 242                                                             | 933                                               | 26%                       |
| <b>By geographical area:</b>  |                                                                 |                                                   |                           |
| Christchurch Central City     | 135                                                             | 309                                               | 44%                       |
| Lyttelton (Urban Township)    | 31                                                              | 126                                               | 25%                       |

Partial demolitions of listed heritage items (where a substantial part of a building was demolished) add a further 2% to the figures presented above (approximately).

A study of factors influencing post-earthquake decisions by Marquis et al (2015) found that the decision-making process for whether to repair or demolish was complex, and it was ‘not solely driven by structural damage’ (Marquis et al. 2015), as discussed in the following paragraphs.

### 3.2.1 RBA operations and RBA inspectors’ technical background

Rapid Building Assessors deployed during emergency responses usually include:

- Building Officials from local TAs (approximately 80%).
- Professionals - structural and geotechnical engineers, architects (approximately 20%).

In the emergency response following the 2010-2011 CES, inspectors with little or no experience of historic construction materials and methods were in the unenviable position of being tasked with assessing the structural capacity of heritage buildings without suitable technical support or training (Marriot 2011) (McLean et al 2012) (Sage 2013) (Stevens 2014) (Forbes 2017) (ICOMOS 2021) (Caponi et al 2024). This contributed to conservative approach that favoured demolition over possible alternatives (such as temporary stabilisation works) that could have been identified considering more realistic estimations of the residual seismic capacity of damaged structures. (Caponi et al 2024).

### 3.2.2 Misinterpretation of building Red Placard Status

Although intended (only) to indicate whether a building can or cannot be occupied or used during time of emergency, a red placard was often mis-interpreted as an indication of:

- Extremely severe level of damage (beyond repair).

- Structures at risk of imminent collapse.

As a result, in the Canterbury Earthquakes emergency response, the outcomes for many heritage buildings seemed irrevocably set once the first RBA was completed and a red placard issued.

To limit the reoccurrence of similar misinterpretations in future emergency responses, the BMiE TWG advised MBIE to revise the existing placard system and emphasise its legal and intrinsic limitations. The statement “This is not a demolition order” is now included on both the new R1 and R2 red placard templates launched by MBIE in November 2023. This clarification is, however, only one contributing factor to reducing the number of immediate reactive demolitions. Enhancing the RBA procedures and ensuring that expert advice is sought throughout the process remain two critical factors to be addressed in order to improve the overall outcomes for the emergency management of heritage buildings.

### 3.2.3 Lack of integration between HNZPT, TA's and RBA processes

The MBIE guidelines “*Managing buildings in an emergency – Guidance for decision-makers and territorial authorities*” (MBIE, 2020) encourages early liaison between TAs, the Building Response Manager and HNZPT (Section 5.6.5). However, there is little specific advice on how this relationship should be fostered. As a result, collaboration between all the different parties has proved to be difficult to achieve during past emergencies, impeding optimal use of time and resources.

HNZPT involvement is formalised only once urgent works including demolition of heritage buildings are requested by CDEM. Section 5.9.6 of the *Managing buildings in an emergency – Guidance for decision-makers and territorial authorities*” (MBIE, 2020) and the CDEM Act 2002 state that the Building Response Manager must consult HNZPT at least 24hrs before any urgent works are carried out to remove or reduce risk induced by heritage buildings. Contributors to the gap analysis, however, noted that this timeframe is difficult to manage – particularly when high volumes of demolition requests are lodged concurrently and input from heritage experts is not embedded in the assessment or demolition application process.

Early engagement with HNZPT and deployment of heritage experts during the RBA processes is critical to ensure reliability of the damage/risk assessment, streamline interagency decision-making processes and reach consensus on possible mitigation strategies.

### 3.2.4 Lack of heritage funds and streamlined Resource/Building Consent processes

A study undertaken by Marquis in 2015 found that demolition decision-making in Christchurch following the 2010-2011 CES was complex and included decisions by government and government agencies, as well as considerations of risk-perception, business strategies, building regulations, compliance costs and timeframes, and insurance settlements (Marquis et al. 2015). Based on data provided by CDEM Christchurch, demolition applications during the Canterbury Earthquake emergency response were lodged:

- **20%** by **CDEM** and approved by the Emergency Response Manager in the early stage of the response phase to provide safe egress routes in the emergency designated area.
- **80%** by **building owners** and approved by Canterbury Earthquake Recovery Authority (CERA) during the recovery stage bypassing the usual Resource Management Act (RMA) processes.

