

**REPORT INTO BUILDING SAFETY EVALUATION  
PROCESSES IN THE CENTRAL BUSINESS DISTRICT  
FOLLOWING THE 22 FEBRUARY 2011 EARTHQUAKE**

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**LIST OF ABBREVIATIONS**

CBD	Central business district
CDEMA	Civil Defence Emergency Management Act 2002
CDEMG	Civil Defence Emergency Management Group
CERA	Canterbury Earthquake Recovery Authority
CPEng	Chartered Professional Engineer New Zealand
SOE	State of emergency

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## 1. INTRODUCTION/CONTEXT

### 1.1 Background

This report provides information about the role of the Christchurch City Council ("Council") in the building safety evaluation process during the state of national emergency following the 22 February 2011 earthquake. It deals with events and processes up until the end of the state of emergency on 30 April 2011.

The information provided in this report has been collated from a variety of sources, including interviews with various Council staff members and other personnel involved in the emergency response.

While the Council has endeavoured to ensure the information included in this report is as accurate as possible, time has elapsed since the events described in the record and recollections will differ. This report of necessity covers events only in general terms. It is also important to note that while the emergency response procedures described in this report were followed in most instances, there were inevitably variations in such procedures.

This report provides the Council's perspective of the emergency response. In addition, there were many other organisations and persons that had a significant role in the response. Examples include the National Controller, USAR, the Fire Service, the Police, the Military, the Ministry of Health and Environment Canterbury.

The role of the Council in respect of the building evaluation response following the 22 February 2011 earthquake was fundamentally different from the role taken after 4 September 2010 for many reasons, including that:

- The 22 February 2011 earthquake caused substantial loss of life and other casualties, so early response efforts concentrated on rescue.
- It was readily apparent that damage was so serious and widespread that broad cordons were placed around the CBD, making building evaluation impossible, as well as superfluous, for the purpose of reoccupation. Building evaluation for safety assessment for those conducting rescues, and later deconstruction and demolition work, in the central area did occur, but this necessarily had a different focus to the rapid assessment/placarding process carried out post 4 September. Conversely, there was more demand outside the CBD for the assessment of buildings for safe reoccupation.
- From 10.30am on 23 February 2011, a national state of emergency was in force, which meant that the Council officers operated under the direction and authority of the National Controller as part of the emergency response.
- Prior to the February earthquake, many building owners had developed relationships with their own earthquake engineers, as a result of the 4 September earthquake.

Again this report only covers the Council's role in the building evaluation response during the state of emergency following the 22 February 2011 earthquake. The Council also had many other roles in the earthquake response, including for example water and sewer repairs, responding to welfare needs and operating welfare centres, repairing damaged roads and carrying out its general obligations as an employer and building owner. In addition, the processes discussed in this report were carried out against a background of disruptions caused by ongoing and significant aftershocks.

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## 1.2 Immediate Events Following the 22 February 2011 Earthquake

The earthquake, with a magnitude of 6.3, struck at 12.51pm on Tuesday 22 February. In the next 7 hours, five aftershocks with magnitudes ranging from 5.0 to 5.7 were recorded. A state of local emergency was declared at 2.45pm on 22 February. At 10.30am on Wednesday 23 November, a National State of Emergency (NSE) was declared under section 66 of the CDEMA. The result of such a declaration is that the state of local emergency ceased to have effect.

Immediately after the 22 February earthquake, a team of Council officers (30-40 people) gathered at the Art Gallery. There were no immediate preparations for building evaluation. It was apparent that there was loss of life, that people were trapped in buildings, and rescue operations had to be commenced. Many buildings were clearly unstable. There were aftershocks and building debris was still falling. So far as initial building assessments were concerned, these were targeted primarily at safety assessments to avoid further loss of life or injury. The emphasis was on removing people and cordoning off the CBD completely.

The Police had control of the CBD and by the evening of 22 February there was a comprehensive cordon around the Four Avenues, taking in the CBD. USAR teams were operating within this cordon.

## 2. BUILDING EVALUATION PROCESSES<sup>1</sup>

### 2.1 Operation Shop

Once the CBD was cordoned, the priority for the Council from a building evaluation perspective was Operation Shop. This involved the rapid assessment of about 400 buildings outside of the CBD such as supermarkets, pharmacies, petrol stations and other premises suitable for welfare centres.

