

Building Safety Evaluation

During a State of Emergency

Guidelines for Territorial Authorities



Prepared by the

**New Zealand Society for
Earthquake Engineering**

With support from



Department of
Building and Housing
Te Tari Kaupapa Whare



*Te Rākau
Whakamarumaru*

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Please send any comments or questions on this document to the NZSEE Executive Officer at exec@nzsee.org.nz.



Endorsement by Department of Building and Housing

The Gisborne earthquake of 20 December 2007 provided a timely reminder that it is crucial to quickly evaluate the safety of buildings and determine whether or not they are suitable for occupancy. Gisborne District Council's actions in response to the earthquake followed the processes defined in the NZSEE Guidelines. These actions served to reassure the community that the Council was in control of the situation and to reduce anxiety amongst owners by providing rapid and authoritative decisions on the safety of their buildings and their suitability for occupation.

Gisborne District Council coped well with this aspect, but had the earthquake been bigger, the extent of the damage would have overwhelmed their limited resources. The Gisborne earthquake was thus a lesson for all territorial authorities to be better prepared in all respects, but particularly for the rapid evaluation of building safety.

After the Gisborne earthquake, the Department convened a debriefing meeting of those closely involved in the aftermath, including Gisborne District Council, structural designers, emergency managers, insurers, and earthquake hazard specialists. The capability of territorial authorities in the rapid evaluation of building safety was a stand-out item in the areas for improvement identified at that meeting. As a result, the Department actively supported a project to finalise the draft updated NZSEE Guidelines and develop training packages.

The Department commends the NZSEE for its continued leadership in maintaining and updating these Guidelines and developing the associated training packages, and is pleased to support their adoption and use by all territorial authorities.

The Department urges each and every territorial authority to improve its preparedness and capability by adopting the procedures in these Guidelines, and putting in place the arrangements necessary to deal with the scale of work required. In most, if not all, cases this will require each territorial authority to make prior arrangements with neighbouring territorial authorities and other resources, notably structural engineers.

It is vital that every territorial authority is able to mobilise the resources and adopt the processes needed to lead the response to a major earthquake or other major emergency. The ability to deal quickly and effectively with the concerns about building safety and suitability for use is paramount at a time of great stress and uncertainty.

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Deputy Chief Executive, Building Quality

August 2009

Guidelines for Building Safety Evaluation During a State of Emergency

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FOREWORD

Basic Aims of Document

The primary aim of this document is to provide territorial authorities with guidance to prepare for and manage effectively a process of structural safety evaluations of damaged buildings. The focus of this document is on the rapid assessment of buildings to be carried out during the period of a state of emergency declared under the Civil Defence Emergency Management Act 2002, as may follow a major earthquake or other disaster which affects a significant number of building structures.

Territorial authorities have the responsibility of co-ordinating building inspections to provide for public safety. A range of professional groups are needed to assist in this operation, including structural and civil engineers, building control officials, architects and building contractors. The associated aim of this document is to prepare building industry personnel to participate in this process.

The definitions, procedures, management systems, placards and checklists in these guidelines are intended to represent a common standard for use by all New Zealand territorial authorities. These guidelines are intended for use as the core resource document for territorial authorities to base their specific emergency procedures for building safety evaluations on.

Background

The first edition of these Guidelines was produced by the New Zealand Society for Earthquake Engineering in January 1998. This second edition updates the original document to take into account subsequent local and international experience, and the experiences of territorial authorities in implementing building safety evaluation procedures. The experiences and learnings from the rapid structural safety evaluation of buildings following the 20 December 2007 earthquake in Gisborne have also greatly assisted in finalising the updating of this document.

The key areas of change are:

- Updating of references to relevant legislation ie. Civil Defence Emergency Management Act 2002 and Building Act 2004
- Clarification that the building safety evaluation procedures are to be applied under the direction of a Controller (appointed under the Civil Defence Emergency Management Act 2002) during a state of emergency (this addresses issues of liability, including for volunteering professionals)
- Change from the four placard system to the original US three placard system (ie. Green – *Inspected*; Yellow – *Restricted Access* and Red – *Unsafe*)

This document has been produced by a NZSEE Working Party with support from the Department of Building and Housing and the Ministry of Civil Defence & Emergency Management.

These Guidelines draw heavily upon North American experience, and in particular, upon:

*ATC-20 Procedures for Post-earthquake Safety Evaluation of Buildings and
ATC-20-2 Addendum to the ATC-20 Post-earthquake Building Safety Procedures.*

The building evaluation methodology presented in these Guidelines is similar to that outlined in these two publications (refer to the Bibliography for publication details). A training package will be available in a New Zealand version by the end of 2009, along with a field guide for those carrying out the inspections.

Scope

The scope of these Guidelines covers the Rapid Assessment of buildings to be carried out during a state of emergency declared under the Civil Defence Emergency Act 2002.

These Guidelines address disaster scenarios where there is extensive damage to buildings (residential, commercial or industrial) and infrastructure (roads, bridges, water supplies, electricity supply, telephone communications etc) over a large area, and people are likely to have been killed and injured, possibly numbering in the hundreds. ***The focus of this document is for the period from when the initial reconnaissance has been completed until the emergency declaration is lifted.*** The initial reconnaissance by emergency services and the territorial authority is necessary so that the extent of the problem is understood and areas of major concern have been identified.

The procedures to be employed, once the actual task of inspecting individual buildings for structural damage can begin, are described.

Services such as drainage, water supply and roading are not included within the scope of this document. Nor is non-structural damage that does not pose a risk to human life. While dams and bridges are covered by the Building Act 2004, their safety evaluation procedures are also excluded from the scope of this document.

The focus of the building safety evaluation process is on immediate public safety, not the provision of an engineering assessment service to building owners.

Quantified assessment of building damage is necessary to determine reconstruction programmes and resource requirements for repair and restoration, and to assess how long recovery may take. Such detailed assessment is outside the scope of this document.

Disaster Context

While these Guidelines generally addresses building safety following a large earthquake, the principal actions, operations and procedures are equally applicable to other disasters that affect the safety of buildings.

Buildings of different age, form and construction material are likely to suffer different extents of damage within an area and between different areas and localities. Some buildings at first sight may appear to be undamaged, but on closer inspection may be found to be significantly damaged. In an earthquake event aftershocks may cause subsequent damage and instability.

Following any major event that disrupts and threatens life and normal activities, a state of emergency will be declared under the Civil Defence Emergency Management Act 2002. There is likely to be shock, confusion and chaos in the period following the event, which may last some appreciable time. All people, whether the general community, or those attempting to help in or manage the emergency response as individuals or in organisations, will be subject to all human emotions in all manner of ways. All participants are potential victims of the disaster.

Recommended Action Steps

Upon reading these Guidelines, Territorial Authority Building Control Managers should take the following action steps:

- Agree to utilise the post-disaster procedures outlined in this document
- Prepare and adopt ***an emergency plan and procedures for building safety evaluation***
- Write emergency responsibilities into role descriptions for identified key positions and deputies
- Ensure Territorial Authority staff are familiar with the Civil Defence Emergency Management Group Plan and Territorial Authority response arrangements, and with the key personnel, particularly the nominated Controller(s).
- Find and prepare an alternate location for a Co-ordination Centre for the Building Safety Evaluation operation
- Identify priorities for building evaluation
- Assemble and stockpile resources
- Enter into mutual aid agreements to provide access to other resources
- Prepare database for receiving and recording information
- Develop a current list of contacts with other organisations who may provide volunteers, those who manage critical facilities and lifelines, and own staff
- Initiate training sessions for building control staff with other organisations that may co-operate during an emergency
- Develop and regularly undertake exercises using realistic local scenarios based on risk assessment studies, and involving others that may play a part in building safety evaluations
- Review and update Council's Earthquake Prone Building Policy to allow for shortened time-frames where buildings have been damaged in a seismic event
- Document the approach (policy) that will be taken post-disaster including;
 - Use of exemptions
 - Work done under urgency/processing of certificates of acceptance
 - Reasonable practicality of upgrading for alteration (remedial work)
 - Reliance on Producer Statements as part of these processes

Further detailed guidance is given in Sections Three and Four, and Appendix C about the resources that are needed. There is a Pre-planning and Maintenance Checklist in Section 4.9. Information about the associated training modules is given in Section Five.

Section One: Process Overview

1.1 Context

The building safety evaluation process outlined in this document is intended to be activated immediately after a state of emergency is declared following a damaging earthquake, or in any other emergency where significant numbers of buildings are potentially unsafe.

Territorial Authorities have the responsibility of co-ordinating building inspections to provide for public safety. People need to be kept from entering or using unsafe buildings, or be informed that essential activities may continue where structures are assessed as safe. Authorities will be under intense media, public and political pressure to manage the inspection process well.

Authority for Territorial Authorities to undertake the activity of building safety evaluations during a state of emergency is generally provided for in the Civil Defence Emergency Management Act 2002 and the Building Act 2004 (*refer Section Two*). While neither Act makes specific reference to the building safety evaluation process, this activity is one of a range of post-disaster functions that need to be undertaken, and hence specifically prepared for.

Important short-term aims for inspections include:

- safe use of streets adjacent to damaged buildings
- safe occupation of buildings for:
 - continued use, especially emergency facilities
 - minimisation of impact on commercial activity
 - minimisation of displacement of people
- assessment of the need for temporary works such as shoring, temporary securing and making safe
- saving property from unnecessary demolition
 - conserving heritage fabric
 - minimising economic impact for the owners and community

Inspections also contribute to longer-term recovery measures, by assisting with:

- cost of damage estimates
- determining the aid and resources required for permanent recovery
- obtaining engineering, scientific and insurance data to improve disaster mitigation measures.

1.2 Building Safety Evaluation Inspections

A variety of inspections are required following an event severe enough to warrant a state of emergency being declared. They are listed and summarised in **Table 1**.

Territorial Authorities are responsible for organising a rapid safety evaluation process. This includes:

- the initial or **Level 1 Rapid Assessments**, and
- the more considered **Level 2 Rapid Assessments**, which are more appropriate for assessment of large buildings (typically multi-storey). Level 2 Rapid Assessments may be undertaken by critical facility operators (e.g. hospitals, lifeline utilities, emergency services), and by Territorial Authorities to facilitate the issuing of Building Act 2004 notices prior to the emergency declaration being lifted.