The significant percentage of demolition applications lodged by building owners reflects the financial dilemma often faced by private owners when evaluating their possible options:

- Cash settle the premiums offered by the insurance company; or,
- Embark on repair/strengthening projects with uncertain scope of work, timeframe and overall cost.

In most cases demolition applications were lodged simply based on the outcomes from the RBA operations and the red placard status of the buildings, with no or marginal input from heritage experts. The availability

of public funding to support private owners to undertake damage assessment, detailed seismic assessment, strengthening schemes and feasibility studies could be a key-factor to enable retention of built heritage in New Zealand. More in-depth studies can assist building owners to identify cost-effective repairs/strengthening solutions and confirm realistic timeframes and costs to undertake the works. With reliable data at hand, heritage building owners may consider more positively the repairing of their premises rather than immediately lodge a demolition application.

Contributors to the gap analysis also identified that streamlined Resource/Building Consent processes during the recovery stage may represent a decisive factor to facilitating retention of built heritage following disasters.

These observations appear to align with a study undertaken by Smith in 2019, which identified the lack of public funding, guidance on simple and achievable temporary and permanent strengthening solutions, and streamlined consenting procedures as three potential impediments to repair and built heritage retention.

## 4 KEY AREAS TO IMPROVE

Experts and agencies participating in the gap analysis provided the following recommendations to improve the emergency management of built heritage:

- **Preparedness Stage**

Implement:

- A Heritage Information Database.
- A GIS Heritage Data Layer (ideally with an Application Programming Interface (API) links to allow integration).
- A Heritage Emergency Response Priority List.

- **Response Stage:**

- Rapid Building Assessments (RBAs)
  - i. Deploy heritage experts to undertake or support RBA activities.
  - ii. Clarify HNZPT's role and functions within the emergency response framework.
  - iii. Reinforce effective collaboration between HNZPT, TA heritage advisors, CDEM and RBA personnel.

- **Recovery Stage:**

- Streamline consent processes for temporary securing works.
- Allocate public funds for assessments, strengthening/repairs options and feasibility studies.
- Provide guidance on simple and achievable temporary and permanent strengthening solutions.

The remaining sections of this paper focus on possible improvements for the preparedness and response stages. They discuss possible short, medium and long-term solutions to bridge current gaps in the emergency management of heritage buildings. It is worth noting that the improvements proposed represent recommendations from contributors to the gap analysis and they are not included in the MBIE, HNZPT or TA current working programme.

## 4.1 Heritage information database

The Heritage Subgroup concluded that access to basic building information (including building age, original plans, construction materials, structural layout, and any alterations or seismic strengthening works already undertaken) is critical to inform RBA operations. This information can help assessors to:

- Understand the robustness of existing structures.
- Assess the severity of the damage.
- Identify active or resolved structural weaknesses.
- Make an educated assessment of the building's residual capacity and its relative risk to public safety.

This information, however, is often difficult to locate and access during emergency as it is held by TAs and repository institutions in their physical or electronic internal archives. The proposed solution is to collate existing information on heritage buildings and make it available in shared electronic platforms to ensure ready access by CDEM, Emergency Response Manager and RBA inspectors.

### Proposed solutions:

*Table 2: A heritage information database*

| Short Term Solution  | Electronic Archives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | <p>Suggest TAs and HNZPT local offices:</p> <ul style="list-style-type: none"><li>• Collect information on buildings in District Plan heritage schedules and on the New Zealand Heritage List Rārangī Kōrero.</li><li>• Digitise and convert electronic files to standard formats to maximise integration between different digital eco-systems.</li><li>• Create an electronic archive with extractable metadata (reportable format).</li><li>• Provide easy access for CDEM, FENZ and the Emergency Response Manager.</li></ul> |
| Medium Term Solution | Digital Archives on web-platforms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                      | <p>Suggest TAs:</p> <ul style="list-style-type: none"><li>• Create digital archives using web-platforms.</li><li>• Provide easy access for CDEM, FENZ and Emergency Response Manager that can be shared with RIAs, USARS and RBA assessors.</li></ul>                                                                                                                                                                                                                                                                             |
| Long Term Solution   | Catalogues and synoptic tables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                      | <p>Suggest HNZPT and MBIE:</p> <ul style="list-style-type: none"><li>• Provide data on local traditional construction techniques for assessors, by:<ul style="list-style-type: none"><li>- identifying most common heritage buildings typologies for each region, illustrating typical construction techniques and architectural features.</li></ul></li></ul>                                                                                                                                                                    |