Teams conducting Operation Shop included at a minimum one CPEng engineer. The teams were looking for buildings to use or clear for use. The emphasis was on looking for buildings that had essential services, and could be entered safely; not on general assessments. So, for example, in a suburban area the pharmacy, dairy and service station would be checked, but the hairdresser and newsagent may not be checked.

Operation Shop was completed by 2pm on Friday 25 February. Ten buildings were red stickered.

### 2.2 CBD Building Evaluations

Inspection of buildings within the CBD cordon commenced after some initial planning in which the Kestrel Group (which had been involved after the September earthquake) had a significant role. Grids were organised, and Council officers

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<sup>1</sup> The Council notes that the building evaluation process followed post 22 February 2011 is also discussed in Section 4.2 of the Ministry of Civil Defence and Emergency Management's October 2011 report to the Royal Commission (**ENG.MCDEM.0001**); and in the New Zealand Society for Earthquake Engineering's September 2011 report to the Commission (**ENG.NZSEE.0001**).

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continued with organisation and the collation of returned information. Rapid building assessments (rather than assessments for rescue and injury prevention) began on Friday 25 February.

There were initially about 100 engineers involved, reducing to about 20 engineers at the end of March. These engineers were not Council employees nor contracted to Council, though they were warranted as discussed in Section 2.5 of this Report.

Building evaluation teams consisted of two or three engineers, including CPeng engineers, and a USAR person. Initially Council building inspectors were involved in these teams, but as more engineers arrived from other centres, the "value add" of the Council building inspectors was reassessed. It was considered that the building inspectors would be more usefully employed in conducting residential assessments, so they were reassigned to Operation Suburb, which is discussed below.

The order of assessment was determined by grid blocks, and teams were provided with plans showing title boundaries, street addresses and Council property numbers.

Level 1 assessments were carried out for all CBD buildings where there was no immediate fall danger from other buildings (for example, not in the fall zone of the Hotel Grand Chancellor).

Level 1 assessments were followed by Level 2 assessments on yellow placarded buildings, then green placarded buildings and finally on red placarded buildings.

Because of access issues, this was not necessarily a sequential process. Level 1 assessments were still being carried out (or had not commenced) for some buildings, while Level 2 assessments were being carried out for others.

Building evaluation teams reported back to Council Officers who were compiling the register of Critical Buildings (see below) and to the Demolition Team. Also, in some cases engineers retained by owners were carrying out assessments of particular buildings.

### **2.3 Operation Suburb**

Operation Suburb began as Operation Shop was being completed. The purpose was primarily to identify residential buildings which should not be occupied and to assist with any welfare needs of the building occupants. The assessment teams generally included a building inspector or engineer and representatives from EQC and welfare organisations. At its peak, about 1,000 people were involved.

### **2.4 Other Assessments Outside of the CBD**

In early March, evaluations started on routine commercial and some residential buildings outside of the CBD that had not been assessed under Operation Shop or Operation Suburb.

Building assessment teams comprised of an engineer and two Council staff. Placarding was on the basis of red/yellow/green for commercial buildings and red only for residential buildings. Assessments were on a Level 1 basis, with engineers called in if a Level 2 assessment was thought appropriate. Level 2 assessments were organised by Neville Higgs, an engineer at that time on contract to the Council.

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These assessments were carried out until the end of June 2011. The information was recorded on spreadsheets and provided regularly to the national controller and then to CERA, once CERA had been established, for decisions on full or partial demolition, or "make safe" works.

## 2.5 Other Tasks

Assistance was also provided by Council organised engineering teams for other tasks including:

- drive-by assessments of arterial routes;
- risk assessments of suburban commercial buildings that had already been red-placarded;
- cordon safety advice;
- safety advice for vehicle removal from buildings.

## 2.6 Warrants

The CBD building evaluation team members were issued with warrants by the Council even though they were not Council officers. At the time, warranting was thought to provide the following:

- An assurance that the teams had been adequately briefed (they had to be briefed in order to receive a warrant). The standard briefing sheet is attached as **Appendix A**.
- The ability to impose conditions; and some instructions were included on the warrants.
- The ability to require reports back to Council, even though these teams were not accountable to the Council, but rather to the National Controller.
- Identity documents to enable Police and others within the cordon to verify these private sector people.

