

**Review of the Civil Defence
Emergency Management Response
to the 22 February
Christchurch Earthquake**

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Abbreviations and Acronyms

ACC	Accident Compensation Corporation
BAU	Business as usual
CBD	Central Business District
CCC	Christchurch City Council
CD	Civil Defence – used almost interchangeably with emergency management
CDEM Act	The Civil Defence and Emergency Management Act (2002)
CE or CEO	Chief Executive
CECC	Canterbury Employers’ Chamber of Commerce
CERA	Canterbury Earthquake Recovery Authority
CIMS	New Zealand Coordinated Incident Management System
ComCen	Communication Centre
CRC	Christchurch Response Centre (under declaration of National Emergency)
CYF	Child Youth and Family - part of the Ministry of Social Development
DBH	Department of Building and Housing
DHB	District Health Board
DIA	Department of Internal Affairs
DPMC	Department of Prime Minister and Cabinet
DVI	Disaster Victim Identification
ECan	Environment Canterbury, the Canterbury Regional Council
ECC	Canterbury CDEM Group Emergency Coordination Centre
EMs	Emergency managers
EOC	Emergency Operations Centre
EQC	Earthquake Commission
FTE	Full time equivalent (staff)
GNS	Formerly Institute of Geological and Nuclear Science – now just GNS
GP	General Medical Practitioner
GPS	Government Procurement Service
IEC	INSARAG External Classification system
IMT	Incident Management Team
INSARAG	International Search and Rescue Advisory Group
IPENZ	The Institution of Professional Engineers, New Zealand
IS	Information Systems, or Information Technology

JFNZ HQ	Headquarters Joint Forces New Zealand
LAs	Local Authorities
LO	Liaison Officer
LUC	Lifelines Utility Coordination Group
MCDEM	Ministry of Civil Defence and Emergency Management
MED	Ministry of Economic Development
MFAT	Ministry of Foreign Affairs and Trade
MoH	Ministry of Health
MSD	Ministry Of Social Development
NBS	New Building Standard (in Building Code)
NCCM	National Crisis Management Centre ('the bunker')
NHCC	National Health Coordination Centre
NIWA	National Institute of Water and Atmospheric Research
NZDF	New Zealand Defence Force
NZFS	New Zealand Fire Service
NZSEE	New Zealand Society for Earthquake Engineering
NZTA	NZ Transport Agency
NZTE	New Zealand Trade and Enterprise
ODESC	Officials Committee for Domestic and External Security Co-ordination
OSH	Occupational Safety and Health
OSOCC	On Site Operations Coordination Centre
PIF	Performance Improvement Framework
PM	Prime Minister
PIM	Public Information Management
SSC	State Services Commission
SSO	Senior Station Officer
S/Sgt	Senior Sergeant
TA	Territorial Authority (comprises Regional Councils and TLAs)
TLA	Territorial Local Authority (i.e. either a City or a District Council – functions unaffected by title.)
URM	Unreinforced masonry
USAR	Urban Search and Rescue
WAG	Welfare Advisory Group
WDC	Waimakariri District Council

Preface

This review deals with the Civil Defence Emergency Management (CDEM) Response to the 22 February 2011 Canterbury earthquake, from the date of the earthquake until 30 April 2011. On that date the response phase officially ended and recovery process was taken over by the Canterbury Earthquake Recovery Authority (CERA).

The purpose of the review is:

... from an emergency management perspective identify the practices that should be reinforced and identify the processes and policies that warrant improvements.¹

The Review was contracted by the Director of Civil Defence and Emergency Management with Ian McLean Consultancy Services Ltd on 24 November 2011. A draft was required by 30 April, and the final Review by 30 June 2012.

The Terms of Reference as approved by the Cabinet appear in Appendix 1. Specifically excluded by the Terms of Reference are the recovery process and the whole-of-government response.

The team conducting the Review comprised:²

Ian McLean	Rotorua
David Oughton	Wellington
Stuart Ellis	Adelaide, Australia
Basil Wakelin	Wellington
Claire B. Rubin	Washington DC, USA.

The team conducted interviews with over 200 people involved in the Response, primarily in Christchurch, but also in Wellington and Auckland, over the period from November 2011 to April 2012. The interviews were almost all face-to face, and with varying numbers of team members according to the topic. People freely described their experiences,³ especially those who had not been adequately de-briefed or counselled since the earthquake and who wished to unburden themselves. The team consulted with CERA as required in the Terms of Reference.

The Review Report is not a history of the Response. Much has already been recorded in a broad range of debrief reports and in documents of the Canterbury Earthquakes Royal Commission.⁴

1 Terms of Reference, para. 5

2 Further detail of the team are included in Appendix 2

3 The team found that asking people where they were at 12.51pm on 22 February took the interviewees' minds back to the time of the earthquake. In many cases information flowed from there.

4 <http://canterbury.royalcommission.govt.nz/>

The Report provides analysis and recommendations and only enough description of events to provide context.

Importantly, the Review reflects what it was told from the extensive number and range of interviews conducted and material reviewed. This information is not always in accord with official agency views and positions. The Review acknowledges this, but does not shy away from reflecting in this report what was presented to it. It is for others to reconcile why this may not be consistent with agencies' own evaluations of their response.

In order to meet the objectives of identifying the practices that should be reinforced and also identifying the processes and policies that warrant improvement, we have expressed our views in a free and frank manner. This Review represents our assessment of what occurred and our opinion of what went well and what did not. Consistent with the terms of reference and our duty to conduct an independent review, our analysis is at times critical of some aspects of the response where in our opinion that is warranted. We sought to fulfil our duty to report on matters as we see them so the lessons of the 22 February 2011 Christchurch Earthquake can be learned.

Some of those we interviewed wanted us to go further in examining agency responses, others not so far. We sought to go far enough to examine each agency's contribution to the Response as a whole, the successes and failures, without delving into detail of their technical operations. Some wanted us to examine the whole of government response, which we resisted as being outside our terms of reference. We did however, as required by our Terms of Reference, consider cooperation between agencies and coordination of the response by the CDEM authorities.

The team wish to thank the people of Christchurch for their assistance, especially as they are still actively involved in recovery from the earthquakes. They also wish to thank all others who have assisted in the Review, particularly the Director of Civil Defence and his staff, the Emergency Manager of Christchurch City Council, Louise Sinclair, Vicky Overton and Ann Green.

The Review team was inspired by the courage and positive outlook of the people met in Christchurch. The earthquakes will have a lasting impact both on the city and on New Zealand as a whole. Apart from the human tragedy and economic cost, the challenge for our country is to ensure that we learn from this catastrophe, and in so doing, enable our Government, Local Authorities, communities and emergency services to be better prepared for future events. From this disaster in Christchurch can come knowledge that will enable other cities to deal better with disasters when they occur.

The Review extends its sincere condolences to those who lost family and friends in such tragic circumstances. Our sympathy also goes out to all who suffered personal injury, dislocation or damage to homes and businesses.

Executive Summary

Introduction

The Christchurch earthquake of 22 February 2011 caused tragic deaths and injuries, severe damage to tens of thousands of homes and the devastation of the city central business district (CBD). It was an unprecedented challenge for civil defence emergency management in New Zealand.

The quiet, strong leadership shown by John Hamilton as National Controller, together with political leadership by Hon Gerry Brownlee and Mayor Bob Parker, held the organisation and indeed the city together.

In the immediate aftermath of the earthquake, Police, Fire, Ambulance, Defence, Health Services and Lifelines maintained control, rescued the injured and kept the public safe. Together with Council staff they brought order from the chaos of the day.

The success of the emergency response however, was also due to the resilience of the Christchurch community and work by community organisations. Most of the rescues were by people close by, and help for those in need was mostly provided by neighbours, community organisations including marae and churches, or by the recently emergent voluntary organisations like the FARMY Army and the Student Army.

Overall the Response to this extremely challenging situation can justifiably be regarded as having been well managed and effective.

CDEM

The Review has concluded that at the time of the earthquake the local civil defence emergency management (CDEM) structures were dysfunctionally divided and recovery from the 4 September 2010 earthquake had stalled. The scale of the disaster and the need for national resources required a Declaration of National Emergency. The scale, together with the weakness of CDEM cooperation between Christchurch City Council (CCC) and the CDEM Group⁵, required a nationally recognised figure with high mana to be in charge in Christchurch. Hence the unplanned resumption by John Hamilton of the previously delegated role of National Controller, and his relocation to Christchurch, were necessary.

The lack of pre-planning for the move of the National Controller to Christchurch caused difficulties both in Christchurch and for the National Crisis Management Centre (NCMC) in Wellington. The Emergency Operations Centre (EOC) in Christchurch (called the Christchurch Response Centre, or CRC) was formed by merging the CCC EOC and that of the CDEM Group.

⁵ The CDEM Group is the regional organisation responsible for civil defence in the Canterbury Region, to which senior leadership from the CCC had given little attention in recent years.

Within the CRC this forced marriage caused a degree of confusion, inefficiency and duplication. Cohesiveness was never fully achieved despite the efforts of many of the staff.

The internal organisation of the CRC departed significantly from the structure set out in the National CDEM Plan and Coordinated Incident Management System (CIMS) doctrine. CCC staff formed the basis of the 'operations directorate' which was led by managers whose regular jobs were general management of different functions in the City Council administration. CDEM Group staff formed the basis of the 'planning directorate'. Full authority for management at various levels rotated with shift changes so that consistency in decisions was not always achieved.

The CRC lacked an experienced and highly trained chief of staff to coordinate staff efforts and to ensure that the National Controller's decisions were implemented effectively. Like the CIMS structure, the CRC lacked a senior position responsible for all welfare and logistic issues, and also had inadequate arrangements for linkage with community groups and with business. The Review recommends that the CIMS structure of EOCs for significant and major emergencies include these positions, with the 'welfare' role better titled as 'community well-being'.