- identifying typical seismic response(s) and potential failure mechanisms for each building class and typology.
- summarising research outcomes in synoptic tables to provide comprehensive and accessible data on local traditional construction techniques for use by assessment teams.

**Benefits:**

- Digital archives can provide essential information to inform RBA activities. Files and electronic documentations can be shared and consulted in real-time by different agencies operating from multiple locations.
- Information about important features of local traditional buildings and construction techniques can assist assessment teams - particularly where no other documentation or information is available.

**4.2 GIS heritage data layer**

During a state of emergency, the CDEM, FENZ and Emergency Response Manager operate under “time of war” conditions, with operational protocols characterised by extremely short timeframes. Decisions and action plans need to be finalised very rapidly, as delays and mistakes could cost lives and prolong recovery time (Caponi et al. 2024). For this reason, information should be provided in a clear and concise manner to allow CDEM and the Emergency Response Manager to interpret the relevant data at “a glance”.

The management of built heritage, however, is complex and:

- heritage buildings may be listed in the New Zealand Heritage List Rārangī Kōrero.
- heritage buildings may be scheduled in District Plan heritage schedules.
- heritage buildings may contain Galleries, Libraries, Archives, and Museum (GLAM) collections.

To avoid any confusion and misinformation, contributors involved in the gap analysis suggest implementing a GIS Heritage Regional Data layer encompassing all local and regional heritage items. Once created, this GIS layer can be then shared with CDEM, FENZ and the Emergency Response Manager to create awareness of heritage items located in the emergency precinct. This approach has been already adopted and successfully tested by some TAs including Auckland, Wellington, Christchurch.

A concern to be addressed, however, is that there is no guidance (within the current national emergency management framework) on the provision or use of a Heritage Data Layer. This means that it may not in fact be utilised by those planning for or responding to an emergency.

**Proposed Solutions:**

*Table 3: GIS heritage data layer*

| Short Term Solution | Physical placards and general guidelines                                                                                                                                                                                                                                                                                                                         |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <p>Suggest TAs and HNZPT:</p> <ul style="list-style-type: none"> <li>• Install (physical) plaques on buildings to identify listed/scheduled items (subject to building owner agreement).</li> </ul> <p>Suggest TAs, HNZPT and GLAM:</p> <ul style="list-style-type: none"> <li>• Ensure consistency for the TAs’ GIS Heritage Regional Data Layer by:</li> </ul> |



- Preparing guidelines for its implementation.
- In consultation with CDEM, defining a unified coding system to record heritage and cultural items.

Suggest MBIE:

- Update the emergency framework and include instructions on when to activate the GIS Heritage Regional Data Layer.

## **Medium Term Solution      GIS Heritage Regional Data Layer**

Suggest TAs:

- Create a GIS Heritage Regional Data Layer including all items in District Plan heritage schedules, in the New Zealand Heritage List Rārangī Kōrero and in the GLAM collections.
- Ensure maximum compatibility of the GIS Heritage Regional Data Layer (including API link to allow integration).

## **Long Term Solution      GIS Heritage National Data Layer**

Suggest TAs and HNZPT:

- Create a Heritage National Data Layer by merging regional layers.
- Adopt a Data Federation approach with:
  - TAs and GLAM managing data for their own schedules and collections.
  - HNZPT managing data for the New Zealand Heritage List Rārangī Kōrero.

Benefits:

- When no GIS Heritage Data is available, physical plaques could help the CDEM, FENZ and RBA teams identify heritage buildings in an emergency. Presence and locations of heritage items can be then back fed to the Emergency Operations Centre and allow special measures to be undertaken.
- A GIS Heritage Regional Data Layer could provide an ‘at a glance’ summary of heritage items/collections present in the territory, CDEM, FENZ and TAs.
- A Heritage National Data Layer based on a federated approach could significantly simplify data management operations and ensure an up-to-date flow of information among all the agencies.