Table 1: Summary of Building Safety Evaluation Inspection Categories

Purpose	Timing*	Initiated by	Task	Conducted by	Comment
Overall Damage Survey	Within hours after event	Civil Defence staff, emergency service action plans, territorial authorities action plans	Assess aggregate damage and identify affected areas	Emergency services, Territorial Authority staff, Civil Defence volunteers	No entry of premises, no formal records, emphasis on extent of damage, areas of high impact, identifying rescue tasks, identifying areas of priority for rapid assessment, estimating manpower and skill base needs etc
Level 1 Rapid Assessment (Figure 1)	During a period of a state of emergency declared under the Civil Defence Emergency Management Act	Controller; Building Safety Evaluation Leader	Ascertain level of structural damage to individual buildings and note other hazards; assess building safety and decide appropriate level of occupancy; recommend security and shoring requirements	Structural and civil engineers, architects and other personnel from the building industry volunteer status	Formal system, typically based on exterior inspection only; placards posted on buildings, central record maintained, note made of sites needing further inspections, unsafe areas cordoned off.
Level 2 Rapid Assessment (Figure 2)				Structural engineers, building services and geotechnical engineers volunteer status	Formal system based on inspection of interior and exterior of the building plus reference to available drawings. Calculations not envisaged. May result in revised placards posted on buildings, central record updated, unsafe areas cordoned off, urgent work recommendations <i>Typically for priority inspection of critical facilities (for situations where facilities operators do not have contracted engineers), or where further information that raises concerns is received</i>
Detailed Engineering Evaluation and Remedial Work	Typically longer-term, but may be immediate for critical structures.	Building owners, insurance companies, Territorial Authorities	Ascertain extent of structural damage, establish losses for insurance purposes, and recommend remedial work to restore functionality and compliance with Building Code.	Engineers, architects and loss adjusters contractual agreement	Meets insurance and restoration requirements under the Building Act 2004 <i>These evaluations are likely to involve review of construction documentation, and the preparation of detailed engineering reports</i>

* all timings are indicative estimates only

Detailed Engineering Evaluations are generally considered part of the disaster *recovery* phase, and will usually be undertaken by engineers contracted by building owners. Territorial Authorities are responsible for the Detailed Engineering Evaluations of buildings that they own.

The Rapid Assessment inspections will require mobilisation of all available inspection resources and the co-ordination of additional resources from outside the area affected by the disaster. All Territorial Authority building control staff and additional assessors should be familiar with the Rapid Assessment procedures, in order to promote consistency of application and minimise the time needed for briefing before inspections commence.

Level 1 Rapid Assessments may be undertaken by teams comprising building control officers, structural and civil engineers, architects, experienced building contractors, and other suitably experienced building professionals. Local professional engineering resources will initially be focused on critical facilities and those enterprises which have arranged inspection contracts for such an event. Conservation of structural engineering resources for undertaking *Level 2 Rapid Assessments* of large buildings and performing *Detailed Engineering Evaluations* is a likely requirement where the scale of damage is extensive.

Rapid Assessment Inspectors will quickly assess the type and extent of a building's structural damage, using the rapid assessment form, and on that basis will post one of the following placards on the building:

- | | |
|-------------------------|---------------|
| • <i>Inspected</i> | <i>GREEN</i> |
| • <i>Restricted Use</i> | <i>YELLOW</i> |
| • <i>Unsafe</i> | <i>RED</i> |

Copies of safety assessment forms and recommended placards for use with Rapid Assessments are provided in Appendices A and B respectively.

1.3 Level 1 Rapid Assessments

The initial or Level 1 Rapid Building Assessments involve the following steps:

1. identifying the building
2. assessing the current building structural damage by external observation only
3. noting any other observed non-structural hazards for follow up assessment by others
4. recommending further detailed inspections if appropriate
5. recording site details for the database
6. assigning a placard according to the severity of damage that can be seen
7. fixing the appropriate placards at all entrances.
8. placing barrier tape to stop access into a building assessed as unsafe (RED placard), and directing the cordoning off of adjacent areas with barrier tape where there is danger from collapse
9. providing an information sheet on the state of the building to the building owner, if possible, where access needs to be restricted

Where a restriction applies to part of a building or a specific tenancy within a building only, the extent of the restriction must be stated on the yellow placard that is posted. Further actions to reduce danger in and around the building may be identified, and the assessors may cordon off some areas or recommend that either a Level 2 Rapid Assessment or a Detailed Engineering Evaluation be carried out.

This process is summarised in **Figure 1** following.

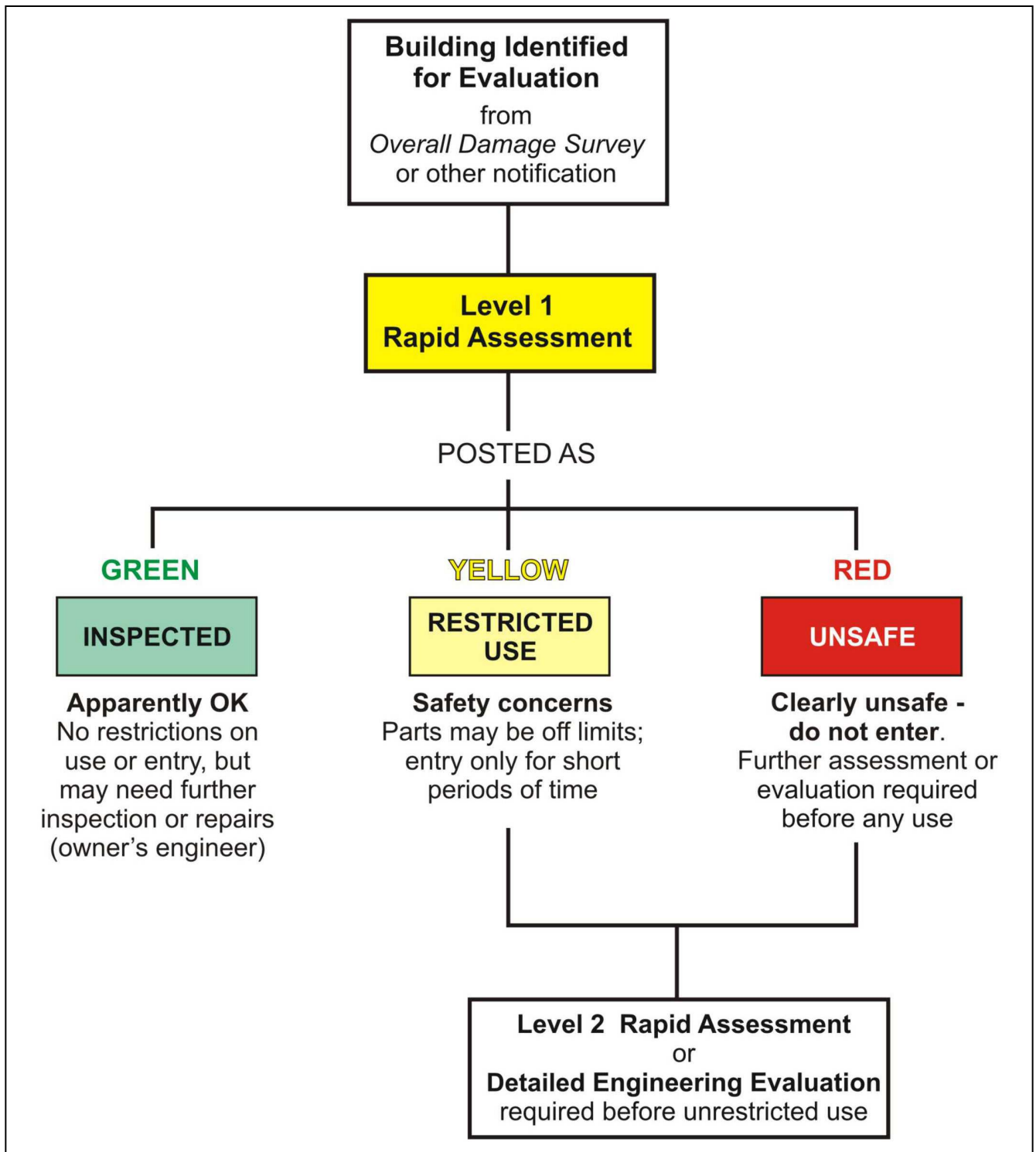


Figure 1: Flow Chart Showing the Level 1 Rapid Assessment and Posting Process

(Adapted from ATC-20)

The first task is to accurately identify the building. The inspector may be provided with maps, aerial photographs, official street addresses, and legal descriptors, and any heritage listings. It is not unusual for numbers not to be shown on commercial buildings, or for numbers on the buildings to differ from the official address given, particularly for buildings occupying corner sites or having access from more than one street. Record the official address on the sheet, and record any observed variance as 'also known as'. If the building bears a name, this is also helpful for identification.

Use the 'other ID' field to physically describe the position of a building where there is more than one building on a property. For commercial and industrial buildings it is also helpful to record the name of the business that occupies the premises - for example, the prominent tenancy (usually ground floor).

Taking a photograph of the building, with the placard posted, is useful for both identification purposes and for future monitoring over time and after further worsening conditions. A log of photographs taken will need to be kept by the Territorial Authority.

1.4 Level 2 Rapid Assessments

A Level 2 Rapid Assessment should be performed on all critical facility buildings, and large, typically multi-storey buildings, and on any other buildings where the Level 1 Rapid Assessment identifies the need for further and more specific inspection.

As for Level 1 Rapid Assessments, identification of the building is a critical task. Critical facility buildings, such as hospitals, often have multiple buildings in a complex. A copy of the plan showing the building location and building descriptors used by the organisation should be provided to aid identification of specific buildings and recording of data.

Structural and building services engineers are required for the Level 2 Rapid Assessments of multi-storey buildings, supplemented as required by geotechnical engineers. The outcome of this process is a completed Level 2 Assessment form (Appendix A) and an appropriate placard, possibly revising the initial posting.

The assessing teams may also make recommendations for work to be done under urgency where there is a need to demolish or secure the structure to ensure the safety of the public or to protect adjacent property.

This process is summarised in **Figure 2** following.