In Wellington the NCMC had not only lost its controller and several key staff, but with the National Controller based elsewhere had to develop a role for itself with quite different responsibilities to those in the National Plan. The Review considers that major emergencies should be managed close to the disaster by a nationally recognised and competent figure. To achieve this, the position of National Controller should be separated from that of the Director of CDEM and enhanced. Staff for the NCMC in all shifts should have capability and experience in emergency management and be drawn more widely from across governments and agencies.

The level of professional expertise and experience of emergency controllers and managers needs to be enhanced as well. The Review recommends the establishment of a highly trained cadre of men and women who are competent to control and lead CDEM emergencies.

Assistance from overseas was of great value and was well managed. The major issue requiring improvement is the cross matching of offers and needs, which would have been better if both the CRC and NCMC had had visibility of both offers and needs. The Review also considers that closer links and cooperation with emergency management agencies in Australia, on an on-going basis, would be beneficial to both countries.

The transition from response to recovery was facilitated by preliminary plans developed within the CRC to establish the Canterbury Earthquake Recovery Authority (CERA). However no legislation was in place for recovery from major events. This caused delay in setting up CERA and hence extended the Response beyond what was desirable.

Emergency Services

The event in its magnitude and complexity was in many ways overwhelming. For emergency services in the first 24 hours, far more demands were received than these services had resources to respond. Their overall efforts were commendable and on many occasions courageous. The scale of

the event and volume of calls seeking assistance from a traumatised population placed great strain on emergency service operations. In this demanding and difficult operational environment Police, Fire Service and St John's Ambulance responded well. The Review highlights some areas where improvement can be made but this should not detract from an impressive response overall.

The Police assisted with rescues, removed the public from danger, maintained law and order and managed disaster victim identification (DVI) very well. The Fire Service using local career and volunteer firefighters, together with members of the public, carried out the majority of the initial rescues before Urban Search and Rescue (USAR) teams arrived. Thereafter, while largely resuming normal fire protection of the city and region, they continued to respond to community welfare requests across the Canterbury region. USAR teams from New Zealand and overseas took up the more technical rescue operations and then assisted in searching for possible victims, recovering bodies, and facilitating entry to damaged buildings.

While internal command was in place within Police and Fire, there were unresolved incident control arrangements between the services at those major rescue sites where an overall incident controller was not appointed. The Review considers priority should have been given to ensuring that tactical level incident control was in place before establishing a regional incident management team, and if this required an executive officer to be at a major rescue site to achieve it, then so be it.

NZFS has published an internal review of their response, completed to quickly identify issues that need addressing, which the Review considers was inadequate as a basis upon which to plan the role of the NZFS in responding to future CDEM emergencies. In the future, a much better relationship and understanding between general firefighters and those in USAR is needed and the Review has been advised by the NZFS that progress has been made in Christchurch in this regard.

The NZDF contribution to the Response was overwhelmingly positive and facilitated by the fortuitous presence of troops for an NZDF exercise and the HMNZS Canterbury being in the Port of Lyttelton. The Review considers that NZDF skills are well suited to enhancing CDEM capabilities both within EOCs and in the field and that considerably more use could be made of military capacity.

Lifelines

Most of the lifelines organisations serving Christchurch were well prepared, and some like Orion, the Port Company and the Airport Company were organised for such an eventuality. All responded well after the earthquake.

CCC faced an immense job in restoring its water and waste water services and its roads, but managed the task competently and effectively. The cellphone system proved remarkably resilient and provided the core of communications, without which the Response would have been severely hampered. The air traffic control system (ATC), which for all New Zealand is based in Christchurch, coped with the earthquake well, the airport was opened within hours and the port within days.

Some problems arose with specific lifelines, such as access to the port through the road tunnel and key telecommunications nodes being located in vulnerable and damaged buildings, but these were overcome. Apart from the widespread damage to the sewerage system which inevitably took time to repair, early restoration of lifelines facilitated the Response and early recovery.

The success of this sector was due to a high level of preparedness, including an understanding of the vulnerability of lifelines' assets. The best prepared lifeline companies were those with embedded operational and maintenance relationships that transferred smoothly from business-as-usual into emergency mode through practised communications. The Review considers that lifeline clusters across New Zealand should exercise regularly.

Health and Welfare

The health sector successfully provided timely and high quality treatment for those injured in the earthquake, mostly because of the high level of preparedness based on exercises and previous activation in emergencies. The successful experience of the Christchurch health sector should be used as a template for the response in other regions. However public health protocols need to be developed to facilitate the continued safe operation of welfare and other centres where utility services are compromised but welfare needs exist.

Welfare services were for the most part well provided, except where on-going problems in badly impacted suburbs were not recognised. There was surprisingly little demand for accommodation at welfare centres. Waimakariri District Council assisted with the provision of a welfare centre and Selwyn District had one on standby. More assistance for other activities could have been drawn from these councils.

The Review considers that the Ministry of Social Development (MSD) can play a more integrated and wider role within CDEM responses, but in order to do so it needs in an emergency to extend its efforts and activities beyond its business-as-usual role in order to take the lead in CDEM welfare services. The welfare or 'well-being' part of the Response has a much broader ambit than the role that MSD is responsible for in normal times.

The CBD Building Inspections, Demolition and Business

The devastation of the CBD was extensive, with only about a quarter of buildings undamaged enough to be repairable. The inspection of damaged buildings to determine their safety was a substantial task and was carried out well technically. Some improvements are required in organisation and in communications with owners and tenants. Better communications are also needed regarding demolition of buildings and for systems for access to the cordoned area.

Both building safety evaluations and demolition would be improved by:

- the development of a high level national resource to manage the evaluations of buildings

- a national system for the selection, training, warranting and mobilisation of building professionals in an emergency
- revision of the Guidelines for Building Evaluation in light of Christchurch experience, in particular revision of the placarding system and education of the public in its meaning
- development of protocols for consultation prior to demolition and for the establishment, management and access through cordons.

Most businesses survived the earthquake; in fact, a larger proportion than usually survive after comparable events in the USA. This was due to the initiative of businesses and the substantial support of the innovative Earthquake Support Subsidy (ESS) scheme. Communications between the CRC and the business community improved as the Response went on, but in future a much more formal relationship is desirable. Early restoration of business, including preservation of jobs should be an objective of the Response; and a senior business liaison person should be part of the organisation of the EOCs for any emergency or disaster that significantly affects economic activity and the business community.

Logistics, Information and Science

Management of logistics was fragmented between the CRC, NCMC and government departments. Less division and better involvement of government agencies in emergency management would be helpful. The Guide to the National Civil Defence Emergency Management Plan should include a section on logistics. A more formal adoption of a CIMS structure at all levels would have helped.

With respect to logistics, the media and public consciousness focused on the supply of portaloos. This issue became symbolic of what was claimed to be neglect of the eastern suburbs. The underlying problem was provision of assistance and information about alternative sanitation arrangements while awaiting the arrival of chemical toilets being manufactured overseas. The original distribution of portaloos was not well planned and the Response was never able to recover until enough chemical toilets arrived, a month or so after the earthquake. The Review considers that the actual procurement and transport of chemical toilets and portaloos was done well and that this was due very largely to the presence of an experienced private sector logistics person in the CRC.

Of significance was the failure to convert the large inflow of raw information into intelligence and a common situational awareness. Internal information sharing was problematic for the CRC and there did not appear to be one area within the CRC which was considered the most reliable source of information. Information was not generally well displayed. Many CRC staff did not understand the distinction between information and intelligence. A strategic plan for information collection and intelligence analysis was lacking and there was little development of a 'common operating picture'. An operations 'knowledge board' or an electronic intelligence summary was needed in the CRC.

One of the main public issues during the Response was whether or not the Eastern and Hill Suburbs were being adequately cared for. Most of the support for the suburbs came from within their own communities. Surveys were conducted but did not result in cohesive intelligence being conveyed in a timely fashion to decision-makers in the CRC. Communications from the response organisations (both the CRC and the NCMC) to the media were well managed, even though the task was challenging with a total of 1,269 media representatives accredited to the CRC. The media did an excellent job in informing the country and the world about the tragic disaster that had befallen Christchurch. The Mayor's excellent presentational skills were well utilised. The appointment of a competent and high-profile spokesperson for the CRC would have reduced the significant time the National Controller spent daily on media preparation and briefings.

The media made considerable efforts to tell the people of Christchurch what they needed to know about the Response to the earthquake, though technical limitations and loss of services made this effort insufficient. Nevertheless, the provision of very timely and localised information to badly impacted communities not contactable through traditional media (such as when electricity supply was disrupted) needed significant improvement. At Kaiapoi, after the 4 September earthquake, daily fliers were hand-delivered to households in affected areas. This method was more effective and should be used in future. See Appendix 5 and 6.

The scientific input was sound and timely, and assisted the Response in its day to day activities as well as gathering information to better understand earthquakes and their risk.

The Community

The work done by community organisations, particularly in severely impacted or isolated suburbs, was of immense value in the Response. The organisations included existing community organisations not usually associated with civil defence such as churches, community associations and marae, as well as voluntary organisations dealing with emergencies of different kinds, such as volunteer fire brigades and the Coast Guard. The Student Army and the Farmy Army were organisations of a quite distinct and different kind, having sprung up in the Response to the 4 September earthquake.

The CRC did not easily manage its relationship with these groups initially, but linkages soon improved dramatically when the CRC liaison person relocated to their headquarters. The community groups in the suburbs had little or no contact with the CRC. It was abundantly clear to the Review that the CIMS structure of EOCs needs to be modified to provide a way for such groups to 'plug in' to the Response as they seek to assist. Their work would also be enhanced by making prior arrangements. The existing arrangements for volunteers from the community to train for and assist in managing welfare centres, etc., should continue, and with more emphasis placed on Neighbourhood Support.

The Review recommends that a template be developed for future CDEM emergencies for a simple structure to link community organisations to the official Response, and that the development of

the template be led by the groups which so successfully contributed to the Response. This template should then be adopted nationally.