In addition, section 93 of the CDEMA requires that persons exercising certain powers of inspection must carry, and produce if requested, evidence of identity. Warrants would also have constituted a general explanation of the authority under which people were acting.

## 3. ACCESS TO BUILDINGS

It was very apparent from the beginning that returning the CBD to a business situation was impossible. The interest from owners was in gaining access to their records, computers, stock and other items; not reoccupation on any long term basis.

As an indication of access restrictions, access to the CBD Red Zone at 12 March 2011 was confined to:

- Government Departments (documents and security)
- Medical/Dental; critical only

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- Supporting emergency services
  - Law Firms (Court files)
  - Supporting critical infrastructure services.

This was under a Business Access Plan approved on behalf of the National Controller on 11 March.

Access became even more restricted later as demolition works caused safety concerns, due to the numbers of people in the CBD Red Zone. By way of example, at 19 March, there were 6,000 contractors working in the CBD. On 16 March access to Government Departments and law firm offices was stopped for that reason.

#### **4. INDICATOR BUILDINGS**

Because of the high number of damaged buildings in the city, it was not practical to inspect all buildings after each aftershock; even if this was confined to aftershocks over magnitude 5. So a cross section of typical buildings was identified. These buildings were used as a representative sample and checked after each major aftershock, and monthly if there were no major aftershocks. The monthly check was to identify whether multiple minor shocks had any effect, and to monitor effects of land settlement.

After the 4 September earthquake, the Manchester Courts building was used as a general indicator, but this concept was greatly expanded after 22 February.

The indicator buildings were strategically located throughout the CBD. They were selected due to their varying height, width and construction type; (for example, unreinforced masonry, concrete beam and pillar construction and tilt panel). After an initial assessment was carried out, certain faults were identified, logged and monitored for any changes. This provided structural engineers with a good indication of the structural behaviour of that particular building type, which could then be related to other similar buildings in the CBD.

Some of the buildings used as indicator buildings after February 2011 were:

- Bus Exchange – Lichfield Street
- Avonmore Building – cnr Hereford Street and Latimer Square
- Bates Building – Worcester Street
- Harcourts Building – Madras Street
- Novotel Hotel – The Square
- Craigs Investment House – cnr Armagh Street and Oxford Terrace
- Fidelity Building – Victoria Street
- Ibis Hotel – Hereford Street



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## 5. CRITICAL BUILDINGS

These were buildings that would have a major impact on any recovery. Identification and assessment of critical buildings began immediately on 23 February. The list began with the Hotel Grand Chancellor and the St Elmo Apartments, but was later extended. For example, the six storey Ballantynes Building was added on 14 March because it had significant fall potential. By 11 April 2011, there were 46 buildings on the Critical Buildings list.

The criteria for critical buildings were:

- 5 or more storeys; and
- risk to public, infrastructure, or other buildings; or
- impeding removal of cordons or opening of transport routes.

The critical buildings were identified by various teams and entities including Police, Fire, Army and evaluating engineers. The work of the Critical Buildings Team involved assessing engineering reports and proposed remedial works, and dealing with owners, insurers and original designers. Level 2 assessments were usually carried out for these buildings.

The Critical Buildings Team managed any necessary works such as stabilisation, demolition, or stabilisation for eventual demolition. The National Controller had to sign off any work plans before work began.

The role of Council staff in the Critical Buildings Team was in relation to administration and attempting to locate owners. Tasks included sending reports to owners and insurers and arranging agreements as to the work that would be carried out, who would pay, and how the process would be managed.

Owners and insurers were expected to sign agreements to meet costs, but the Council had to make payments initially to get action started.

## 6. ORGANISATION STRUCTURE

Appendix 2 of the Council's First Report into Building Safety Evaluation sets out the Civil Defence Emergency Framework with emphasis on the processes, functions and powers during a state of local emergency (**ENG.CCC.0002F.50-66**). The framework is also discussed in Section 2 of the Ministry of Civil Defence and Emergency Management's October 2011 report to the Royal Commission (**ENG.MCDEM.0001**).