### **4.3 Heritage emergency response priority list**

During a state of emergency, CDEM, TAs, FENZ and NZ Police have limited personnel and resources. Their primary focus is on life-safety and the mitigation of consequential risk; only limited resources can be deployed to safeguard and protect heritage sites and GLAM collections.

In the Canterbury Earthquakes Emergency Response, CDEM Christchurch requested a priority list of the most significant heritage buildings located within the emergency precinct. The Christchurch City Council (CCC) heritage team, however, was not in the position to provide the list, due to several reasons including:

- The impracticality of establishing a TA and HNZPT working group while responding to an emergency.
- A lack of pre-existing guidance or methodology.

As specific guidance was not provided, emergency management operations involving heritage buildings seemed to be led by the rule “Equal priority = No priority”, drastically impacting the potential effectiveness of any possible operational plan to safeguard and protect heritage buildings.

Following the Canterbury and other earthquakes, CDEM and other stakeholders have continued to advocate for the creation of heritage priority lists for emergency response purposes. A suggestion is to adopt a three-tier system for top, high, and standard priority heritage buildings based on their relative significance.

The creation of a heritage priority list would also be in alignment with the approach adopted by HNZPT in 2014, when they launched the “National Historic Landmarks Programme” with the aim to identify the most significant HNZPT heritage items from a national point of view. Once completed, the National Historic Landmark Register could be used to inform the discussion with TAs and confirm possible criteria and methodologies to compile their Heritage Emergency Response Priority List.

### **Proposed solutions:**

*Table 4: Heritage emergency response priority list*

| <b>Short Term Solution</b>  | <b>Initial consultations</b>                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <p>Suggest TAs and CDEM:</p> <ul style="list-style-type: none"> <li>• Discuss and agree on the maximum number of items to be included in each Tier of the Heritage Emergency Response Priority List.</li> </ul> <p>Suggest TAs and HNZPT:</p> <ul style="list-style-type: none"> <li>• Initiate discussions on possible criteria and methodologies to implement the Heritage Emergency Response Priority List.</li> </ul> |
| <b>Medium Term Solution</b> | <b>Establish criteria and methodologies to set up priority lists</b>                                                                                                                                                                                                                                                                                                                                                      |
|                             | <p>Suggest HNZPT:</p> <ul style="list-style-type: none"> <li>• Continue developing the “National Historic Landmarks Programme”.</li> <li>• Prepare national guidance on the preparation of priority lists, with input from TAs.</li> </ul> <p>Suggest TAs:</p> <ul style="list-style-type: none"> <li>• Prepare local priority list(s) for use in emergencies.</li> </ul>                                                 |
| <b>Long Term Solution</b>   | <b>Heritage emergency response priority list</b>                                                                                                                                                                                                                                                                                                                                                                          |
|                             | <p>Suggest TAs:</p> <ul style="list-style-type: none"> <li>• Finalise Heritage Emergency Response Priority Lists and integrate relevant information on their GIS Heritage Regional Data Layer.</li> </ul> <p>Suggest HNZPT to:</p> <ul style="list-style-type: none"> <li>• Integrate data from the National Historic Landmarks Programme into the GIS Heritage National Data Layer.</li> </ul>                           |

**Benefits:**

- Priority lists could help manage and retain the most significant built heritage in an emergency, especially in case of large-scale disaster or for high-density populated TAs or TAs characterised by an elevated number of significant heritage sites in their territory.
- Integration with GIS layers would help CDEM identify the most significant heritage items from the earliest stage of the response. This could inform their decision-making processes for identification, clearance, and securing of access or evacuation routes.
- Heritage Emergency Response Priority Lists could optimise use of resources and facilitate deployment of heritage experts in the RBA units assigned to the most significant heritage places within the emergency precinct.

**4.4 Deployment of heritage experts to support RBA activities**

The lack of heritage experts within RBA teams can lead to significant inefficiencies in the response and recovery stage. In the Canterbury Emergency Response, for example, competing assessments were common when heritage experts were asked to re-assess buildings already inspected by RBA assessors. When assessments differed, further visits, meetings and discussions had to be held to reach consensus on the level of structural damage to the structure and relative risk to public safety. “Conferencing”, however, was not always possible, and decisions were made based on sometimes overly or insufficiently cautious RBA assessments.