Major Findings

- The Review considers that the duplication of control and EOCs between Christchurch city and the regional CDEM group was not only inefficient but put people and property at risk. Under existing legislation the same situation could arise in a number of different parts of New Zealand. The Review considers that for efficiency and clarity only one level of emergency management should exist below the national level. **The Review therefore recommends that while territorial local authorities should continue to be able to declare a state of emergency the responsibility for leading and controlling the response should rest solely with CDEM Groups.**
- It was clear from the Response to the 22 February earthquake that many people who were called upon to manage or staff the EOCs had neither the training nor the capability to lead during a major emergency, despite their skills to do quite different jobs in normal times. The problem is compounded by the fact that New Zealand has relatively few significant emergencies and managers do not get sufficient live emergency experience to sustain a high level of skill. **The Review recommends that a small cadre of personnel be established to lead in senior emergency management positions during natural disasters, that they be highly trained in catastrophic event management (including staff and command training from NZDF and Police) and that they be drawn from CDEM groups and public and private sector organisations.** They would carry on with their regular job for much of their time; but would be well trained and maintain their emergency management skills through education, training, and regular exercises.
- Community groups played a major part in the Response, but two way flows of information, tasking and provision of resources need to be improved. **The Review recommends that new structures be developed to modify CIMS to better link the Response with the community and community organisations, and a formal project be undertaken in Christchurch, led by community groups participating in the Response, to develop templates to optimise the use of such volunteers**
- The Review considers that needs of the business community and the preservation of jobs need to be made a specific objective during emergency response, and emergency organisation (including the CIMS structure) needs modification to forge a better link. **The Review recommends that the preservation of business and jobs be made an objective of the Response, that CDEM planning and EOCs take this fully into account in their planning and their activities, and that a strong link with business be established within EOCs**
- The Review found that the position of Ministry of Civil Defence and Emergency Management (MCDEM) as a small element in the broad portfolio of the Department of Internal Affairs

(DIA) hampered its relationships with major departments in preparation for and during emergencies. This, together with the traditional lack of seniority of its Minister, places MCDEM at a disadvantage in dealing with departments in the Response. It is more important to locate MCDEM to enhance operational efficiency during emergencies rather than for administrative convenience in normal times. **The Review considers that at the time that the whole-of-government response is reviewed, consideration be given to MCDEM being located within the Department of Prime Minister and Cabinet so as to provide a better platform for launching responses.**

- In examining the Response one feature was strikingly apparent: organisations of any kind that were well prepared in advance responded much better than those who were not. **The Review recommends that MCDEM continue to promote a culture of preparedness for major disasters amongst all sectors and is resourced appropriately to do so.**

Chapter 1 - Background

1.1 Overview of the Response

The Review team was privileged to undertake this Review and to be welcomed in Christchurch and hear first-hand from local people their accounts of the disaster and its aftermath. Being there one year after the event was a poignant and helpful reminder of the impact of that day in February 2011 and the ongoing consequences and challenges.

At 12.51 pm on 22 February 2011 folk in Christchurch were going about their business. Lunch time was nearly over for most workers. Most people were in their offices, factories, shops and in the streets. Then the magnitude 6.3 earthquake struck and the lives of many were shattered. Christchurch was changed forever. The shaking from the earthquake was brief but its peak acceleration was amongst the greatest ever measured. It made a direct hit on the city of Christchurch. Land liquefied, mostly in the east and along the Avon River. Rockfalls damaged homes in and below the Port Hills. The Central Business District (CBD) was devastated. Most houses in the city had some damage (although those in the west of the city were much less affected), and this added to the damage from the previous earthquakes. Sewerage and water and electricity supplies were again disrupted over large parts of the city.

The greatest tragedy was the loss of human life. Sadly 185 deaths occurred, or would later occur as a result of injuries. Of these 169 were known to be people in the CBD at the time of the earthquake.⁶ Many more were injured, some are still recovering. While the collapse of buildings in the CBD is not part of the Review, we acknowledge the sad loss of life.

The Response⁷ to the February 2011 earthquake so seamlessly morphed into recovery that it is difficult to separate one from the other. People and organisations initially responded from Christchurch, then the Canterbury Region and then from across New Zealand. International help was speedy, including USAR teams from around the world and Police from Australia.⁸ The Director of the Civil Defence resumed the previously delegated role of National Controller and deployed to Christchurch the day after the earthquake to take control. Under him the Christchurch City and Canterbury Group Civil Defence organisations were brought together and operated for the next two months out of the Christchurch Art Gallery – an alternative Emergency Operations

6 See Appendix 3, Key data and metrics

7 The National CDEM Plan gives the meaning of 'response' as: actions taken immediately before, during, or directly after a civil defence emergency to save lives and property, and to help communities recover':(cl 1)

8 Details of these features of the Response are in succeeding Chapters.

Centre named the 'Christchurch Response Centre'. At its peak about 500 people were working in the Art Gallery building managing the Response. Many more from supporting agencies were located elsewhere around the city.

In the badly affected suburbs the community response was inspiring, with community groups, local churches, marae, police and many others assisting those most in need. Welfare centres were established and many spontaneous volunteers offered their personal assistance, notably the Farmy Army and the Student Army.

Not only did people remain in their homes despite severe damage, but most families survived with little outside help. Where help was needed neighbours supported each other and people from within Christchurch and beyond helped friends and strangers. Community groups mobilised to organise assistance. These are some of the indicators of a resilient community.

Businesses were badly impacted by the devastation in the CBD, including the loss of premises, and the on-going restrictions on accessing records, data and material from CBD offices. Business revenue suffered from trading interruptions and relocation. Many businesses had maintained business continuity plans but had never envisaged the CBD being evacuated for an extended period. Despite that, a high proportion survived, indicating considerable resilience.

1.2 Event and Impact

The Response to the 22 February earthquake was greatly influenced by the earthquake being one of a series.⁹ The initial event on 4 September 2010 was a magnitude 7.1 shallow earthquake centred near Darfield, 40 kilometres west of the city centre. There were very few injuries and no directly attributable fatalities, but substantial damage to buildings especially unreinforced masonry (URM) and infrastructure. Of the aftershocks between September 2010 and February 2011, the worst were a magnitude 5.1 event on 4 September 2010, a magnitude 5.0 event on 19 October and then on 26 December 2010 a series of more than 32 aftershocks. The largest of these was a magnitude 4.9 causing further damage, closure of the central city and power outages. On 20 January 2011 another aftershock of magnitude 5.1 occurred at 6.03am.

The September 2010 earthquake faded in significance when the February 2011 earthquake of magnitude 6.3 occurred at 12.51pm on Tuesday 22 February 2011. It was technically an aftershock, with epicentre near Lyttelton, 10 kilometres south east of Christchurch CBD. 185 people died as a result of this earthquake, and with people of over 30 nationalities amongst the killed or injured, it

⁹ Descriptions and details of the earthquakes are available on GeoNet and Te Ara: e.g. <http://www.geonet.org.nz/earthquake/historic-earthquakes/top-nz/quake-14.html> ; and <http://www.teara.govt.nz/en/historic-earthquakes/13>

quickly became an international event. The Government declared a National Emergency that remained in place until 30 April 2011.

Further aftershocks greater than magnitude 5.0 occurred on 13 June 2011, 22 July 2011, and two on 23 December 2011. More than 7,000 aftershocks have been registered from September 2010 to this date (April 2012).

Impact

Apart from being built partly on what was once a swamp, and apart from loose volcanic rocks on the Port Hills, Christchurch was well placed geographically to deal with an earthquake. It lies on a level plain with good communications to the North and South and its air and sea ports were accessible and usable after the earthquake. Christchurch was known for its community spirit and as a city is much more unified than the larger metropolitan areas of Auckland and Wellington.¹⁰ The strength of the community was demonstrated in the days, weeks and months following 21 February 2011.

The major impacts of the 22 February earthquake on the people of Christchurch were:

- deaths and injuries arising from the collapse of buildings
- distress, misery and financial loss due to damage to homes
- discomfort and great inconvenience from lack of sanitation facilities
- loss of jobs and businesses because of damage to buildings
- damaged schools, universities and training centres
- disruption of almost every kind of social activity
- churches, sports grounds, theatres, clubs and bars severely damaged resulting in the social activities dependent on these facilities being severely hampered.

In addition to the deaths noted, thousands were injured in the earthquake. A good indicator is the number of Accident Compensation Corporation (ACC) claims,¹¹ totalling 7,171, of which 46% were immediate and 18% subsequent to the event (e.g. tripping over debris.)¹² Nearly 140,000 houses were the subject of claims to EQC for damage¹³ and in addition there were many claims for damage to land and contents. Thus almost all houses in Christchurch City suffered some damage and many thousands have been demolished or ultimately face demolition.

10 The populations of these metropolitan areas were estimated as at June 2010 to be: Auckland 1,354,900, Wellington 389,700, and Christchurch 390,300. Source: 'Subnational Population Estimates: At 30 June 2010'. Statistics New Zealand..

11 The cost of all medical attention for injuries, apart from that provided in public hospitals, is claimable from ACC.

12 See Appendix 3, Summary of the Impact and its Key Metrics.

13 EQC reported 139,139 claims related to insured residential buildings damaged by the 22 February event. (See EQC Annual Report 2010 – 2011 p18). In addition a small proportion of houses were not insured. The total number of houses in Christchurch City and the two adjacent TLAs at that time was 165,210. Source: 'Statistics NZ: 2006 Census', Dwellings Statistics NZ Regional-Summary-Tables-Territorial-Authority.xls.

Significant liquefaction affected the Eastern Suburbs generating silt variously estimated at 350,000 tons and 500,000 tons.¹⁴ This liquefaction contributed to major damage in the sewerage system. Household toilets were unusable in areas with major damage to sewerage reticulation and across the whole city their use was advised against because of damage to mains and pumping stations. The water supply system was also affected and many homes, again more in the liquefied areas, had no supply. Rockfalls damaged houses in the Port Hills, Redcliffs and Sumner, destroying some and making others too hazardous to inhabit.