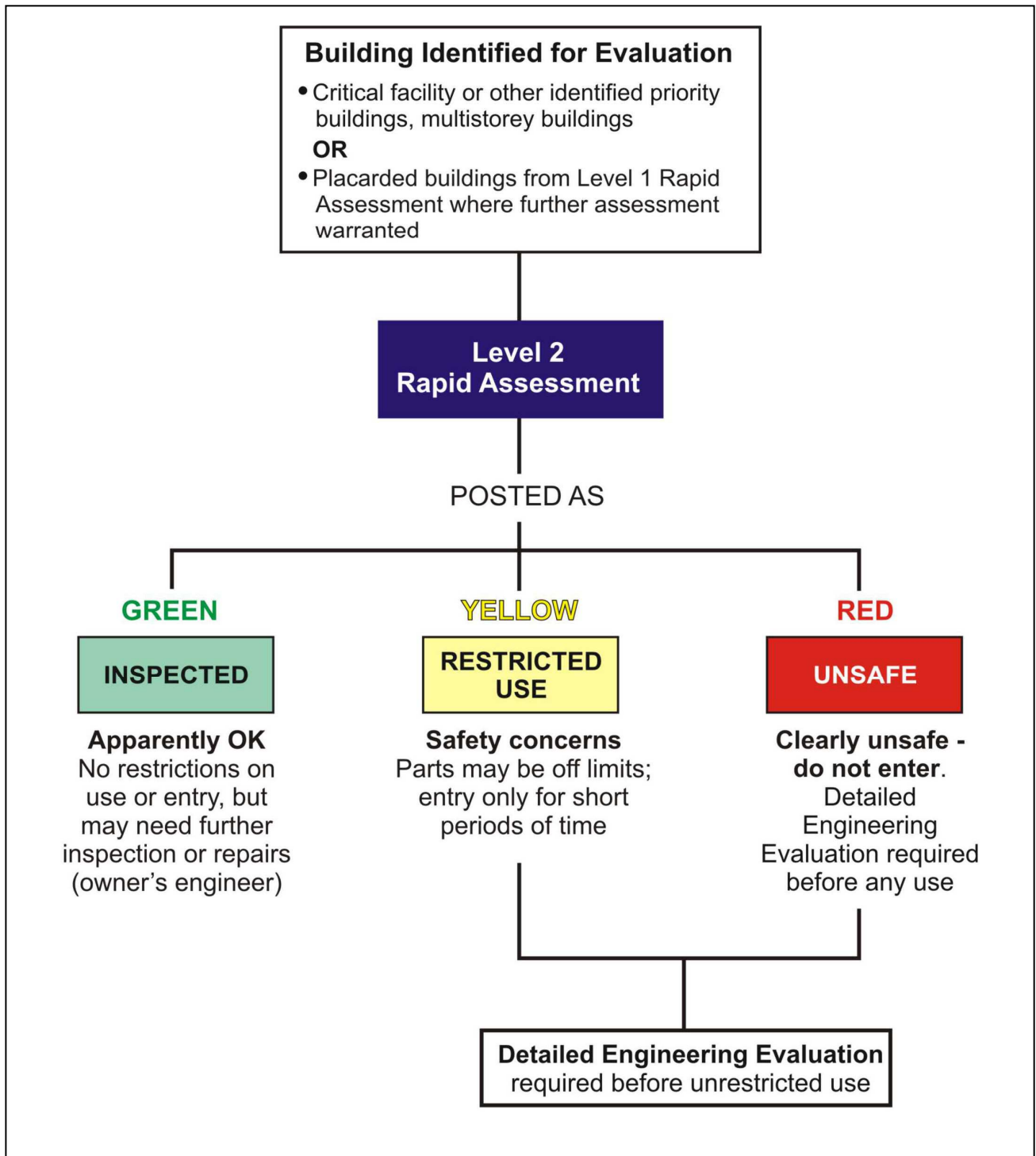


Figure 2: Flow Chart Showing the Level 2 Rapid Assessment and Posting Process

(Adapted from ATC-20)

Section Two: Legal and Regulatory Considerations

2.1 Legal Considerations for Rapid Assessments

The scope of this document is for Rapid Assessments of buildings to be carried out during the period of a state of emergency declared under the Civil Defence Emergency Act 2002 which is summarised below.

Civil Defence Emergency Management Act 2002

The **Civil Defence Emergency Management Act 2002** provides for the formation of Civil Defence Emergency Management Groups. Their members (local authorities) are generally charged with the function of responding to and managing the effects of emergencies in their area (s17(1)(d)).

Civil Defence Emergency Management Groups may *issue and control the use of signs* issued under the Act (s18(2)(c)). Building safety evaluation notices would come into this category where issued by a Controller (appointed under the Act), member of the Police, or person authorised by them during a state of emergency in order to prevent or limit the extent of the emergency (see reference to s92 below).

During a state of emergency, Civil Defence Emergency Management Groups may carry out works, clear roads and other public places, remove, dispose of, *secure or otherwise make safe dangerous structures* and materials (s85(1)).

During a state of emergency a Controller, member of the Police, or person authorised by them may

- require the *evacuation of any premises or place* (including public places), and/or may *exclude people* or vehicles from those places (s86). This can only be done if the Controller or member of the Police believes the action is necessary for the preservation of human life.
- prohibit or restrict public access to *roads and public places* in order to prevent or limit the extent of the emergency (s88)
- *examine, mark, seize, sample, secure, disinfect, or destroy* any property, animal or thing in order to prevent or limit the extent of the emergency (s92). This general power allows for the rapid evaluations described in this document to occur.

It should be noted that the Civil Defence Emergency Management Act does not specifically authorise the entering of premises for the purpose of conducting a safety assessment.

The Civil Defence Emergency Management Act also provides protection from liability for any act or omission of the Crown, Civil Defence Emergency Management Groups (including officers, employees or members of those groups), or other persons, except in cases of bad faith or gross negligence (s110).

Operational implications

Preparation

Territorial Authorities should make preparations for a potential emergency situation, including planning, preparation of resources and training, and undertaking exercises to test preparedness. As part of their business continuity planning, Territorial Authorities should also have established methods of collecting the records produced as a result of inspections and integrating them with their own property databases.

The identification of buildings is critical to the accurate integration of the information provided from evaluations into the Council databases. It must be clear if the inspection and placard relate to a tenancy or part of the building only, or if the building has been evaluated as a whole. This is particularly important in commercial and industrial areas where there may be multiple tenancies in one building.

Training and exercises should reflect the co-operative effort required from a number of sectors. Refer to Section Five for training information.

During the state of emergency

During a state of emergency, those people carrying out inspections will need authorisation from the Controller to:

- carry out the inspections
- issue placards
- require evacuation and/or limit entry to buildings and places

The authority of the Civil Defence Emergency Management Group is also required to direct urgent work to be carried out.

2.2 Legal and Regulatory Considerations Post-Emergency

Once the state of emergency is lifted, the legislation relevant to the safety of buildings reverts to the **Building Act 2004** as summarised below. The placards, placed on the buildings under the authorisation of the Civil Defence Emergency Management Act 2002, have no status under the Building Act 2004.

It is necessary to utilise the powers given by the Building Act 2004 in order to require or effect remedial work after the state of emergency is lifted.

Building Act 2004

The Building Act 2004 has general provisions related to inspections (s222). This allows authorised officers of a Territorial Authority to enter premises for the purpose of determining whether a building is dangerous, earthquake prone, or insanitary. Building owners, occupiers, or persons engaged in building work on the premises must give “all reasonable assistance” to allow an authorised officer to make such inspections. s226 requires that written notice be given prior to entry into a household unit unless invited in by the occupier (s228 requires at least 10 days notice). The Building Act requires particular notices if a Territorial Authority assesses a building to be dangerous, earthquake-prone, or insanitary. The red, yellow and green placards suggested in these guidelines do not constitute official Building Act notices (under s124 and s125). They may however fulfil the purpose of warning notices under s124(1)(b).

Under s131, Territorial Authorities have adopted policies on dangerous, earthquake-prone, and insanitary buildings which state the approach that the territorial authority will take in performing its functions, its priorities in performing those functions, and how the policy will apply to heritage buildings. The policies require review every five years.

Other sections of the Building Act relevant to the period following an event that damages buildings include:

- s17 specifies that *all building work must comply with the building code* but s67 gives Territorial Authorities extensive powers to waive or modify provisions of the building code.

- s41(1)(c)(i) and s42 permit *urgent building work* to commence without obtaining a building consent in advance provided that the owner applies for a *certificate of acceptance* (s96 to s99) from the Territorial Authority as soon as practicable after completion of the building work. A Territorial Authority may issue a certificate of acceptance (s96) only if it is satisfied that the building work complies with the building code.
- s112 specifies what, if any, *upgrading* must be undertaken when a building is being altered. Most repairs of other than superficial damage will require a building consent to be obtained and will trigger the upgrading requirements of s112.
- s124 authorises Territorial Authorities to erect hoardings, fix warning notices to buildings and *give written notice* requiring work to reduce or remove danger or remedy insanitary conditions.
- s125 prescribes *who* the notice must be given to.
- s128 prohibits the use of the building if a hoarding is erected per s124
- s129 authorises Territorial Authorities to take measures to *avoid immediate danger or to fix insanitary conditions*.
- s216 requires Territorial Authorities to *keep information* about buildings. This includes records of evaluations undertaken.
- s233 to s236 provides for the procedure for a Territorial Authority to transfer functions, duties or powers to another Territorial Authority.
- s388 provides a statutory defence against prosecutions for actions taken in emergency situations due to natural disasters *as long the effects of the action are adequately mitigated or remedied after the event*.
- Schedule 1 provides for some building work to be *exempt* from the need to obtain a building consent. This includes item (k) (i), building work that is unlikely to be carried out otherwise than in accordance with the building code. The complete or substantial replacement of any component or assembly contributing to the building's structural behaviour is *not* exempted from the need to obtain a building consent unless the Territorial Authority decides to give an exemption under item (k).

Operational implications before the state of emergency is lifted

As the placards placed on buildings as a result of the rapid assessments undertaken at the direction of the Controller under the Civil Defence Emergency Management Act 2002 have no status under the Building Act 2004, they need to be replaced with notices where there is an ongoing concern that requires building work to reduce or mitigate the danger. The aim should be to issue Building Act 2004 notices in these situations before the emergency declaration is lifted.

The accurate identification of the building at the time of inspection is critical for follow up with Building Act 2004 notices. Although notices under the Building Act 2004 relate to buildings as a whole, the particulars of contravention or descriptions must make it clear if the remedial actions relate to the whole or a part of the building.

The database of information from the records of Rapid Assessments and subsequent Detailed Evaluations undertaken will be invaluable for identifying individual buildings of ongoing concern.