Due to their heritage values, historic materials, and non-standard construction details, the assessment of built heritage presents additional complexity when compared to the assessment of newer buildings and structures (Caponi et al., 2024). To achieve more reliable outcomes, it is crucial to enable heritage experts to be deployed in the RBA response operations.

Acknowledging all the potential benefits, the latest MBIE guidance for RBA operations includes recommendations for the deployment of heritage experts in the emergency response stage. Specifically, it suggests embedding heritage expert advice at least within an RBA unit (consisting of multiple RBA teams), or as a resource for high-interest sites.

**Proposed solutions:**

*Table 5: Deployment of heritage experts for RBA activities*

| Short Term Solution  | TA heritage expert list                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | Suggest TAs and HNZPT: <ul style="list-style-type: none"><li>• Consult with ICOMOS NZ.</li><li>• Create a list of heritage experts by location/region.</li><li>• Share the list with CDEM and MBIE.</li></ul> Suggest CDEM and MBIE to: <ul style="list-style-type: none"><li>• Confirm availability of the experts on the heritage list to be deployed in case of emergency</li></ul> |
| Medium Term Solution | Heritage experts’ RBA training                                                                                                                                                                                                                                                                                                                                                         |

Suggest TAs, HNZPT and MBIE:

- Invite heritage experts to complete RBA training.

Suggest Engineering NZ:

- Consider creating a register of engineers with specific expertise in the Heritage Sector.

## Long Term Solution

### Heritage Engineers' National Register

If endorsed by the engineering community, suggest Engineering NZ:

- Establish a Heritage Engineers National Register.

---

## Benefits:

- Embedding heritage expert advice from the early stages of the RBA operations could:
  - streamline CDEM and Building Response Manager decision-making process.
  - promote time efficiency reducing risk of re-work.
  - reduce risk of overly or insufficiently cautious assessments and recommendations optimising use of cordoning, barricades, temporary securing works.
  - increase level of safety for public and emergency service personnel.
  - Reduce the risk of unnecessary demolitions.
- A Heritage Engineers National Register could assist MBIE to and mobilise experts for small TAs or large-scale state of emergencies.

## 4.5 HNZPT role and functions

The lack of integration between crown and government agencies can significantly impact the effectiveness of their work during emergencies. The Heritage Subgroup identified that absence of specific Government instructions on when and how TAs should liaise with HNZPT is one of the principal factors impeding the development of effective cooperation among all the different agencies.

## Proposed Solutions:

*Table 6: HNZPT role and functions*

## Short Term Solution

### MBIE and HNZPT Joint Workshop Sessions

Using existing events' programmes, suggest HNZPT and MBIE:

- Arrange joint sessions and provide TAs with updates on upcoming legislation changes.
- Explore the assistance/services that HNZPT can provide in case of emergency.

## Medium Term Solution

### Foster network opportunities between central and local agencies

Suggest HNZPT and MBIE:

- Promote networking events for TAs, CDEM and HNZPT personnel.

## Long Term Solution

## MBIE Guidelines

Suggest MBIE:

- Revise the Emergency Response Framework and include specific instructions on when and how TA should initiate liaison with HNZPT.

### Benefits:

- Formalising HNZPT's involvement in the response framework could optimise the use of emergency resources, allow time-efficiencies in the RBA operations, and reduce any potential assessment re-work.
- HNZPT can provide some specialist advice for heritage places – this is of particular use to smaller TAs which may lack in-house heritage expertise.

## 4.6 Improve collaboration between HNZPT, TAs' and CDEM.

CDEM, TAs' heritage staff or HNZPT personnel are used to operating in different work environments and with different timeframes:

- TA officers and HNZPT personnel work within a “**time of peace**” (e.g. no state of emergency). Their goal is to ensure the protection of heritage places for the foreseeable future. Projects may span over months or years, and involve periods of research, consultation, and discussion before finalising any decision.
- CDEM personnel are trained to work in a “**time of war**” (e.g. during state of emergency) with short timeframes to make decisions and confirm their action plan. Their goal is to ensure public safety and reduce consequential risk following a disaster event. CDEM's timeframes may be measured in hours or days. Decision-making is based on readily available information and data.