The numbers indicating the measurable extent of the impact have been assembled by the Ministry of Civil Defence and Emergency Management (MCDEM) and are presented as Appendix 3.¹⁵ The cost of damage to property was over \$30 billion, plus an estimated \$10 billion for upgrading to higher standards during rebuilding, inflation and business disruption.¹⁶ However a major reinsurer, Swiss Re, reports that about 80% of its (somewhat lower) estimate of economic and physical damage losses are covered by insurance, amounting to approximately \$15 billion.¹⁷ The aftershocks which have continued for more than a year have contributed to the damage.

What is unusual about the impact is that:

- nearly all damaged homes remained inhabitable (despite many being highly uncomfortable, cold and often damp)
- most buildings in the CBD were damaged beyond repair
- the CBD was closed off for over a year with major effects on businesses
- sewerage and water supply services were so severely damaged primarily because of liquefaction.

1.3 National Context

This section relates the 22 February earthquake to other hazards and emergencies in New Zealand and describes the institutional and legal setting for managing emergencies.

New Zealand Hazards

As a country on the 'Ring of Fire', New Zealand is exposed to earthquakes, volcanic eruptions and tsunamis. In addition it occasionally is battered by climactic events such as Cyclone Bola or the Wahine storm. The question for Government in determining policy on emergency management is

14 Sources: 'Resilient Organisations Research Report.' 2011/04, Table 1; and Briefing to Christchurch City Council by Lee Cowan.

15 We record our appreciation to MCDEM for assembling this data which is derived from many sources.

16 Source: 'Pre-election Economic and Fiscal Update.' NZ Treasury, 2011.
<http://www.treasury.govt.nz/budget/forecasts/prefu2011/prefu11.pdf>.

17 http://www.swissre.com/clients/Sigma_2012_Natural_catastrophes_and_manmade_disasters_in_2011.html

whether or not an event with such huge impact as the 22 February earthquake occurs sufficiently often as to require specific preparation.

The 22 February event in itself appears to be of very low annual probability. Hopefully once the present series of after-shocks settles down, Christchurch should only be shaken by such a severe local event every few thousand years. However Christchurch does face earthquake risk from the Alpine Fault and from other faults in North Canterbury. While earthquakes from these sources may not have quite as much impact as 22 February did, they do require comparable levels of preparation. Across New Zealand, movements of important individual faults have been well measured and dated, and more importantly, the total seismic risk has been estimated zone by zone.¹⁸ Past volcanic eruptions have also been dated. This does not make it possible to predict the date, decade or century when future events will occur, nor when or where the very infrequent highly damaging events will strike. Such information would be very helpful, but risk can still be assessed and managed in its absence. For some hazards the expected return period can be estimated with enough confidence on which to base emergency planning. The major difficulty is ensuring that government agencies, businesses and communities take account of the less frequent but ultimately inevitable events in their planning.

In many regions of New Zealand severely damaging earthquakes can be expected. Wellington is exposed not only to movements of the Wellington Fault but also to earthquakes arising from other faults locally, in the Wairarapa and in Marlborough. Wellington faces the possibility of some liquefaction in built-up areas, the risk of fire following earthquake in the oldest suburbs¹⁹ and possible tsunami impact around the airport. Thus emergency management planning for Wellington needs to be predicated on events with comparable impact to 22 February.

Volcanic eruption is a risk from Taupo and the Okataina Centre near Rotorua, from Taranaki and from the Auckland field. While each of these volcanic centres has a return period for eruptions of many hundreds of years, together they pose a risk that emergency management needs to take account.²⁰

In addition to these natural disasters technological disasters have occurred in the past, and these and other man-made disasters can be expected in the future. In the 60 years prior to 22 February the worst New Zealand disasters were transport events: rail crash at Tangiwai,²¹ the wreck of the Wahine²² and the air crash on Mt Erebus.²³ Even worse events may well occur, such as the crash of a large airliner in a residential area or the wreck of a cruise liner. The conclusion is that emergency management in New Zealand does need to prepare for disasters both natural and man-made with

18 Stirlinger, et al. 2011.

19 The risk is higher because of old wooden houses close together with the presence of reticulated gas.

20 GNS is currently comprehensively reviewing the risk from hazards across the country.

21 <http://www.teara.govt.nz/en/historic-volcanic-activity/5>

22 <http://www.teara.govt.nz/en/shipwrecks/5/4>

23 <http://www.teara.govt.nz/en/air-crashes/5>

a potential impact similar to that of 22 February. Basing emergency management on dealing with such huge disasters has the great advantage of preparing organisations to meet with lesser and more frequent emergencies much more easily. Planning does need to structure the level of response to scale up or scale down according to the impact of the disaster. Scaling up proved difficult at Christchurch in February 2012.

Impact Compared With Other Disasters

Given the 185 deaths and the enormous impact on residential and commercial buildings, the 22 February event has become perhaps New Zealand's worst peacetime disaster^{24,25}. Its effects had similarities with those of past disasters in New Zealand, but like all disasters and emergencies it had its own peculiar features.

The differences arose in large part because of:

- the very high levels of acceleration experienced. However, the shaking did not last nearly as long as may be expected in other events
- the extent of liquefaction (itself partly due to the high acceleration²⁶). Liquefaction in turn led to significant damage to houses built according to the current code (especially concrete slab houses) and which may have survived with limited damage had the ground underneath not liquefied. Other places with poor soils can be expected to experience liquefaction, but unless either or both the acceleration and the magnitude of the event are high, the same degree of liquefaction may not occur. In that case the response to such events is unlikely to have to deal with so much damage to reasonably well built houses.

Occurring five months after the first Christchurch quake, such a damaging after-shock is unusual in New Zealand. The Response had to deal with people suffering extra trauma and stress because they saw their valiant efforts in restoring their lives after September coming to nothing. The Response was mounted in the midst of a recovery operation that for various reasons was stalling.²⁷

On the positive side, at an operational level many organisations had learnt from the September event and had taken action to be more resilient and prepared for future events. Nevertheless, the Response (and recovery) from the 22 February earthquake was hindered by multiple after-shocks of significant impact. Earthquakes have damaged Christchurch over an extended period. While in other places earthquakes may not extend over such a long period, other perils may well cause damage. Of concern for the future is that fire may well follow earthquake in cities like Wellington

24 For a list of disasters see: <http://www.nzhistory.net.nz/culture/new-zealand-disasters/timeline>

25 For completeness, about 8,600 died in the influenza epidemic of 1918 (Source: Rice, p221, 2005)

26 See evidence of Associate Professor Cubrinovski to the Royal Commission on 25 October 2011

27 The Response to 22 February was assisted however by the presence in the central city of heavy machinery engaged in demolition of buildings damaged in September.

with densely packed wooden houses in some of the older suburbs and with reticulated gas. Tsunamis are also a risk. Perils like volcanic eruptions may well extend over a significant length of time with several bursts of activity. The conclusion is that the extended period of time that Christchurch suffered may not be unusual in future natural disasters in New Zealand.

Christchurch has one great advantage as compared with other major cities in New Zealand: it is situated on a plain with easy land access to the north and the south. Wellington on the other hand is a city whose lifelines and access roads cross active faults. Many other cities can expect much more difficulty in mobilising resources from outside than did Christchurch.

Frequency of CDEM Emergencies

Over the 45 years prior to the 22 February earthquake 110 separate events have occurred in New Zealand leading to declarations of a CDEM emergency.²⁸ Some were quite small and limited to only two hours and a small locality while others covered several regions. About 70% of the emergencies were caused by floods.²⁹ Somewhat surprisingly, the events over the past 45 years that triggered CDEM emergencies (apart from the 22 February earthquake) are reported to have caused only 15 deaths. The last natural disaster causing a large number of casualties was the Hawke's Bay earthquake of 1931 when 258 people died.³⁰ In addition to these declared emergencies many other events occurred for which no declaration was made.

Major transport crashes or wrecks or other technological incidents have caused fatalities since the Hawkes Bay earthquake, including:

Event	Deaths	Year
Ballantynes fire	41	1947
Tangiwai rail disaster	151	1953
Wreck of the Wahine	51	1968
Mt Erebus plane crash	257	1979
Cave Creek platform collapse	14	1995
Pike River mine explosion	29	2010

28 Source: Data from MCDEM at http://www.civildefence.govt.nz/memwebsite.nsf/wpg_url/for-the-cdem-sector-emergency-declarations-index?opendocument

29 The fact that the majority of emergencies involved floods, and river control lies within the statutory responsibility of regional authorities, suggests that declaration and control of all emergencies could better lie wholly with regions or groups rather than with territorial local authorities (TLAs) as well. This supports the proposals later in the report.

30 An interesting gallery of NZ earthquake pictures is at <http://www.geonet.org.nz/earthquake/historic-earthquakes/top-nz/gallery.html>

No CDEM emergency was declared for these disasters under the legislation in force at the time. In the first five listed, the loss of life occurred over a very short period of time, and there was no need for emergency powers. Questions were raised regarding the management of the Response to some of these incidents. Inquiries were held and the Royal Commission of Inquiry into Pike River has just concluded hearings.

The disasters listed above were all localised events and experience gained in responding to them is unlikely to yield the lessons needed to deal with major earthquakes or other catastrophic events.

The infrequency of emergencies is good for New Zealand but presents a major difficulty for emergency management. For most local authorities, years lapse between the events that emergency managers are called upon to deal with. Except in the more hazardous parts of the country, emergency managers for TLAs may never be called upon to deal with an emergency in their own territory during their whole professional career. Even at the regional level, emergencies are sufficiently infrequent that it is difficult for emergency managers to maintain their skills at top efficiency for operational responses.

This issue can be dealt with in two ways:

- Involve senior emergency managers from other local authorities far and near whenever an emergency arises (either in person or by virtual communities).³¹
- Train and exercise to maintain professional freshness in the same way as does the military (through simulations, mutual aid experiences and exercises).

Both of these proposals are discussed later in the report.

The conclusion is that changes are needed in emergency management in order to develop and maintain a high professional standard for controllers and other managers involved in responses. The review proposes such changes which are described in Section 9.4.