The provisions allowing for a notice to fix (s164) are of little use as there has generally been no breach of the Building Act 2004 to remedy.

The provisions of s124 allowing for dangerous, earthquake-prone, or insanitary building notices to be issued are considered to be the most relevant for this situation. The assessment of a dangerous building under s121 of the Building Act must be considered in the ordinary course of events and not by anticipating a future event such as an earthquake. However, where damage has already occurred, an assessment under s121 can still be used. This means assessing whether the structure of a building that has been weakened has been compromised to the extent that it could no longer carry loads that could be reasonably expected to occur in the normal course of events, including dead and live loads.

The provisions of s124 allow for the issue of an earthquake prone building notice if the residual strength of the building is less than one-third of the strength of a new building. Where a building has been significantly damaged, it may be clear from the Rapid Assessments carried out that the building is earthquake prone. In other cases a more thorough engineering assessment will be required to confirm whether or not the building falls below the earthquake prone building strength threshold.

Territorial Authorities should ensure that the policies adopted by their Council, regarding dangerous, insanitary and earthquake prone buildings address the issue of post disaster recovery by allowing Council officers to issue notices with appropriately short timeframes in these circumstances.

Although s125 requires that notices be issued to building owners, occupiers and those with an interest in the land, the process can be time consuming, particularly for buildings with company or multiple owners. However, s125 (3) provides that the notice is not invalid as long as it is fixed on the building. In emergency circumstances it would be prudent to concentrate on issuing and fixing notices to buildings, following up with notification to others as workload permits. The notice should be prominently displayed on the building, ideally where those entering the building will be warned. Where there are multiple entrances, copies of the notice should be fixed at each entrance.

A notice using s128 of the Building Act is provided in Appendix C for fixing to a fence or hoarding to prohibit the use or occupation of a building.

Operational implications for return to business as usual after the emergency

During the state of emergency and shortly after there may have been building work undertaken as a matter of urgency without first obtaining a building consent. The Building Act 2004 provides for these circumstances by requiring that a certificate of acceptance is obtained as soon as practicable after the work is completed. The scope and detail of work undertaken needs to be documented much as for a building consent and the Territorial Authority needs to decide if the work undertaken complies with the building code. Unlike a building consent, the upgrading requirements of s112 are not triggered by a certificate of acceptance which relates only to the standard of work actually undertaken.

Where a building consent is obtained for remedial work, the upgrading required by s112 is triggered, and the Territorial Authority will need to use discretion about the level of upgrading that is considered reasonably practicable in the given circumstances. Documentation of the approach is important for communication/shared understanding with owners and designers, and consistency of application.

Increased reliance on producer statements is one way of managing the heavy workload. The Territorial Authority should have robust policies for the acceptance of such statements. Producer Statements could be accepted:

- as evidence that work already undertaken complies with the building code as support for an application for a certificate of acceptance, or
- in support of applications for an exemption from the need to obtain a building consent, or
- for approval of building consent on the basis of audit only, or
- to supplement or replace the Territorial Authority inspections of work under a building consent

Work carried out under s112 of the Building Act after the state of emergency has been lifted would be undertaken by contracted engineers, not those working in a voluntary capacity.

Section Three: Management of the Process

3.1 Overview

The rapid building safety evaluation process is undertaken under the direction of the Civil Defence Emergency Management Controller (Group or Local).

Those undertaking inspections must be authorised to do so by the Controller. It is suggested that every person undertaking inspections is issued with an identity card recording this authorisation. A suggested format for such a card is shown in Appendix G.

The arrangements and designations suggested in this section need to be **specifically defined** by each Territorial Authority within their emergency procedures.

3.2 Key Roles

The following table identifies the key roles and primary source of resources envisaged for the Building Safety Evaluation process.

Role	Primary Source of Resources
Building Safety Evaluation Leader	Territorial Authority (Senior Building Control personnel)
Support Staff	Territorial Authority
Sector Co-ordinators	Territorial Authority (Senior Building Control personnel)
Induction & Technical Co-ordinator	Structural engineers
Rapid Assessment Inspectors: <i>Level 1 Rapid Assessment</i> <i>Level 2 Rapid Assessment</i>	Volunteer professional structural engineers, Territorial Authority building control staff, architects and other Licensed Building Practitioners Volunteer professional structural, building services and geotechnical engineers Heritage professionals
Detailed Engineering Evaluation Inspectors	Contracted Professional Engineers

3.3 Resources

Mutual aid agreements should be entered into with one or more distant Territorial Authorities for building control resources, as it must be assumed that some local Territorial Authority staff will be unavailable. They might be away, injured during the event, or unavailable due to their family situations. Arrangements should therefore be made for the provision of suitably qualified persons to come from another Territorial Authority.

The general expectation is that volunteering professional inspection personnel will offer their services for up to three days. The Territorial Authority is expected to ensure that volunteers are reimbursed all reasonable expenses for this period. If their services are required after this time, a contract for service with agreed payment arrangements should be entered into.

3.4 Suggested Operating Structure

The structure chosen must reflect the existing arrangements for inspection within each Territorial Authority.

A suggested operating structure is shown in **Figure 3**. In this model, *Sector Co-ordinators* are appointed for specific building types - for example, critical facilities, commercial and industrial buildings, or domestic and residential buildings. Territorial Authority databases of building stock will help identification and prioritisation of individual buildings.

The owners of many large buildings and those involving critical facilities will have contracted arrangements (Priority Response Agreements) with engineers for post-event evaluation (and are encouraged to do so). The Territorial Authority should endeavour to reach prior agreement with these building owners to supply the details of any evaluations undertaken to avoid duplication, particularly as skilled engineering resource will have limited capacity.

Assessment teams are allocated to a Sector Co-ordinator. However, in some situations it might be more appropriate for each Sector Co-ordinator to control one geographic area. The intelligence from the initial reconnaissance evaluation will assist in identifying the geographic areas needing to be evaluated and help assign a priority to each.

In most cases Sector Co-ordinators will personally manage and receive reports from field assessment teams, but some in the residential area may need deputies, each with responsibility for an area of the damaged region. The severity of the event will determine the number of Sector Co-ordinators and the division of tasks as depicted.

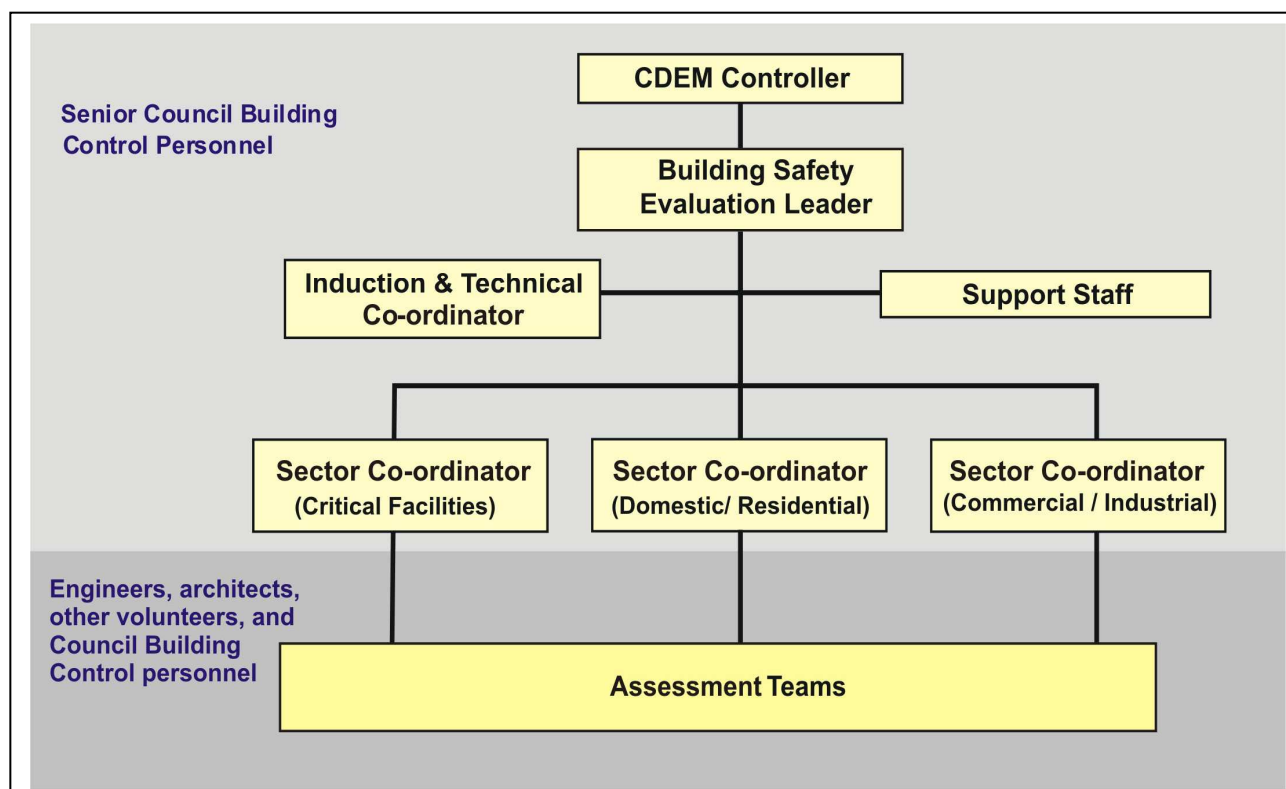


Figure 3: Suggested Operating Structure

3.5 Responsibilities

Key responsibilities for each group or designated role are outlined below. These are to be reflected in Job Descriptions of key Territorial Authority personnel who will fill these roles where practical.

Building Safety Evaluation Leader

The Building Safety Evaluation Leader is responsible for managing the process for the safety evaluation of damaged buildings. This person must be thoroughly conversant with building safety evaluation procedures in order to provide technical leadership to all those participating in the process, and be familiar with the Civil Defence Emergency Management organisational arrangements and operational plans of the affected Territorial Authority, including the relationship between the Controller and the Chief Executive.