Given the divergent goals and work environments of each organisation (or teams within organisations) it is easy to see where confusion and misunderstanding can arise during emergency situations. This is of concern when it affects the efficiency of the emergency response. To address this issue, the Christchurch CDEM Group has developed training pathways to promote professional development and collaboration throughout the local emergency management sector.

### Proposed solutions:

*Table 7: Improve effective collaboration between HNZPT, TAs and CDEM*

## Short Term Solution

## CDEM Integrated Training Courses: contents and programmes

Suggest HNZPT and MBIE:

- Evaluate CDEM EOC and CIMS course contents and programme.
- Collaborate with CDEM and expand the current training courses to include modules for the emergency management of heritage buildings.

## Medium Term Solution

## Pilot Projects

Suggest HNZPT and MBIE:

- Launch pilot projects and test the efficacy of the new EOC and CIMS Training Courses with selected TAs.

## Long Term Solution

## TA's Preparedness plan

Based on the outcomes from the pilot project, suggest MBIE consider:

- Including CDEM integrated training courses in TA emergency preparedness plan guidelines.

## Benefits:

- Integrated Training Courses provide opportunities for professional development and for positive and constructive networking. This may foster stronger interagency cohesiveness and reduce inter-personal conflict during response and recovery operations.

## 5 CONCLUSIONS

In 2024, the BMiE Heritage Technical Working Subgroup undertook a gap analysis to identify key areas for improvement of the emergency response management of heritage buildings. The work was informed by meetings with national and local agencies, and through feedback from stakeholders with first-hand experience “on-the-ground” following emergency events. The conferencing process provided an opportunity for national, local and crown authorities to discuss lessons learned, share data and combine specialist knowledge on different aspects of the emergency response. By collating all the information together, it was possible to envision a more holistic approach to the emergency management of heritage buildings, with experts from different agencies pro-actively contributing to identify more efficient and effective measures to ensure public safety and enable a higher degree of retention of built heritage (where possible).

This paper reports insights from the gap analysis and outlines six possible areas of improvement in the New Zealand regulatory framework. For each area, potential goals and milestones were identified considering a gradual and continuous progression enabling concrete benefits to be achieved in the short, medium and long-term. Notably, system improvements in the collation and sharing of geospatial data in relation to heritage assets have been identified as one of the key factors to enhance inter-agency collaboration in disaster recovery.

All the proposed enhancements would allow Building Response Managers to improve efficiency and maintain effective operational pacing in future emergency response events, avoiding the protection of built heritage to become or be perceived as a hinderance to other critical operational objectives. If safeguarded, the built heritage retained can in turn foster the resilience of the communities impacted by a disaster and promote a faster urban regeneration in the recovery stage (Caponi et al.,2024).

## 6 ACKNOWLEDGMENTS

The authors would like to thank Win Clark, Suzanne Richmond (CCC), Richard Gant (CCC), Mike Gillies (HNZPT), Robyn Burgess (HNZPT), Vanessa Tanner (HNZPT), Eddie Herbert (MBIE), Robbie Watts (MBIE), Sarah Sinclair (MBIE) and Brendan Winder (CDEM) for the availability and continuous support provided to the BMiE Heritage Technical Working sub-Group.

The views expressed in this paper are those of the authors and do not necessarily reflect those of the organisations to which they belong.