Institutions

Management of emergencies involves both local and central government. NZ has 78 local authorities (LAs) at regional or local level.³² Populations range from under 4,000 for Kaikoura³³ to

31 For example, see various papers in ISCRAM 2008.

32 The LAs comprise:

11 regional councils (RAs)

61 territorial authorities (TLAs) - 11 are city councils, 50 are district councils

6 unitary councils - which are territorial authorities with regional council responsibilities

<http://www.lgnz.co.nz/lg-sector/>

33 http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/SubnationalPopulationProjections_HOTP2031.aspx

nearly 1.5 million for Auckland.³⁴ In practice a TLA nominates a local controller for that TLA, but the Group (Joint Committee) approves and formally appoints. The Mayor or a designated elected member may declare a state of local emergency.

Within central government all departments have a responsibility under the CDEM Act to maintain and restore their functions and the 'emergency services' have more direct responsibilities. Their role as part of the whole-of government response is outside this Review. What the Review does consider is how the structure and normal procedures of central departments helped or hindered the management of the Response within which they played a part.

In 'peacetime'³⁵ departments co-operate to a considerable extent in implementing particular projects or programmes. That cooperation takes place within a framework where each department has its own statutory obligations and responsibilities to its own minister. At times departmental priorities clash with those of interdepartmental programmes and this clash can be particularly seen during emergencies. The Ministry of Education needed to get students back at school, the Ministry of Social Development needed to continue paying benefits and assisting families at risk with whom it was already dealing, and the Ministry of Health needed to safeguard public health. The manner in which each of these carried out their business-as-usual tasks had an impact on the extent to which they could assist the overall Response,³⁶ as well as the activities of other agencies involved in the Response.

The Review recommends a greater role for several departments or agencies in the response phase together with a requirement for greater cohesiveness in the Response.

Legislation

The roles and responsibilities of the different entities involved in the Response are set out primarily in three documents:

- The Civil Defence Emergency Management Act (2002)
- National Civil Defence Emergency Management Plan (promulgated by order in Council in 2005)
- The Guide to the National Civil Defence Emergency Management Plan of 2006, New Edition 2009

These documents provide very broad powers for controllers during emergencies and describe in general terms how these powers should be used. They set out the roles of key government agencies and give the controllers considerable power to direct these agencies. Clarity in

³⁴ <http://monitorauckland.arc.govt.nz/our-community/population/population-projections.cfm>

³⁵ For lack of a better word, the jargon term 'peacetime' is used to describe the periods when life is normal and no emergency exists.

³⁶ For example, recovery is greatly assisted by schools re-opening promptly so that parents do not have the extra responsibility of arranging day-time care or supervision.

responsibilities is essential even though in all emergencies (declared or not declared), controllers must rely heavily on cooperation rather than the use of legal powers.

The regional and local structure is based on the concept of a CDEM Group comprising a Regional Authority and Territorial Local Authorities working together. Either, or both, the Group or individual authorities can declare an emergency. Only the Group has power to appoint controllers, but in cases like Christchurch TLAs have appointed their own controllers and to comply with the Act the appointment has been ratified by the Group.

None of the documents appear to specify in detail how Groups and TLAs are to work together. Integration of their efforts appears to rely on plans jointly prepared in advance and on good relationships and willing cooperation. When all goes well such an arrangement is excellent. But if relationships between Local Authorities break down for whatever reason, cooperation in emergency management is jeopardised. This is unacceptable and this report deals with the issue.

The question is: to what extent are other CDEM Groups in New Zealand weakened by controversy amongst their constituent authorities? Arguments between Local Authorities, and friction arising between personalities, do not appear to be confined to Canterbury. From discussions with those involved with CDEM arrangements in other regions, it appeared to the Review that the problems in Canterbury, while having their own flavour, were far from unique.

The CDEM Act does make it clear (s64) that TLAs are responsible for restoring their own infrastructure and services when these are damaged by a disaster. It is also clear that TLAs need to continue supplying resources to assist Groups in the Response to a major emergency.

In general terms the legislation and subsidiary documents provide an adequate basis for emergency management and the changes in structures and operations proposed in this Review would require relatively straightforward and limited amendments to the documents.

Chapter 2 - Management of the Response

2.1 Situation on 22 February before the earthquake

The 4 September 2010 earthquake

When the earthquake struck on 22 February Christchurch was far from recovered from the magnitude 7.1 event of 4 September 2010, and the subsequent Boxing Day earthquake. The much more devastating earthquake in February 2011 came as a surprise to most people and the huge blow to those who were just rebuilding their lives after the earlier events. Damage had been extensive, including power and water supply breaks, and liquefaction was significant in Kaiapoi and the Eastern Suburbs. While most services had been restored relatively few houses had been repaired. Great uncertainty existed over repair of houses on liquefied land and many insurance issues were unresolved. Much had been learnt by the staff of CCC and its two surrounding district councils at an operational level but local political differences and structural weaknesses were unresolved.

Pre-1970s city buildings, especially those built of unreinforced masonry (URM), were damaged³⁷ and EQC received 172,026 claims for damaged houses.³⁸ Of these, 100,000 were substantially affected. Significant liquefaction occurred in central and eastern Christchurch and in Kaiapoi.

Because the 4 September earthquake occurred at 4.35am when nearly everybody was at home in their generally earthquake-safe homes, nobody was killed. Had the earthquake occurred during business hours on a working day or earlier on the Friday night, the building damage in the city would almost certainly have caused deaths and many more injuries. Three territorial authorities (TAs) declared local emergencies and established Emergency Operations Centres (EOCs) as a result of the earthquake: the CCC (at the Art Gallery), at Rangiora in the Waimakariri District and at Rolleston in the Selwyn District. In addition, Environment Canterbury (ECan) Group Emergency Coordination Centre (ECC) was activated but no regional emergency was declared by the Group.³⁹

37 A striking video of an unreinforced masonry building failing in the 22 February earthquake is at <http://tvnz.co.nz/national-news/cctv-footage-shows-liverpool-st-quake-hits-chch-4-38-video-4097563>

38 EQC Annual Report, 2011.

39 i.e. a region-wide local declaration

New Zealand USAR Task Forces deployed to Christchurch with a full complement on the ground in just over 48 hours.⁴⁰ The 130 or so personnel located themselves at the USAR base next to the Woolston fire station. Career and volunteer firefighters were deployed from around the country as an additional resource to local crews. More than 40 fire appliances were in Canterbury during the emergency and incident responses for many smaller brigades exceeded in two weeks what normally would be expected in a year.

The USAR teams together with NZFS general firefighters assessed buildings in the central city area and well over 750 private homes. They knocked out damaged windows, removed chimneys, secured walls, knocked down small unstable areas and taped off dangerous buildings. Advice was given to residents regarding building stability and safety. As the days progressed, USAR also assisted as the demolition began of some of the larger unstable buildings.⁴¹

The 4 September magnitude 7.1 earthquake was considered a very major event at the time. It was the largest New Zealand Fire Service deployment in 20 years. As it evolved, the 4 September event proved to be an effective training event for the 22 February 2011 earthquake. While there were no direct fatalities and relatively few injuries, EOCs were practised, police and emergency services deployed, infrastructure was repaired, streets cleared and buildings assessed. 'September was a brilliant earthquake – no one got killed and we all got tested.'⁴²

The subsequent 'Boxing Day Earthquake' had helped make people familiar with the way in which after-shocks of lesser magnitude follow an initial earthquake. After-shocks are usually about one level of Richter magnitude less than the initial event. Unfortunately the popular belief was (and is) that events of lower magnitude are always less damaging than those of higher magnitude. This belief does not take into account that the impact of an earthquake depends not only on the magnitude but also the depth, the distance from the epicentre, and any amplification due to local geological or soil conditions. Some organisations, including Orion and the Lyttelton Port Company, did not take for granted that after-shocks would be less damaging than the original event and sought advice from GNS Science.⁴³ They took action to reduce the effect of potential damage from later after-shocks.

Hence the 22 February 2011 earthquake was not only a huge physical event; it also was a major psychological shock to a city slowly recovering from the stress of the earlier earthquake. This unexpected event seems to have affected many people in Christchurch. We met with officials who had obviously been shocked by loss of friends or family and further damage to their homes, but who still had carried out their responsibilities to the utmost best of their ability.

40 A flight disruption caused delay with one team

41 Collins, G., 2011.

42 NZFS CAD Supervisor

43 Formerly the Institute of Geological and Nuclear Science

While services had generally been restored by 22 February, repairs to houses damaged in the 4 September earthquake were barely getting underway.⁴⁴ Repairs were slow to start because of the huge task of assessing claims. Furthermore, liquefaction had been quite extensive and there was great uncertainty as to whether it was technically possible to restore affected land so that houses could be built on it again.

In many respects Christchurch learnt a lot from the September event concerning emergency management and some organisations had significantly improved their level of preparedness for disasters. Sadly, in other respects little was learnt and not only was the organisation of the recovery struggling to make progress, but overall the local Civil Defence Emergency Management structure was as dysfunctional as at 4 September. The lessons learnt have been described in various reports and are not addressed here.⁴⁵ At an operational level relationships were developed between different organisations after 4 September 2010 and these relationships significantly assisted the 22 February Response. Many organisations used the experience of 4 September to further strengthen their response capacity.

The Canterbury Earthquake Recovery Commission (CERC), set up by legislation passed on 14 September 2010, had yet to make an impact by 22 February. This body was essentially a coordinating and advisory body and had no executive powers. Although the mayors of the three affected TLAs were members of the Commission, the Mayor of Christchurch delegated his role after initial participation. The chair was part-time and appointment of a chief executive took some time. CERC took no part in the Response to the 22 February event and disappeared thereafter.

The CDEM structures in Wellington were only peripherally involved, if at all, in the recovery from the September event. As a consequence their links with Christchurch were not being enhanced as the months went by. The new organizational structures being set up in Wellington to support CERC did not appear to have CDEM expertise and hence did not contribute to the Response to the 22 February event.