During an event, this person will be responsible for:

- the activation of Building Safety Evaluation process
- reporting to the Civil Defence Emergency Management Controller
- appointment and management of Sector Co-ordinators and Support Staff as required
- establishing inspection requirements and shortfalls
- requesting inspection resources as necessary (eg. sourcing volunteers via IPENZ List or from other Territorial Authorities as per mutual aid agreements)
- providing technical leadership
- setting inspection priorities
- liaison with other agencies
- obtaining and promulgating summary reports
- providing advice to the Controller or Chief Executive as appropriate
- liaison with media in accordance with Civil Defence Emergency Management media liaison procedures

Support Staff

- arranging location, support services and resources for the inspection process
- organising facilities, resources, transport, meals etc for field teams
- briefing Council's Call Centre on arrangements and how to handle inspection requests
- establishing and maintaining inspection database inputting records from inspections
- providing communications
- distributing information to the public at the front desk
- maintaining tracking system for assessors
- assisting with hosting of visiting reconnaissance groups

Sector Co-ordinators

- managing inspection teams
- arranging inspection schedules
- reporting on progress to Building Safety Evaluation Leader
- reporting observed non-structural hazards
- confirming critical facilities are being evaluated
- receiving records and plot reported damage on maps

Induction and Technical Co-ordinator

- managing the induction of volunteer inspectors
- ensuring Health & Safety briefing is provided
- organising Personal Protective Equipment (PPE) for inspectors
- providing technical advice when required

- arranging for follow up actions for reported non-structural hazards
- preparing handouts for the public

Rapid Assessment Inspectors

- reporting to Building Safety Evaluation Leader as soon as practical after the event (*family needs, physical access or contractual reasons may impose delays*)
- signing on as acting under the authority of the Controller and be briefed and tasked
- conducting rapid inspections as directed
- providing records each day to Sector Co-ordinators
- alerting Support Staff to any process problems observed

3.6 Record Keeping, Reporting and Plotting

3.6.1 Arrange a method for tracking inspection teams

Inspectors should always work in pairs, and their movements should be tracked for safety reasons. Each assessment team ideally consists of two technical field staff and a person to interact with the occupants (this may be a non-technical person).

A log of assessment teams and their area allocations must be kept, along with personal contact and next of kin details of all field personnel.

3.6.2 Prepare the operation of information management systems

Assessment teams will report on damaged buildings by using the pre-printed assessment forms. A database is to be used to keep records against individual buildings, and to report on trends and summaries. The filing of forms and the transfer of information into a purpose designed database is critical, and is a major task.

The assessment database should record and report on:

- the location of the building, structural damage reports, nature of the placard placed, and the parts of the building any restriction may apply to
- requests for inspection and re-inspection
- non-structural hazards observed
- progress of building assessments, by category, area etc
- key contacts

The fields within the database must reflect the information collected via the Level 1 and 2 Rapid Assessment forms [Appendix A] and Call Centre Operator or Counter Enquiry forms [Appendix E].

In planning for an event which may prevent access to Council databases, it may be necessary to record information from inspections and telephone records in a temporary database to enable collation and reporting in the short term. This temporary database needs to be able to interface with other systems to allow for the accurate transfer back to the Territorial Authority database when functionality is restored. A simple database can be pre-prepared and held on memory stick for use in an emergency.

As reports are received, the summary information needs to be plotted on to maps. The aim is to identify which areas have suffered significant property damage, and to rank those areas in terms of overall severity as a guide to the Civil Defence Emergency Management response, and for prioritising further Rapid Assessments.

Contact must be made at the outset with the Civil Defence Emergency Management Group or Local Emergency Operations Centre (CDEM EOC). Initially, a member of the inspection staff may be sent to the CDEM EOC to act as a liaison person. Subsequent updates in summary and plotted form should be provided regularly to the CDEM EOC.

Damage cost estimates can be calculated from the percentage damage figures, for aggregation at local and regional levels.

Building assessment records may need to be later transferred to other parties, such as insurance companies, involved in restoration work.

3.7 Support Requirements

3.7.1 General

In an emergency situation there are a variety of requirements to be provided by the support staff, which includes:

- Arrange for adequate numbers of support staff
- Arrange for suitable office space and equipment
- Provide necessary resources to all inspectors (pre-prepared)
- Provide transport as required, noting the likely disruption to normal means of transport
- Arrange for support to staff members' families
- Organise the welfare of all staff e.g. catering, accommodation

Inspectors need to be adequately briefed and equipped before being deployed to undertake Evaluations. Where possible, volunteers and Territorial Authority staff should bring their own tools of trade, such as hard hat, high visibility vest, clipboard, dust mask, tape measure, camera, torch etc. Spares and consumables such as batteries must however be provided.

A field manual, provided as part of the induction package, provides guidance as to appropriate actions including appropriate placard postings.

Registration, processing and briefing material is required for all inspectors. A list of other documents and necessary equipment is given in Appendix D.

Support staff must arrange for the following additional resources to make up any shortfall listed in Appendix D:

- placards (from water resistant non-fading material)
- indelible non-fading marker pens
- inspector identification (Appendix G)
- briefing sheets
- assessment forms
- inspector handbooks/field manuals
- maps, including aerial reproductions with street number and legal description layers
- any other detailed information re specific buildings that may be available

Field staff can be expected to be available for up to five days maximum to avoid becoming overstressed, and then be stood down or replaced. The Territorial Authority should take responsibility for providing inspectors with all local transport, accommodation and food.

3.7.2 Prepare adequate communications systems

Each assessment team should have a means of communication such as a cell phone (if networks are operating). Alternatively, an arrangement should be established whereby teams have access to a two-way radio or satellite phone. This may only be possible via a resource such as a liaison person or 'runner' shared with adjacent assessment teams.

It should be assumed that telephone networks may be disrupted for up to two weeks. Once phone lines are restored, and help numbers are advertised, this will attract a high volume of calls between the public and the operations headquarters. The Council's Call Centre will be required to take calls to answer general queries from the public. These will include requests for evaluations of damaged buildings, although in most cases Council will be unable to respond to individual requests. An example of a guidance form for Call Centre operators is suggested in Appendix E.

A front desk facility, where members of the public and/or visiting inspectors can call in, is a useful addition. This centre should normally be established close to, but not within, the Building Safety Evaluation Leader's office area.

Handouts for building owners and occupiers, as described in ATC 20-2, should also be prepared.

3.8 Activation Procedures

3.8.1 Authority and Scope

The persons responsible for the activation and implementation of the Building Safety Evaluation process should be referenced in the Territorial Authority's Civil Defence Emergency Management Plan and response procedures. During a state of emergency, the persons named in those documents act as agents of the Civil Defence Emergency Management Controller.

Following the lifting of the state of emergency, management structures revert to those normally operating within the Council.

3.8.2 Activation

On the basis of initial damage reports, the Civil Defence Emergency Management Controller will request the activation of the building safety evaluation process. It can also be activated by the responsible officer(s) of Council, where evident damage to property demands it.

The Building Safety Evaluation Leader will activate a prepared management structure to facilitate Rapid Assessments, according to the provisions of these Guidelines and the Territorial Authority's specific emergency procedures.

A building safety evaluation co-ordination centre will be opened at the pre-identified facility(s) (refer section 4.5). If damage precludes the use of these facilities, alternative premises must be urgently obtained and the new location advised to the Controller and staff.

All staff with assigned roles should report as directed in their Council plan. For most this will initially be to report to the co-ordination centre or alternative previously identified location. For others, arrangements such as provisions for activation of call trees to receive instructions or the use of radio announcements may be in place.

3.8.3 *Preparation and Briefing of Teams*

Inspectors need to be adequately briefed and equipped before being deployed to undertake assessments.

All inspectors will need to be briefed on the process, lines of communication, responsibilities etc. They will also require appropriate authorisations to carry out the work. Pre-prepared induction packages should be stocked to streamline the process.

3.8.4 *Summary of the Activation Sequence*

- Declaration of a state of emergency under the Civil Defence Emergency Management Act 2002
- Territorial Authority emergency procedures activated, including Building Safety Evaluation Procedures
- Staff report (as they are able given personal circumstances)
- Ascertain broad extent and distribution of property damage from an Overall Damage Survey
- Appoint Sector Co-ordinators and the Induction & Technical Co-ordinator and allocate priority tasks
- Establish inspector resource shortfall and request support
- Check that Level 2 Rapid Assessments of critical facilities are being undertaken by facility operators; arrange for these to be undertaken if needed
- Create and brief assessment teams
- Brief Council's Call Centre on arrangements and how to handle inspection requests
- Activate database
- Commence Level 1 Rapid Assessments on block by block basis
- Record and report progress to the Civil Defence Emergency Management Controller

3.9 **Health & Safety**

Following an event that causes damage to multiple buildings (residential, commercial or industrial), many buildings may be hazardous from potential collapse or the falling of debris, particularly following earthquakes and aftershocks.

Building Safety Evaluation inspectors must be conscious of their own safety and that of their team members at all times. The Building Safety Evaluation Leader must ensure that all reasonable steps are taken on checking that correct personal protective equipment (PPE) is used at all times and inspectors carrying out evaluations are briefed on Health & Safety issues before starting each shift.

Refer to Appendix D for a list of recommended PPE.

Sector Co-ordinators must ensure that the following arrangements and practices are in place to support the assessment teams:

- all inspectors are accounted for daily
- debriefing facilities are made available
- inspectors are well briefed on safety issues
- next of kin details are maintained
- inspectors are replaced after a maximum of five days on duty.

Coping with stress in the field is also a consideration that needs to be carefully monitored. The long hours that inspection teams may be working can be stressful and emotional, and can easily lead to 'burn out'. Encourage inspectors to support each other, and discuss any issues or feelings. Make sure they have adequate rest breaks and eat well.

The Territorial Authority should ensure full legal immunity from civil liability for personal injury, death or property damage caused by non-wilful acts or omissions during their inspections. s110 of the Civil Defence Emergency Management Act 2002 covers only the period of a state of an emergency; other arrangements need to be made for activities after its termination.

Field Safety Tips

- Travel in teams of at least two people
- Wear correct PPE including hard hat, high visibility vest and identification
- Always survey the building exterior completely *if* you have to enter the building
- Avoid any areas where there may be a hazardous substance release or a possibility of a leak – cordon the area
- If gas is smelt, shut off the gas (if possible) and cordon the area
- Avoid downed power lines and any buildings in contact with them
- In case of fire, evacuate the area
- Be alert to falling debris or other hazards
- Take care following earthquakes/aftershocks

Section Four: Planning Before an Event

Specific and ongoing attention by Territorial Authorities to the key elements of the planning framework will ensure successful implementation of the building safety evaluation process. This section provides an overview of key 'readiness' actions, in addition to the requirement to prepare an organisation-specific ***emergency plan for building safety evaluation***.