In the case of a state of national emergency, the primary operational document is the National Civil Defence Emergency Plan (NCDEP)<sup>2</sup>. Under the NCDEP<sup>3</sup>, the CDEMGs come under the control of the Director or National Controller.

Under the CDEMA<sup>4</sup>, the Director of Civil Defence has extensive powers, most of which can be exercised under delegation by the National Controller.

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<sup>2</sup> National Civil Defence Emergency Plan Order 2005 (SR2005/295)

<sup>3</sup> Clause 19

<sup>4</sup> See section 9

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The National Controller had his own support team for the response to the 22 February 2011 earthquake. Council local controllers and the group controller were assigned the role of Director of Infrastructure and reported to the National Controller. The operation was essentially "top down", but the National Controller was taking account of inputs from his direct reports.

The organisation structure adopted with the declaration of the state of national emergency is set out on page 8 of the Ministry of Civil Defence and Emergency Management's report to the Royal Commission (**ENG.MCDEM.0001.10**).

## **7. PROCESSES AFTER THE SOE – TRANSITION TO CERA**

CERA was established to assist with recovery efforts following the end of the national state of emergency. The powers of the Chief Executive of CERA in relation to dealing with buildings, including demolition, are discussed in Section 8.3 of the Council's First Report (**ENG.CCC.0002F.43-47**).

It is not intended to describe in detail here the interaction between the Council and CERA in relation to building management or more generally. However, a brief summary of the division of responsibilities of CERA and the Council in relation to earthquake recovery is as follows:

CERA responsibilities:

- Co-ordination and planning of infrastructure
- Individual building enquiries
- Cordon management and access schemes for businesses and residents
- Demolitions
- Debris management
- Business communications
- Economic recovery co-ordination and skills/workforce planning
- Welfare rebuild co-ordination
- Land remediation

Council responsibilities:

- Maintenance of street laterals
- Porta-loos and chemical toilets
- Roading and traffic management
- Kerbside collections
- Water conservation and restrictions
- Rodent management plan
- Earthquake prone building policy
- Heritage issues
- Resource consents
- LIMs
- PIMs
- CBD business putrescence cleaning
- Flood protection
- Central city plan

# APPENDIX A

## Safety, Security and Procedures for Structural Engineers

*The points contained in the this document have been explained in detail at the Health & Safety and Building Evaluation Briefing.*

### **ALL ENGINEERS ARE INDUCTED BEFORE BEING ASSIGNED A TEAM AND TASK**

Due to hazards and risks caused by the earthquake and the after shocks, these procedures must be followed to insure your safety and the response time it takes to ensure all our teams are safe.

- When you enter the EOC (Art Gallery) you must sign in at the front desk
- A 'Memorandum Of Understanding' is signed by each Engineers and this acts as an agreement between the Engineer and the council
- Each morning at 8am you will have a briefing that will outlay the tasks for the day and any immediate risks that may be apparent
- You will then be formed with a team and assigned a task
- Two safety officers will be assigned to your team and be with you always
- Your team must then check out and travel on the most direct or the assigned route to assigned area or grid reference.
- When you exit the EOC you must sign out from the front desk
- While out on the ground you must text message the welfare number ever 90 mins to let management at EOC know you are safe
- Follow the instructions of your safety officers when entering dangerous areas
- Walk in the center of the roads, looking out for high falling objects
- If you feel unsafe or feel the building is unsafe then withdraw from the area
- When you have completed your task return to the EOC via the same route you used to get to the site if it is still ok to use
- When you return to the EOC please sign in the at front desk
- Check in with the welfare team in the Engineering Area.

### **The specific hazards that are identified at the briefings are:**

- Tripping hazards – broken pavements etc
- Overhead falling hazards – parapets, glass, loose timer, brick, iron and tiles etc
- Gas – should be no smoking in the area
- Electricity – treat all wires as live
- Water – basements in particular could be full of water which may include sewage
- Lack of support – trap door may be loose and there may be holes in floors. Don't climb on rubble.
- Asbestos and other dust in the building could be injurious to health – wear masks
- Rotting organic material
- Bodies – if you find a body or body parts, return in the same route as you entered and call 111 and wait for the Police to arrive