It appears the 4 September event had not improved relationships at a political level amongst the TLAs in and around Christchurch. Indeed a report to the Group Joint Committee, critical of some aspects of the CCC response in September, enhanced existing antagonisms.

In summary, the 22 February 2011 earthquake struck a heavy blow to an already damaged city, and while at lower levels organisations were better prepared, the overall civil defence structure in place for Christchurch was no better than on 4 September.

⁴⁴ The major impact of the September event was damage to housing.

⁴⁵ Including: Middleton, D, and Westlake, R., 4 September 2010: May 2011 and CCC, Sep 2011.

2.2 Declaration of National Emergency

At 10.30am on 23 February 2011 the Minister of Civil Defence declared a state of National Emergency covering Christchurch City. This followed the declaration of a state of local emergency by the CCC at 2.45pm the day before. The Minister advised Parliament of the reason that the declaration was made: ‘... The required civil defence emergency management would be beyond the capacity of local civil defence emergency people to respond to on their own.’ He said that: ‘the declaration... will ensure the maximum possible coordination and cooperation between central and local resources and international assistance. It also demonstrates the Government's commitment to help people in Canterbury to respond to this disaster.’⁴⁶ He also pointed out that apart from the Director of CDEM having power to control [the emergency] there was no difference in the powers available in a National Emergency.⁴⁷

The Minister's statement touched on the three reasons for declaring an emergency:

- powers of compulsion
- availability of resources
- creating public confidence

The declaration of National Emergency did not extend the powers available to the controller or the area covered by the emergency. It did however transfer control to the National Controller,⁴⁸ and away from the CCC and the Group.

This was the first Declaration of National Emergency under the CDEM Act. The decision was obviously not taken lightly.

The lives, health and well-being of the people of Christchurch were severely at risk. The national resources required to deal with the emergency would clearly be very substantial and the Government needed to be sure that these resources were wisely managed. The recent history of emergency management in Christchurch and Canterbury, together with the slow progress of the recovery from the September event, gave no confidence that local control or the existing structures would be effective.

The skills required in managing the Response were far more than what was available within the CCC.

⁴⁶ Hansard: Volume 670, p16948

⁴⁷ The Act does not explicitly provide extra powers for a national declaration as compared with a local declaration, but it seems to expect extra resources to be available. For example, s66 (1) (b).

⁴⁸ The CDEM Act provides that the National Controller of Civil Defence is the Director of Civil Defence, but, as is also provided, the Director had delegated this role on a semi-permanent basis to his deputy.

The people interviewed by the Review almost universally believed that a national declaration was inevitable and nearly all welcomed it. The Review considers that the Government had no option but to declare a National Emergency.

The question does arise as to whether or not a national declaration would have been necessary in Christchurch if Canterbury had been well prepared to manage an emergency of this scale. The 4 September earthquake was locally managed but the scale of the impact of the 22 February event was such that no city or region in New Zealand on its own would have the capacity to provide adequate management of the emergency.

The need for a national input was increased by some additional factors:

- CCC had its own infrastructure to restore which required most of its available resources.
- Local managers were traumatised to a greater or lesser extent with colleagues, friends or family injured or killed and homes severely damaged and families distressed.
- Specialized talents and skills in emergency management were needed.

For these reasons it was essential for staff skilled in emergency management to be brought in from outside in order to assist and to assume senior positions in the EOC.

The Government also decided that the Director of CDEM would go to Christchurch and take control of the emergency as National Controller.⁴⁹ This decision was linked to, but quite distinct from, the declaration of National Emergency. All prior planning for a National Emergency had been for the National Controller to remain in Wellington at the National Crisis Management Centre and to leave local management in the hands of Group controllers or perhaps local controllers.

It was evident however, that the emergency management situation in Christchurch needed a controller from outside the area to provide leadership. Such a person would not have an easy task and needed considerable mana.⁵⁰ It was suggested to the Review that the delegated National Controller, David Coetzee, could have deployed forward leaving the Director of CDEM in Wellington to operate at the strategic level. On face value that appears logical since the NCMC would then have been able to carry out its role under the Plan. Yet it was clearly necessary for a nationally recognised figure to be on-scene, and to have unquestioned authority. The Director of Civil Defence Emergency Management (CDEM) was the only person in the structure with sufficient standing as well as technical competence to do the task. The Review considers that one of the outstanding successes of the Response was the installation of a single person as controller who clearly had charge over the operation, and exercised his powers effectively.

⁴⁹ The Director resumed the role of National Controller which had previously been delegated.

⁵⁰ Power, authority and prestige.

This relocation to Christchurch did have consequential problems. The National Civil Defence Emergency Plan is structured around the National Controller being in Wellington. Much of the coordination between the National Controller and other government departments and agencies was planned to be carried out in Wellington. There were simply no plans prepared to assist the National Controller in the field when he moved out of Wellington and processes had to be developed to support the National Controller in this deployed role and link the CRC and the NCMC.

The relocation also confused other government departments or agencies. Since their planning required them to consult with the National Director, they did so in Christchurch. But consultation on strategic rather than tactical issues should have been with the NCMC rather than the local EOC.

A significant issue the Director faced on arrival in Christchurch was how to merge staff from several different institutions into a single EOC. This is discussed later in the report.

Again the question arises as to whether in future events the same procedure should be followed. **Should the National Controller move to the site of a major disaster under a Declaration of National Emergency?**

The Review considers that the Director of Civil Defence should, if at all possible, remain in Wellington. The task is to provide strategic overview, advice and support for the on-site controller, as well as linking in to the whole of government response.

At the same time, in order to ensure that very large disasters are adequately managed, it is necessary to have another person of comparable standing and capacity ready to take over control on the ground. Such an arrangement requires planning and exercising so that all involved know what their roles will be. This will help ensure that local or Group authorities are neither surprised nor feel threatened by such a move, but rather that they will expect it if the impact of the disaster is large enough. The problem on 22 February was that no such plans had been made. The Deputy National Controller who had a standing delegation of the role of National Controller had not been expected to take a sufficiently high public profile as would have enabled him to step into the job in Christchurch, despite his capacity to do so. It is important that in future the position of National Controller be made distinct from the position of Director of Civil Defence and enhanced, so that his move forward in the event of National Emergencies is neither disruptive nor unexpected by local EM authorities.

The Review proposes a cadre of highly trained controllers drawn from across New Zealand which would enhance the capacity of Groups to control large emergencies. Hence there should be less necessity for a controller to be appointed by central government except for the most significant of disasters. In addition the removal of the confusion created by dual responsibilities of Territorial and Regional Authorities would reduce the need for intervention. While appointments would be

made by Groups, it would be prudent for there to be consultation with the Director of CDEM for larger events.

The remaining question is whether control of a major emergency should be exercised locally or centrally. The experience in Christchurch shows that forward control near the impacted area is essential. Even with the controller being based in Christchurch, it was hard enough to efficiently interact with all the agencies involved locally in managing the emergency. The time taken for information to flow to Wellington and back would have created undesirable delays in action.

Conclusions and Recommendations

The Review considers that:

- The government most appropriately declared a National Emergency.
- The emergency management situation in Christchurch needed a nationally recognised figure to be on-scene. The Director of CDEM was the best person available with sufficient standing as well as technical competence to do the task.
- The 'move forward' to Christchurch of John Hamilton as controller was successful and was shown to have been justified.
- The move of the National Controller was unanticipated and prior planning did not cover this circumstance.

The Review recommends that:

- National emergencies should be managed with control forward, appointing a nationally recognised and competent figure as Controller.
- Plans be made and exercised in advance so that the Director of CDEM can remain in Wellington.
- The position of National Controller be separated from that of the Director of CDEM and enhanced to allow for this eventuality.
- The National Emergency Plan provide for potential deployment of the National Controller forward and how the NCMC and ODESC can best support this arrangement.
- There be built up a cadre of highly trained men and women competent to control and lead in emergency operations centres (EOCs) in moderate and large emergencies.

2.3 The Mobilisation and Management of the Initial Response in Christchurch

(until the establishment of the Christchurch Response Centre)

Background to the Mobilisation

The local commanders for Police, Fire and Ambulance in Christchurch were all in Wellington on 22 February 2011 jointly presenting to an Emergency Management conference regarding the September 2010 Response. So too were senior staff from CCC and the CDEM Group. The local army battalion commander was in Auckland to receive the body of a soldier killed in Afghanistan. These circumstances led to subordinate officers 'acting-up' in their roles at the time the earthquake struck to generate the initial emergency Response from these agencies.

When the earthquake struck on a Tuesday at 12.51pm, several factors favoured the immediate Response and subsequent initial recovery. The airport, port and hospital, although damaged, were all operational, as was the Police and Fire Communication Centre (ComCen). Many roads into the city were still passable and local Police and emergency services, including NZFS, a USAR Task Force and Civil Defence, could immediately respond. Despite these favourable factors which supported the immediate emergency response, the resources initially available were inevitably insufficient.

More detailed commentary on each agency and the USAR function are later in the report.

Narrative of the First 48 Hours of the Response

After the earthquake, people escaped from buildings where they could and generally ran onto the streets. Apart from a relatively small number of buildings that collapsed and many unreinforced masonry structures shedding masonry, most CBD buildings survived sufficiently to allow most people inside to leave. Many people gathered in Cathedral Square before moving out of the CBD and then to Hagley Park, which became the main gathering place.