4.1 Designate Key Personnel

Before an event, a *Building Safety Evaluation Leader* should be assigned and provided with a job description outlining both pre-planning and response requirements (refer to section 3.5). Two or three other local persons qualified for the task of Building Safety Evaluation Leader should also be identified, listed in call-out order and prepared for the responsibility by appropriate training.

The assignment of a primary *Support Staff* member is required to assist the Building Safety Evaluation Leader with pre-planning requirements.

4.2 Assemble Resources

Identification of buildings is critical to the successful input of inspection data back into the Council database and for the issuing of Building Act 2004 notices. Street maps should be prepared, indicating priority areas on the basis of expected damage, including heritage listings. To aid accurate building identification, hard copy sheets on a block by block basis with the latest aerial photographs overlaid with the official street identification and the legal description should be kept. This allows for the event that access to Council computer systems is not available, and to streamline the induction process. Additional single building aerial photos packaged with the block aerials can also be useful in commercial areas.

Each Territorial Authority will also have access to building specific information which may be useful to inspection teams, including construction date, building size, primary structure, significant upgrading work, and any previous evaluation. This level of information may be available as part of the assessment under the Territorial Authority's earthquake prone building policy, any prepared Land Information Memorandum and from other publications regarding building valuations.

The appendices to these Guidelines contain sample forms. Each Territorial Authority should create their own version of these placards and forms, with the addition of authority name, contact details, Council crest and logo etc. For the placards, thought needs to be given to what the appropriate Territorial Authority single point of contact should be.

Hard copy and electronic copies of prepared placards and forms should be kept for immediate reproduction. Consideration should be given to having a certain number of pre-printed adhesive-backed placards in strong colours and assessment forms in triplicate, for the initial stages of a response when power and hence printing and copying facilities may be limited.

4.3 Identify and Locate All Critical Facilities

Critical facilities are those buildings that provide services which the community needs to function effectively, and include hospitals, emergency services and lifeline utility facilities. The location and details of these facilities need to be recorded and available at the operations centre, noting that multiple buildings on a site including unique building identifiers are often involved.

Due to the vital importance to critical facilities of being able to re-occupy their premises to maintain delivery of service, the operators should have specific arrangements (Priority Response Agreements)

in place with staff and/or structural consultants. This requirement is a clear implication of sections 58, 59 and 60 of the Civil Defence Emergency Management Act.

Territorial Authority Building Control and Civil Defence Emergency Management staff should proactively follow up with critical facilities operators to ensure the necessary arrangements are in place.

The forms of output from such inspections should reflect the arrangements to be undertaken by Territorial Authorities as outlined in this guideline, and should extend to procedures for reporting in to the territorial authority. Ideally, structural engineers appointed by Lifeline Utilities and other key agencies should be accredited by Territorial Authorities in such a way that the placards they post have official status, and the information relating to these placards can be directly entered into the Territorial Authorities database.

4.4 Develop a Strategy for Prioritising Rapid Assessments

Critical facilities are the first priority for assessment. Territorial Authorities must provide an inspection resource for Council-controlled critical facilities. The responsibility for arranging building safety evaluations of privately owned critical facilities lies in the first instance with their owners and/ or operators (as noted above).

If it is known that some critical facilities operators have yet to put such arrangements in place, then Territorial Authorities must factor into their plans the need to undertake Level 1 or Level 2 Rapid Assessments of these facilities.

Commercial and industrial buildings can be prioritised using criteria such as:

- proximity to arterial routes
- adjacent pedestrian counts
- density of building
- importance of the enterprise
- presence of hazardous substances
- specific roles in the emergency or recovery phases
- storage or production of essential supplies
- restoration of normal commerce and employment

The priorities will need to be re-assessed using the feedback from the initial *Overall Damage Survey* reconnaissance and *Level 1 Rapid Assessments*. Damage assessment and building posting is ideally undertaken on a block by block basis as this proves more efficient, allowing the inspector to see the building on as many sides as possible.

Domestic and residential areas. Some residential facilities will need priority evaluation in suburban areas. For example: rest homes and other places of accommodation, schools and food distribution centres and apartment buildings. However, evaluation teams should work through the damaged areas, according to the priorities established by the Building Safety Evaluation Leader.

Territorial Authorities should undertake risk assessment studies and identify areas likely to be more severely affected by natural disasters. This damage assessment strategy should be as flexible as possible to respond to unexpected building damage distribution, requests from building owners and occupiers, emergency services such as the Police and Fire Service, and other unexpected situations.

One or more realistic damage scenarios must be adopted in order to appreciate the magnitude of the building safety evaluation task. For example, an earthquake risk assessment study of the Wellington region was undertaken in 1994 on a city by city basis against two possible earthquake scenarios, enabling realistic estimates of the severity, extent and location of building damage. Resource and operational planning requirements can then be assessed from this knowledge base.

4.5 Identify and Arrange for Buildings to Serve as Co-ordination Centre

A central building, expected to be serviceable after a major event, is required. It should accommodate all necessary functions, including gathering of field staff for briefing and debriefing meetings. An alternative facility should also be identified and prepared. It may be part of the Emergency Operations Centre (EOC) building, detailed in the CDEM Group Plan (and Territorial Authority Plan), or should at least be close to the EOC to enable sharing of briefings. Ideally, both the EOC and the Co-ordination Centre share the same communications and information management systems.

4.6 Plan for Requesting and Co-ordinating Additional Personnel

In a major emergency, local resources will prove inadequate. Territorial Authorities are responsible for requesting technical personnel and co-ordinating their efforts to ensure they are being allocated in accordance with a pre-planned priority strategy. Lists of locally available and qualified inspectors need to be at hand. These may be maintained *either* as lists of individuals *and/or* as contact points for professional and other associations. Records must be arranged according to the types of skills required. Selection from the Institution of Professional Engineers (IPENZ) List of Engineers for Emergency Response would assure a standard level of engineering qualifications, and will identify the level of training (and experience) of individuals.

An important element in maximising the numbers of professional engineers that make themselves available to undertake Rapid Building Safety Assessments is to ensure that liability issues are fully addressed. It is for this reason in particular that the scope of these Guidelines is limited to “building safety evaluation during a state of emergency, declared under the Civil Defence Emergency Management Act 2002”.

As volunteering engineers in this situation are working for the Territorial Authority, an agreement between the engineer (typically as a volunteering individual) and the Territorial Authority is required. As well as indicating that all liability in this special situation must remain with the Civil Defence Emergency Management Controller, the agreement should outline the expectations around the extent (duration) of volunteer commitment. As noted in section 3.3, the general expectation is that volunteering inspection personnel will offer their services for up to three days.

A sample Memorandum of Understanding for engineers volunteering in a state of emergency situation is provided in Appendix F.

4.7 Develop Linkages with Other Parties

There must be as much mutual agreement and co-operation as possible between all affected parties, including building insurers and the Earthquake Commission (EQC), who play a critical role in the recovery phase. Duplication of technical and administration resources must be minimised. The territorial authorities should also form linkages with selected contractors, local and distant, who can undertake temporary shoring works and building demolition. The maintenance of linkages should be ongoing, with contacts reviewed and updated at least annually.

4.8 Arrange for Ongoing Training and Exercising

Training exercises should be arranged at least annually for appropriate Territorial Authority staff, and as many other potential volunteer inspectors as possible. It is an opportunity to reinforce the linkages with engineers and ensure that contacts are updated regularly.

4.9 Pre-planning and Maintenance Checklist

Priorities

- ☐ Identify and locate all critical facilities, and premises storing or utilising hazardous substances
- ☐ Consider a strategy for prioritising Rapid Assessments
- ☐ Establish realistic risk damage scenarios
- ☐ Identify and arrange for buildings to serve as co-ordination centres
- ☐ Ensure Earthquake Prone Building records and files are up to date

Resources

- ☐ Mutual aid agreements for additional building control and other resources in place
- ☐ List locally available qualified inspectors
- ☐ Contracts for emergency work (shoring, demolition, hoardings etc)
- ☐ Establish and maintain list of critical facilities with priority response agreements in place

Roles and Responsibilities

- ☐ Identify key roles
- ☐ Prepare the operating structure and identify support staff
- ☐ Define specific roles and responsibilities (from section 3.2 and 3.5)
- ☐ Plan for requesting and co-ordinating volunteer inspectors
- ☐ Develop linkages with other parties
- ☐ Arrange for annual inspector training

Reporting

- ☐ Specify assessment team composition and reporting procedures
- ☐ Establish information management systems to capture data and provide reports (temporary), including plotting

General Support Requirements

- ☐ Arrange for suitable office space and equipment
- ☐ Assemble background information for inspections (maps and building specific information)
- ☐ Prepare and stockpile forms and placards
- ☐ Prepare information for the public as handouts
- ☐ Provide for necessary resources to all inspectors
- ☐ Prepare induction packages
- ☐ Make arrangements for adequate communications (temporary telephones, radios etc)
- ☐ Arrange on-going training of administrative staff
- ☐ Establish a method of tracking inspectors

Activation Procedures

- ☐ Authority and scope clearly defined (eg. linkage back to Territorial Authority Emergency Procedures and Civil Defence Emergency Management Group plan)
- ☐ Activation arrangements established and communicated
- ☐ Priority sequence of key initial activities identified
- ☐ Areas of likely greatest property damage identified

Section Five: Training Modules

There are several components to the training package associated with the Building Safety Evaluation process. They are organised under the headings of *Introductory*, *Advanced* and *Induction*.

5.1 Introductory Training

Overview

This one-hour module is aimed at giving Civil Defence Emergency Management Group staff and Emergency Services representatives an overview of what is involved in the Building Safety Evaluation process, and how it links in with their activities.

The contents cover:

- (i) Overview
- (ii) Evaluation Procedures
- (iii) Management of the Process
- (iv) Roles and Responsibilities (including safety)

Process Management

The two-hour Process Management module incorporates 'on the day' requirements for Building Control Managers and Engineers who may have a leadership role during the Building Safety Evaluation process, and Civil Defence Emergency Management personnel who need to know how the process operates. It also highlights planning that should be carried out by Territorial Authorities and designated Building Safety Evaluation personnel prior to an event.

The contents cover:

- Overview – Objective, Purpose, Critical Facilities
- Key Roles
- Activation Process
- Operating Structure
- Deployment & Field Process
- Preparatory Work Required

Evaluation Procedures

The four-hour Evaluation Procedures module summarises the procedures required for inspection teams to carry out Rapid Assessments. It is aimed at members of assessment teams e.g. Building Control Officials, Engineers, Architects and Building Contractors.