## 7 REFERENCES

- Campbell PA, Brunsdon DR, Farrell JR, Green R, Macauley AJ, Herbert E. “Post-Earthquake Response: Update on the Improvements to the Rapid Building Assessment Process and Building Management in Emergencies.” *NZSEE 2024 Annual Conference*, April 2024, Wellington, Paper No.179, 11pp.
- Caponi C, Ohs AE, Stevens FL, Smith MC. “Improving post-earthquake emergency management for built heritage.” *NZSEE 2024 Annual Conference*, April 2024, Wellington, Paper No.120, 14pp.
- CDEM (2013) “*Rapid Impact Assessment: Information for the CDEM Sector [IS14/13]*”. Ministry of Civil Defence & Emergency Management, Wellington, New Zealand, 44pp.  
<https://www.civildefence.govt.nz/assets/Uploads/documents/publications/guidelines/information-series/14/13-impact-assessment/is-14-13-rapid-impact-assessment.pdf>
- Forbes, C (2017). *Issues Paper: Post Earthquake Christchurch New Zealand Issues Associated with the Protection and Recovery of Built Cultural Heritage*. Australia ICOMOS, ICOMOS-ICORP, Blue Shield Australia, AIA 31 January 2017, Revision 5 (March 2019).
- ICOMOS (2021). *ICOMOS Global Case Study Project on Recovery and Reconstruction*.  
<https://www.icomos.org/en/focus/reconstruction/41704-icomos-global-case-study-project-on-reconstruction> (Accessed 24 January 2024)
- Marriot, A (2011). “*The Performance of Heritage Buildings in the 2010/2011 Christchurch Earthquake Swarm*”, paper given at the 16th Engineering Heritage Australia Conference, Australia, November 2011
- Marquis F, Jihyun Kim J, Elwood K, Chang S (2015). “Understanding post-earthquake decisions on multi-storey concrete buildings in Christchurch, New Zealand.” *Bulletin of Earthquake Engineering*, **15**: pp731-758, (2017). <https://link.springer.com/article/10.1007/s10518-015-9772-8>
- MBIE (2020). “*Managing Buildings in an emergency: Guidance for decision-makers and territorial authorities*.” Ministry of Business Innovation & Employment, Wellington, New Zealand, 136pp.  
<https://www.building.govt.nz/assets/Uploads/managing-buildings/post-emergency-building-assessment/managing-buildings-in-an-emergency.pdf>
- MBIE (2024). Building Performance website. *Roles and responsibilities for building emergency management*.  
[https://www.building.govt.nz/managing-buildings/managing-buildings-in-an-emergency/roles-and-responsibilities-for-building-emergency-management#jumpto-mbie\\_0027s-responsibilities-for-building-emergency-management](https://www.building.govt.nz/managing-buildings/managing-buildings-in-an-emergency/roles-and-responsibilities-for-building-emergency-management#jumpto-mbie_0027s-responsibilities-for-building-emergency-management) (Accessed 09 January 2025).
- MBIE (2025a). Building Performance website. *Rapid Building Assessor programme*.  
<https://www.building.govt.nz/managing-buildings/managing-buildings-in-an-emergency/rapid-building-assessment-system/rapid-building-assessor-programme> (Accessed 09 January 2025).
- McClean, R; Duff, M; Burgess, R; Margetts, D; Maclean, C; Whybrew, C; Vincent, M (2012). “*Heritage Buildings, Earthquake Strengthening and Damage: The Canterbury Earthquakes September 2010 – January 2012: Report for the Canterbury Earthquakes Royal Commission*.” New Zealand: New Zealand Historic Places Trust.
- NCDEMPO (2015). “*National Civil Defence Emergency Management Plan Order*.” New Zealand Government, Wellington, New Zealand.
- Sage, E (2013) ‘Heritage New Zealand Pouhere Taonga Bill: Second Reading’, The Green Party of Aotearoa New Zealand: [www.greens.org.nz/speeches/eugenie-sage-speaks-second-reading-heritage-new-zealand-pouhere-taonga-bill](http://www.greens.org.nz/speeches/eugenie-sage-speaks-second-reading-heritage-new-zealand-pouhere-taonga-bill) (Accessed 28 March 2014).
- Shrestha S, Orchiston C, Elwood K, Johnston D, Becker J, Tomassi I (2022). “Understanding the wider social and economic context of post-earthquake cordons: A comparative case study between Christchurch, Aotearoa (New Zealand) and L’Aquila, Italy.” *Earthquake Spectra*, **38**(4): <https://hal.science/hal-03654080/document>



Stevens F.L (2014). “*Developing an Earthquake Response Framework for Historic Buildings in Aotearoa New Zealand*”. Masters Thesis, Department of Archaeology, University of York, York, UK, 240pp.

Stevens F.L (2015). “Earthquake Response for Built Heritage in New Zealand” *ICOMOS NZ Conference and AGM: ICOMOS 50- past, present, future*, 17-18 October 2015, Auckland, 29 pp.