After the earthquake struck, the initial emergency management focus was the Police and Fire ComCen on the third level of the Christchurch Central Police station in Hereford Street. The building housing the St John ComCen was damaged and control of the ambulance response passed to Auckland, with the Police and Fire 111 Centre assisting in taking calls and tasking. Officers from the Canterbury CDEM Group moved to their Emergency Coordination Centre (ECC) in Kilmore Street and CCC staff moved out of their building due to structural safety concerns. Some staff moved almost directly into the Art Gallery to establish it as the previously identified alternative EOC. This mix of EOCs and ComCens continued to function through the emergency,

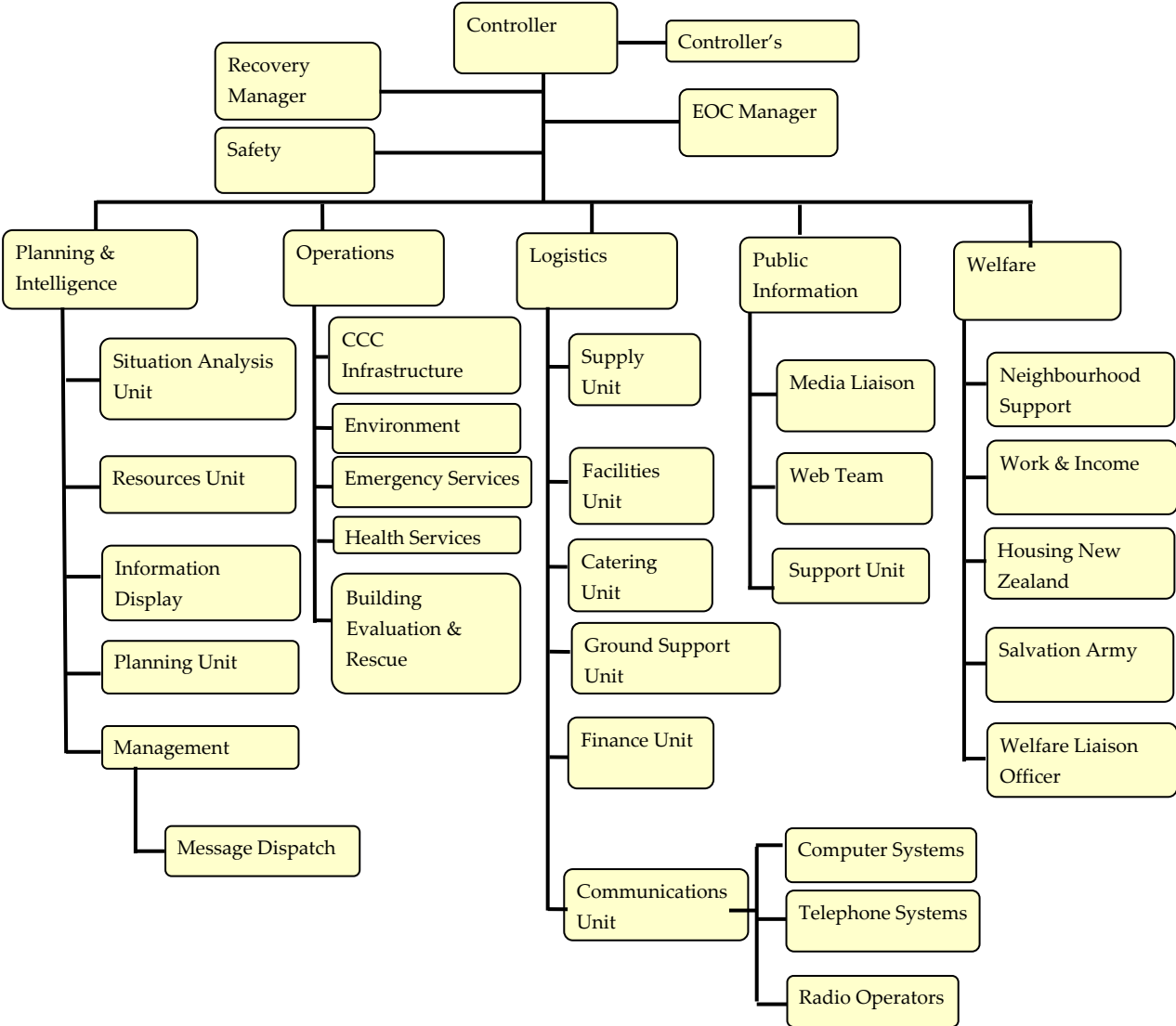
and even though some were co-located and liaison officers were deployed, there was never a seamless operation between the various centres.

The on-duty Police Commander moved out of the Police building⁵¹ with all Police staff, except those operating in the ComCen, and established himself across the road in parklands adjacent to the river. Subsequently he relocated to the compound adjacent to the Police building. The on-duty acting area Fire Commander proceeded from the City Fire Station at Kilmore Street to the CCC building, met with the CCC duty controller and walked with him to the duty Police Commander. Together they agreed a state of emergency should be declared. Subsequently a Fire Incident Centre was established at the Kilmore Street Fire Station, and the Police Incident Centre operated as planned in a room adjacent to the ComCen in the Police building.

Managers and staff from the CCC moved expeditiously to the Art Gallery. Most quickly checked on the safety of their families but then took up their allocated roles in the emergency management structure. Few staff had their laptops with them, Internet access was not immediately available, cellphone coverage was patchy (apart from texting) and landlines were not available. However the EOC was established and commenced operating within an hour or so despite the difficulties. Over the next few hours it gradually became functional as staff reported for duty, communications improved and IT systems were established.

51 The police building suffered damage about which the Review received engineering advice to the effect that this was confined to non-structural elements. However staff in the building at the time could not know that.

The Review was advised that as at 22 February 2011, the formal design of the Christchurch City EOC structure was as follows:



The Review considers that the design of the structure was balanced and consistent with CIMS, together with some additional elements that warranted being in place and that reflect current best practice overseas.

The controllers who rotated in the EOC were the managers directly reporting to the CE of CCC. Similarly the directors of the various functions and the managers reporting to them within the EOC were CCC staff drawn from across the organisation. The Review was told by independent observers that all did their very best in the most challenging circumstances. The difficulty they faced was that few had received adequate training in emergency management or were sufficiently

exercised in the roles they were required to assume. Nor did the choice depend on the personal characteristics of the managers and capability that their role would demand. This put unreasonable pressure on them and on the organisation.⁵²

The Review considers that during the response phase there was a real need for those in senior roles to be effective operational leaders, comfortable with making decisions where there may be an element of fear, a fluid environment with dangers to life and property, and pressure to make decisions without all information. Not all senior managers function well in this environment, particularly if they are unfamiliar with the arrangements in place.

The Christchurch Emergency Services' commanders flew back from Wellington to Christchurch on the Westpac Rescue Helicopter on 22 February. They conducted a brief aerial reconnaissance before arriving at Christchurch airport about 4pm. For Police, the immediate priorities were to gain situational awareness, identify life risk and remove the remainder of the population from potential danger. For the NZFS, the acting regional commander⁵³ was tasked by the National Fire Commander to establish a command structure, support Civil Defence, identify and acquire resources and assist staff families. CCC was also identifying infrastructure that had been damaged and tasking established contractors to commence repairs.⁵⁴

The Review was advised that neither the Police, Fire Service, nor CCC considered that a degree of control was established until about six hours after the earthquake. At that time, five specific sites involved on-going rescue efforts:

- The Cathedral
- CTV building
- PGC building
- The Grand Chancellor
- The Press building

Incident control did not appear to be a significant issue apart from at the CTV site. In respect of that site the Review did obtain first-hand information. The situation at that site at about 6pm as detailed to the Review was:

- A large number of the public were nearby looking on and in the adjacent Latimer Square.
- A large number of media crews were nearby.

52 'During an emergency, what counts is your experience and expertise and qualifications as an emergency IMS leader – and that is all that counts'. Source: Leonard, 2006

53 He had been appointed prior to the earthquake to act as Regional Commander while the incumbent was on leave.

54 See Section 2.3

- There was some semblance of order, with 'chain gangs'⁵⁵ moving debris that could be handled.
- Contractors with knowledge of the building were on site.
- NZ Police and the Fire Service initially lacked executives to deploy forward and take control at the sites identified above, leaving this responsibility with Senior Station Officers within the NZFS and a police Senior Sergeant. This issue is further explored under Section 3.2 - Fire.
- There appeared to be two incident controllers at the CTV site, a Police Senior Sergeant and a NZFS Senior Station Officer. Police indicated they considered the S/SGT was in control and it appears that the SSO may have been too 'hands-on'⁵⁶ to be effectively in control of the site.

The Acting Region Commander and the Region Commander who returned from leave, as well as one of the NZFS executives present on the day, all independently toured various rescue sites in the city late on the afternoon of 22 February. While these officers assumed the SSO was the incident controller, none could indicate they saw the officer in that role.

Who the incident controller was at each of these sites appeared to vary depending on local circumstances. Since there was a fire at the CTV Building that would generally dictate that a NZFS officer would become the incident controller. But it appears that a police officer assumed the role, to some extent. At the Press building, where there was no fire, a fire officer was the incident controller. Police indicated that the Fire Service was responsible for rescue and fire incidents, but the NZFS indicated that Police generally took control once deaths were confirmed at a site. While it may be dependent on circumstances which agency provides the incident controller (as agencies advised the Review), lacking a clear incident controller is contrary to CIMS, the principles of command and control, and places all involved at increased risk. This issue is discussed in more detail in Section 3.2 - Fire Service.

The Review considers the following needs to be taken from the incident control issues at the CTV site:

- There should be a clear and unambiguous national identification of which agency is responsible for managing the range of emergency incidents from fires to rescues, searches to vehicle accidents. This will assist in training and will become the 'default position' for all emergency services.
- There may be circumstances such as a declaration of a Civil Defence Emergency or an absence of appropriate staff where the default position cannot apply. In such circumstances, formal agreement on site needs to be reached and a single incident controller needs to be appointed and clearly identified in the role.

⁵⁵ Or 'bucket brigades': Lines of people passing debris hand to hand from person to person along a line.

⁵⁶ Personally involved in the physical operations.

While the entire Eastern Suburbs were identified early as badly impacted and requiring significant support, there were few reports of immediate risk to life apart from the rockfalls from the Port Hills. Because of the building collapses trapping people in the CBD, the emergency response effort on 22 and 23 February focussed there.⁵⁷ This appears appropriate as the greatest likelihood of saving lives through rescue was at the sites in the CBD. However, the significant effort required to meet other needs in the outer areas was not recognised soon enough. This is further discussed later in the Review in Section 3.2.