The contents cover:

- Introduction
- Operating Structure - Roles
- Level 1 Rapid Assessment - Step by Step
- Procedure for Posting Placards
- Level 2 Rapid Assessment
- Hazards

Key Structural Principles: Types of Construction and their Failure Modes

This module provides an overview of structural engineering basics including the different types of construction of buildings. The areas of distress and damage that may occur, particularly after a major earthquake, are highlighted.

The course manual will be in the form of a Field Guide to provide field inspectors with a reference module to refresh themselves on structural types and likely failure modes.

This module is aimed at members of field inspections teams e.g. Building Control Officials, Engineers, Architects and Building Contractors.

5.2 Advanced Training

Advanced training modules for designated Building Safety Evaluation Leaders, Sector Co-ordinators and Induction and Technical Co-ordinators are under consideration for development.

5.3 Induction Module

A standard induction module has been prepared for briefing field inspection teams prior to their initial deployment in a declared emergency, and will be made available to each Territorial Authority.

A training strategy for delivering these modules and co-ordinating annual refresher training is under development.

Appendix A:

Safety Assessment Forms

RAPID Assessment Form - LEVEL 1

Inspector ID		Date of Inspection		Areas Inspected	
Authority		Time AM/PM		Exterior Only	
				Exterior and Interior	

Building Name

Also known as

Description Lot DP

Other ID

Contact Name

Contact Phone

Storeys above ground ☐ Below ground ☐

Avg. area (m²)

No of residential units

Photo Taken Yes No No.

Address

Type of Construction

<input type="checkbox"/> Timber frame	<input type="checkbox"/> Concrete shear wall
<input type="checkbox"/> Steel frame	<input type="checkbox"/> Un-reinforced masonry
<input type="checkbox"/> Tilt-up concrete	<input type="checkbox"/> Reinforced masonry
<input type="checkbox"/> Concrete frame	<input type="checkbox"/> Other:

Primary Occupancy

<input type="checkbox"/> Dwelling	<input type="checkbox"/> Commercial/ Offices
<input type="checkbox"/> Other residential	<input type="checkbox"/> Industrial
<input type="checkbox"/> Public assembly	<input type="checkbox"/> Government
<input type="checkbox"/> School	<input type="checkbox"/> Heritage Listed
<input type="checkbox"/> Other:	

Investigate the building for the conditions listed and check the appropriate column Estimated building damage (exclude contents)

Observed Conditions

Minor/None Moderate Severe

Collapse, partial collapse, off foundation

Building or storey leaning

Racking damage to walls, other structural damage

Chimney, parapet or other falling hazard

Ground slope movement or cracking

Other* (specify)

Comments:

<input type="checkbox"/> None
<input type="checkbox"/> 0-1%
<input type="checkbox"/> 2-10%
<input type="checkbox"/> 11-30%
<input type="checkbox"/> 31-60%
<input type="checkbox"/> 61-99%
<input type="checkbox"/> 100%

* investigate site hazards such as gas, electricity, sanitary sewer, stormwater or hazardous materials/processes

Choose a posting based on the evaluation and team judgement.

Severe conditions affecting the whole building are grounds for an UNSAFE posting.

Localised **Severe** and overall **Moderate** conditions may require a RESTRICTED USE posting.

Place INSPECTED placard at main entrance. Post all other placards at every significant entrance.

INSPECTED <input style="width: 40px; height: 30px;" type="checkbox"/>	RESTRICTED USE <input style="width: 40px; height: 30px;" type="checkbox"/>	UNSAFE <input style="width: 40px; height: 30px;" type="checkbox"/>
GREEN	YELLOW	RED

Record any restriction on use or entry

Tick the boxes below only if further actions are recommended:

<input type="checkbox"/> Barricades are needed (state location):	
<input type="checkbox"/> Level 2 or Detailed Engineering Evaluation recommended:	<input type="checkbox"/> structural <input type="checkbox"/> geotechnical <input type="checkbox"/> other:
<input type="checkbox"/> Other recommendations, comments	

Sign here on completion

RAPID Assessment Form - LEVEL 2

Inspector ID		Date of Inspection		Inspected		Restricted Use	
Authority		Time AM/PM		Unsafe			

FINAL POSTING from Pg. 2

Building Name

Also known as

Description Lot DP

Other ID

Contact Name

Contact Phone

Storeys above ground ☐ Below ground ☐

Avg. area (m²)

No of residential units

Photo Taken Yes No No.

Address

Type of Construction

<input type="checkbox"/> Timber frame	<input type="checkbox"/> Concrete shear wall
<input type="checkbox"/> Steel frame	<input type="checkbox"/> Unreinforced masonry
<input type="checkbox"/> Tilt-up concrete	<input type="checkbox"/> Reinforced masonry
<input type="checkbox"/> Concrete frame	<input type="checkbox"/> Other:

Primary Occupancy

<input type="checkbox"/> Dwelling	<input type="checkbox"/> Commercial/ Offices
<input type="checkbox"/> Other residential	<input type="checkbox"/> Industrial
<input type="checkbox"/> Public assembly	<input type="checkbox"/> Government
<input type="checkbox"/> School	<input type="checkbox"/> Heritage Listed
<input type="checkbox"/> Other:	

Investigate the building for the conditions listed and check the appropriate column. A sketch may be added on pg. 2

Overall Hazards	Minor/None	Moderate	Severe	Comments
Collapse or partial collapse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Building or storey leaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Structural Hazards				
Foundations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Roofs, floors (vertical load)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Columns, pilasters, corbels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Diaphragms, horizontal bracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pre-cast connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non-structural Hazards				
Parapets, ornamentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cladding, glazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ceilings, light fixtures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Interior walls, partitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elevators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stairs/ Exits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Utilities (e.g. gas, electricity)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Significant fire safety concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Geotechnical Hazards				
Slope failure, debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground movement, fissures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General Comments				

Adapted from ATC-20

[illegible]

--

UNSAFE

RED

Appendix B:

Recommended Placards

Insert Council
Crest & Contact
phone number

INSPECTED

NO RESTRICTION ON USE OR OCCUPANCY

This building has received a brief inspection only. While no apparent structural or other safety hazards have been found, a more comprehensive inspection of the exterior and interior may reveal safety hazards.

- ☐ Exterior Only
- ☐ Exterior and Interior

Facility/ Tenancy Name and Address

Please ensure the owners are advised of this notification. Owners are encouraged to obtain a detailed structural engineering assessment of the building as soon as possible. Report any unsafe conditions to the Territorial Authority. Subsequent events causing damage may change this assessment. Re-inspection may be required. Secondary damage (partitions, windows, fittings and furnishings) may be hazardous. Electrical and mechanical equipment, gas connections, water supplies and sanitary facilities have not been inspected.

Do Not Remove this Placard. Placed on Behalf of the Civil Defence Emergency Management Controller Under the Authority of the Civil Defence Emergency Management Act 2002

This facility was inspected pursuant to the Civil Defence Emergency Management Act 2002

Inspector ID:

Acting under the authority of the Civil Defence Emergency Management Controller:

Date: _____

Time: _____

Insert Council
Crest & Contact
phone number

RESTRICTED USE

NO ENTRY EXCEPT ON ESSENTIAL BUSINESS

WARNING:

This building has been damaged and its structural safety is questionable. Enter only at own risk. Subsequent aftershocks or other events may result in increased damage and danger, changing this assessment. Re-inspection may be required. The damage observed from external inspection is as described below:

Restrictions on use:

- No public entry or residential occupation
- Entry for
 - ☐ Emergency purposes
 - ☐ Damage assessments, making safe
 - ☐ Removal of essential business records
 - ☐ Removal of valuables only
 - ☐ Removal of property
 - ☐ Conducting essential business with minimum staff

- ---

Facility/ Tenancy Name and Address

This facility was inspected pursuant to the Civil Defence Emergency Management Act 2002

Inspector ID:

Acting under the authority of the Civil Defence Emergency

Management Controller:

Date:

Time:

Do Not Remove this Placard. Placed on Behalf of the Civil Defence Emergency Management Controller
Under the Authority of the Civil Defence Emergency Management Act 2002

Insert Council
Crest & Contact
phone number

UNSAFE

DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)

WARNING:

This building has been seriously damaged and is unsafe. Do not enter. Entry may result in death or injury. The damage observed from external inspection is as described below :-

Enter only with specific written authorisation from Territorial Authority acting under the authority of the Civil Defence Emergency Management Controller.

Facility/ Tenancy Name and Address

**Do Not Remove this Placard. Placed on Behalf of the Civil Defence Emergency Management Controller
Under the Authority of the Civil Defence Emergency Management Act 2002**

This facility was inspected pursuant to the Civil Defence Emergency Management Act 2002

Inspector ID:

Acting under the authority of the Civil Defence Emergency Management Controller:

Date: _____

Time: _____

Appendix C:

Notice for Hoarding Preventing Building Occupancy

Red

DO NOT ENTER

Pursuant to s 128 of the Building Act 2004

**THIS BUILDING IS CONSIDERED TO BE A
DANGEROUS BUILDING UNDER
SECTION 124 OF THE BUILDING ACT
2004**

**NO ENTRY IS PERMITTED WITHOUT
SUPERVISION BY A QUALIFIED
ENGINEER**

Do not remove this notice

Placed by order of the Territorial Authority

Appendix D:

List of Essential Items to be Provided to Assessment Teams

- Hard hat, high visibility vest (eg Orange colour AS/NZS 4602), steel-capped boots or shoes
- Official identification/authorisation to enter properties (secure clip-on badges, lanyard or similar)
- Field manual
- Street maps, aerial photographs and building specific information etc
- Forms for Rapid Level 1 and 2 building assessments
- Placards
- Security cordoning tape
- Thumb tacks and masking tape for placards
- Briefing Sheets:
 - outline procedures
 - reporting requirement
 - contact points (etc)
- Office supplies
 - Clip boards (inside plastic bag big enough to write inside when raining)
 - Pens and pencils
 - Spare batteries including means of re-charging electronic equipment
 - Indelible marker pens

Supplies of the following to supplement personal equipment supplied by volunteers

- Cell phones (where possible) with digital camera
- Torch and batteries
- Hard hats
- Personal protective clothing (gloves, dust masks, wet weather gear)
- Tape measures
- Bag to carry supplies and keep them dry

Appendix E:

Example Council Call Centre Operator's Form

Standard Approach For Assisting With Building Safety Enquiries

If the question is in relation to building safety:

1. Council is co-ordinating building safety evaluations in the areas where significant damage is reported, and our resources are fully stretched
2. The immediate priority is buildings which serve an important community function, such as operational facilities and buildings capable of temporarily housing large numbers of people
3. Read out the current message from the Civil Defence Emergency Management Controller in relation to buildings.

If the caller is requesting Council to inspect their premises:

4. We are unable to respond to individual requests for safety inspections unless they are an immediate priority
5. If you are unsure about the safety of your building, please try to find an alternative location until you can arrange for an assessment of your building

While we cannot offer direct assistance, we are happy to record key information about your property and its damage. This information will be useful in assessing the overall impact on the City/ District, and may result in priorities being changed.

1. What is the address of the building?
2. What is your name?
3. What is your contact telephone number?
4. Are you the: Owner ☐ Tenant ☐ Other ☐
Other Agency? (e.g.) Fire ☐ Police ☐ Water, Gas or Electricity ☐
5. How is the building used? Dwelling ☐ Apartments ☐ Commercial ☐
School ☐ Office ☐ Government ☐
6. How many storeys above ground?
7. What kind of construction is your building?
Timber frame ☐ Masonry/Concrete ☐ Steel ☐ Other ☐
8. Has any part of your building collapsed? (Yes/No)

9. Is any part of your building leaning or off the foundation? (Yes/No)
10. Is there any falling hazard? (Yes/No)
11. Are there large cracks in the structure? (Yes/No)
12. Are any of your services damaged? Water (Yes/No) Sewerage (Yes/No)
- Electricity (Yes/No) Gas (Yes/No)

If yes for *Electricity or Gas*; Please contact your Supplier

13. Is your building in any danger from buildings next door? (Yes/No)

Does it endanger other buildings? (Yes/No)

14. Does the ground have any settlement or any cracks? (Yes/No)

15. Please contact your insurer. (Note down if person says they are not insured)

If you have any further questions please call [*council agency*] at [*phone number or location*]

Taken by:

Date: Time: _____ am _____ pm

Appendix F:

Example Standard Memorandum of Understanding Form for Territorial Authorities and Volunteering Engineers

The Memorandum of Understanding form on the following pages was produced by representatives from:

- Association of Consulting Engineers NZ
- Institution of Professional Engineers NZ
- Local Government New Zealand
- Ministry of Civil Defence & Emergency Management

The form has received approval in principle from territorial authority insurer RiskPool, and from the Board of ACENZ.

A background paper that provides further explanation of the key elements of this Memorandum of Understanding is available from the Institution of Professional Engineers New Zealand.

MEMORANDUM OF UNDERSTANDING FOR ENGINEERS VOLUNTEERING TO ASSIST TERRITORIAL AUTHORITIES IN A STATE OF EMERGENCY

The Purpose of this form is to provide standard agreement conditions for engineer volunteers to assess the safety of structures during a State of Emergency

A THE PARTIES

Between:
 (Name of Building Safety Evaluation Leader, for Local Authority)

And:
 (Name of Person Engaged, and Qualifications)

Situation:

Location:

B SCOPE & NATURE OF THE SERVICES: (Delete those that do not apply)

1) Rapid Assessment of safety of structures as per NZSEE Guidelines

2) Or specify below:

C DURATION OF SERVICES:

Start Date: until date; or for the maximum period of three days
 or until the Local Authority notifies the Engineer that the State of Emergency is over (if a shorter duration).

D INFORMATION OR SERVICES TO BE PROVIDED BY THE LOCAL AUTHORITY:

- a) *The Local Authority will provide the Engineer with means of identification to authorise them to undertake this work;*
- b) *The Local Authority will ensure the Engineer has, or is provided with, appropriate safety equipment, and will be supported by at least one other person for safety in the field;*
- c) *The Local Authority will ensure the Engineer is provided with standard report forms and signage as required;*
- d) *The Local Authority will have procedures in place for tracking deployed engineers;*
- e) *The Local Authority will ensure that the Engineer is briefed by the Building Safety Evaluation team as to procedures for this Local Authority;*
- f) *The Local Authority will actively advise building owners that specific detailed engineering inspections are to be subsequently and separately arranged by the owners*

ADDITIONAL:

E INFORMATION OR ACTIONS BINDING ON THE ENGINEER:

- a) *The Engineer will follow instructions from the CDEM Controller, as provided by the Building Safety Evaluation Leader and by Emergency Services personnel.*
- b) *The Engineer verifies that the qualifications stated above and in relation to prior training are correct;*
- c) *The Engineer will not operate outside their field of expertise, unless under the supervision of another suitably qualified engineer;*
- d) *The Engineer will not pass judgement on any facility that is known to be covered by a Priority Response Agreement unless this is specified under (B) above;*
- e) *The Engineer will not release confidential information received in the execution of these duties to any other party, or for any other purpose save Building Safety Evaluation for this State of Emergency;*
- f) *The Engineer will not talk to the Press or make any public statement during the work.*

ADDITIONAL:

<p>F SPECIAL CONDITIONS: <i>Additional conditions that relate to this situation or services may be specified here.</i></p>

<p>G PRIOR TRAINING: The Engineer confirms that they have attended prior training sessions on post-earthquake building safety evaluation procedures YES/NO If YES, specify date of last course _____</p>
--

H SIGNED BY:	
FOR LOCAL AUTHORITY ON BEHALF OF THE CONTROLLER: NAME: SIGNATURE: DATE:	FOR ENGINEER: NAME: SIGNATURE: DATE:

NOTES TO MEMORANDUM OF UNDERSTANDING

1. The Local Authority and the Engineer agree that the services are acquired during a state of local or national Emergency declared under the Civil Defence Emergency Management Act 2002 and relate only to the special case for procuring rapid assessments of safety of structures.
2. This Agreement is for provision of engineering services to a Local Authority for the purpose of assisting in assessment of safety of structures. It does not apply to those personnel working for an Urban Search And Rescue Task Force, or other rescue team.
3. It is understood by both parties that these Services are provided in a voluntary capacity for the duration as specified above, under conditions of a state of emergency. There will be no remuneration for this work. Expenses incurred for travel and accommodation will be met by the Local Authority.
4. Should work proceed beyond the duration indicated or for purposes other than emergency response, a commercial contract must be signed.
5. The Engineer shall perform services for assessment of safety of structures in accordance with Building Safety Guidelines as produced by NZSEE [or other system of classification specified]. No other services shall be supplied without express instructions from the Local Authority.
6. In providing the services, the Engineer shall exercise skill, care and diligence expected of a competent professional. The Engineer should advise the Local Authority of any training or knowledge they have of building assessment systems as in (5) above.
7. The Local Authority shall assist in providing to the Engineer the co-operation of other emergency management personnel and equip him/her as appropriate. This includes providing identification and safety equipment, and providing induction in the Local Authority's emergency procedures, as in (D) on reverse.
8. The Local Authority will ensure that the Engineer is accompanied by another person (not necessarily an engineer) and that communication and tracking procedures are explained and accepted by the Engineer and his/her accompanying person.
9. The Engineer undertaking these tasks is aware of the special safety issues associated with entering or approaching the building or other structure.
10. The Local Authority shall provide to the Engineer, any information in its power to obtain which may relate to the services. Neither the Engineer nor Local Authority will be liable for operating without full information, where it would be impractical to obtain it within the time frame necessary to complete the assessment.
11. The Engineer is protected from liability under Section 110 of the Civil Defence Emergency Management Act 2002 in respect of his or her services carried out under the direction of the CDEM Controller, including liability for Health and Safety.
12. The Engineer shall not be considered liable for any loss or damage resulting from any occurrence during the period where the services are undertaken under the direction of the CDEM Controller.
13. The Engineer will not assume any obligation as the "Client's Agent" or otherwise pursuant to the Health and Safety in Employment Act arising out of this engagement. The Local Authority will be the person who controls the place of work. The Engineer will act in a considered manner regarding his/her own safety in any area which is, by measure of the emergency situation, a hazardous area.
14. The provisions of the Consumer Guarantees Act 1993 do not apply.
15. Either party may suspend all or part of the services by notice to the other party. It is understood that these services are undertaken under emergency conditions and circumstances as to the Engineer's availability, the nature of the situation or the requirements of the controlling authority, may change.
16. This Agreement is governed by New Zealand law; the New Zealand courts have jurisdiction in respect of this Agreement.

Appendix G:

Suggested Format for Authorised Identity Card

Face of card

Name: _____ is authorised under the Civil Defence Emergency Management Act 2002 to:	
<ul style="list-style-type: none">• Inspect buildings• Issue signs• Secure structures• Evacuate premises	<div style="border: 1px solid black; padding: 5px; text-align: center;">Affix Photograph</div>
Identification number: _____	
Signature: _____	
Authorised by the Civil Defence Emergency Management Controller:	
Signature: _____ Date: _____	

Reverse of card

Authorised under the Civil Defence Emergency Management Act 2002 to:
<ul style="list-style-type: none">• Inspect buildings to prevent or limit the extent of the emergency• Issue signs (placards) to prevent or limit the state of emergency• Secure or otherwise make safe dangerous structures and materials• Evacuate premises or exclude people (hoardings and cordoning) if necessary for the preservation of human life• Restrict public access to roads and public places (cordoning) to prevent or limit the extent of the emergency

Appendix H:

Bibliography

ATC-20 *Procedures for Post-earthquake Safety Evaluation of Buildings*, Applied Technology Council, Redwood City, California, 1989.

ATC-20-1 *Field Manual: Post-earthquake Safety Evaluation of Buildings, Second Edition (revised in 2005)*, Applied Technology Council, Redwood City, California, 2005.

ATC-20-2 *Addendum to the ATC-20 Post-earthquake Building Safety Procedures*, Applied Technology Council, Redwood City, California, 1995.

ATC-20-3 *Case Studies in Rapid Post-earthquake Safety Evaluation of Buildings*, Applied Technology Council, Redwood City, California, 1997.

Post-disaster Safety Assessment Plan: Local Building Officials' Guide to the Activation and Utilization of Safety Assessment Volunteers, State of California Governor's Office of Emergency Services, (unpublished) Sacramento, California, 1992.

Building Act 2004

Civil Defence Emergency Management Act 2002