The Police, Fire Service and St John responded to a deluge of 111 calls. The CCC EOC, the Group ECC, as well as for Police and Fire established rosters to ensure 24 hour coverage. Many staff needed to satisfy themselves that their families were safe before resuming emergency response work. With phones unreliable, this often required a visit home and, for some, taking children or dependent relatives to a place of safety. Road damage often meant that this took some hours. Concurrently, managers needed to ensure that after the initial call to action, some individuals needed to be sent home and rostered to return later to ensure 24 hour operations could be implemented. This inevitably affected the availability of senior staff on the night of 22 February. In addition, the initial re-deployment of NZFS USAR personnel from the North Island was delayed some 4.5 hours when a New Zealand Airforce aircraft became unserviceable. Other NZFS resources from across the South Island were quickly moved to Christchurch.

Tourists from city hotels were moved to the Ellerslie Flower Show location in Hagley Park on the night of 22 February and subsequently flown out of Christchurch on 23 February.

A situation report at the CCC EOC at 0130 on the morning of 23 February, 12 hours after the earthquake identified that:

- Water and power supplies were disrupted for extensive areas of the city.
- USAR teams were engaged on specific sites.
- A cordon was erected around the central city and the public were soon thereafter excluded.
- St John's Ambulance had an EOC in place.
- Engineering evaluation was taking place.

The Review was advised that late into the night there was a huge amount of information available to the EOC but they did not have good situational awareness. The information was not being adequately analysed and that analysis was not informing controllers and agency commanders in order to make the best operational decisions. The issue of information management is further explored in Section 7.2.

The National Controller arrived in Christchurch with a small staff on the afternoon of 23 February and went to Ilam to join the Canterbury Group ECC, which by then was located at the university.

⁵⁷ Only 16 of the total 185 fatalities occurred outside the CBD.

There he planned his initial headquarters organisational structure, which he implemented the following morning when he moved the CDEM Group ECC to the CCC EOC and created the Christchurch Response Centre (CRC).

By the night of 23 February only emergency services were working in the CBD. By 48 hours after the earthquake it became evident to emergency services that emergency operations were transitioning from life rescue to body recovery. All available indicators suggested there were no further signs of life.⁵⁸

Evaluation of the Response

The Review considers that the following features of the immediate Response worked well:

4 September 2010 Response - The earthquake experience five months earlier was a valuable rehearsal for what proved to be a much larger event. Agency staff could immediately identify likely tasks and requirement. It was immediately apparent that the earthquake was devastating although the full scale of its impact was not known initially.

Continued operation of the Police and Fire ComCen - While there was an almost immediate overload of calls, with operators sheltering under desks taking calls; supervisors commenced prioritising responses and triaging requests for assistance. With Police and Fire communication co-located, there was the advantage of gaining situational awareness from each other's calls, whereas the Ambulance ComCen was operating in isolation. Police and Fire 111 calls for all of the South Island were transferred to Wellington and Auckland and the Christchurch ComCen focussed only on emergency calls from the city. Local police responded on streets and reported what they saw. Fire trucks initially self-responded as they were not initially receiving calls until they received tasking from the ComCen.

Focus on saving life – The strategy during the first 48 hours was sound with emphasis on life saving operations in the CBD.

Rapid deployment of the Military - By coincidence, a major military exercise was underway and troops were also available at Burnham Military Camp on the outskirts of Christchurch. This provided large numbers of NZDF personnel who could respond rapidly in support of the operational and logistics requirement across the city. Elements from Burnham self-deployed soon after the earthquake event. This was not as a result of any formal call out, but a result of the soldiers' experience after the September 2010 earthquake and a correct assumption that their services would again be required in the city. In the first instance, the NZDF effort was centred on assisting the Police to establish a cordon around the CBD to maintain the safety of the public from

⁵⁸ This relatively short period of time was due to the fact that few collapsed buildings were known to have trapped occupants, and the nature of the collapses left little hope for survivors.

falling debris dislodged by aftershocks, and to establish security within the CBD. This is further analysed in Section 3.5.

Evacuation of the city - While members of the public became immediately involved in individual rescues across the city centre, most initially were congregating in the Cathedral Square before being directed to leave the city centre. Many subsequently congregated in Hagley Park before walking to their homes. The public continued to leave through the afternoon of 22 February and tape was progressively erected to keep the public away from dangerous or active areas. Tape was subsequently replaced by fencing. By the evening of 23 February the CBD was occupied only by emergency service personnel.

The Art Gallery as an alternative EOC - The Art Gallery proved to be an effective but not ideal alternative EOC for the CCC, particularly in the initial stages. With its own power supplies and ample space for expansion, it provided a reasonably suitable venue. Issues with internal layout and cordon access were negatives, but not in the first 48 hours. This is discussed in greater detail in the next section.

Arrival of initial USAR teams - Apart from the USAR Task Force based in Christchurch, other USAR teams commenced arriving in the night of 22/23 February. These included teams from Australia and the other NZ Task Forces and significantly increased technical heavy rescue capabilities.⁵⁹

Survivability – The survivability of key infrastructure including the airport, port, hospital and Police and Fire ComCen facilitated the initial Response. Acknowledging the tragic loss of life in collapsed buildings, the death toll could have been far greater had not most of the buildings in the CBD complied with seismic codes sufficiently to resist collapse in the earthquake and hence to protect their occupants.⁶⁰

The following aspects of the Response could have been better:

Clear Command, Control and Coordination - While agency command was well established across emergency services, there was a lack of clarity of incident control in the initial period of the emergency response. This was evident at specific rescue sites such as the CTV building, where nominally there were two controllers – one from Police and the other from NZFS. While the Review was advised the formal position of NZ Police is that: 'It is well established that rescue and fire scenarios are under Fire command' the Review was also advised by those who responded that: 'who takes command is flexible and depends on the situation at the time'. There also appeared to be a lack of clarity and coordination between CCC EOC and the CDEM Group ECC before the CRC was established. This was a problem made worse by the fact that both were operating from

⁵⁹ See Sections 2.7, 3.1 and 3.2.

⁶⁰ The Royal Commission is examining both the reasons for the collapses of specific buildings and the adequacy of the code.

outside their established EOCs. Ambulance operating from an alternative ComCen from Police and Fire reduced their ability to gain situational awareness.

A Lack of Situational Awareness - Because of the scale of the incident and the movement out of established EOCs, some agencies and individuals lacked situational awareness and were unable to gain a common operating picture. While Police remained well informed, this was not the case initially at the CCC EOC or CDEM Group ECC, or later at the CRC. This disparity in awareness and currency of information was an overall impediment to operations.

Analysing Information to Extract Intelligence - While vast amounts of information flowed into the CRC, greater emphasis on analysing this to produce intelligence would have assisted in identifying early trends and would have better supported the controller's decision making.

Common Location - It was unfortunate and inefficient that the CDEM Group and CCC did not initially move into the one facility when both had to move from their established EOCs. This subsequently occurred with the establishment of the CRC.

Call Centre Overwhelmed - The public call centre relating to missing persons was outsourced to Red Cross but was quickly overwhelmed by the size of the event. The handling of calls was then taken over by a private call centre in Palmerston North through facilitation by Horizons Regional Council. The same private call centre also took over calls to the CCC call centre.

Conclusions and Recommendations

The Review concluded that:

Many aspects of the initial Response were positive:

- the initial response of individuals to assist their fellow citizens conduct rescues and support others
- the focus on saving life
- the valiant response by emergency services across the city
- the evacuation of the city
- activation of emergency services through the ComCen
- mobilising the NZDF
- establishing alternate EOCs

Others were not:

- Weaknesses in incident control, both at incident sites and between the CCC and CRC, led to a less than optimal operational picture.

The Review recommends that:

- **CIMS Training** - During the response phase, only those with CIMS training and acknowledged as effective operational leaders be appointed to senior positions in a CIMS structure.
- **Mobility of EOC** - EOCs of whatever size have the capability to become operational with minimal infrastructure in the first instance and not be location dependant. (The on-duty police commander and both the CCC EOC and CDEM Group ECCs were required to move from their established locations).
- **Co-location of ComCen** – The Police and Fire ComCens continue to be co-located and the Ambulance ComCen be added to the one facility. (This provides the opportunity to quickly gain situational awareness as information from all agencies is collated.)
- **Develop a single EOC for the Canterbury Region** - a single EOC facility be developed that could be used by single or all agencies so as to improve coordination and operational effectiveness and reduce duplication of facilities (but redundancy with back-up facilities is still required.)
- **Establish unequivocal incident control at individual sites** - a single incident controller be appointed at each incident site of significance in accordance with CIMS doctrine, and depending on the size and complexity, an incident management team (IMT) be set up to assist in controlling the incident.
- **Responsibility** – Responsibility for the management of all emergencies and hazards needs to be more clearly identified well in advance between police, emergency services and government agencies, to assist training and avoid duplication. This needs to be a national approach with better defined ‘default’ positions. It is acknowledging that in some circumstances, discussion between agencies commanders may modify these responsibilities for control of multi-agency emergency incidents.

2.4 The Role of National Controller at the Christchurch Response Centre

There can be no greater responsibility or greater reward than assisting others to get through an emergency.

John Hamilton, Director CDEM

Background to the February Event

The Canterbury Group had worked consistently at developing the emergency management competencies of individuals across the Group. In the absence of substantive training provided

nationally, the Canterbury Group imported training from British Columbia in Canada and delivered training not only to officers in the Canterbury Region but from other districts as well. This proved a valuable investment as many of these Canterbury trained officers returned to support Christchurch after the February Earthquake. Some members of CCC had attended the Canterbury Group training, while others had completed the basic CD introduction courses.

A report written for the CDEM Group after the 4 September earthquake criticised the performance of elements of the CCC and this contributed to the disunity between CCC and the Group, and dysfunctionality that was not resolved at the time of the February earthquake.

Features of the Response

On the evening of 23 February, when John Hamilton arrived in Christchurch, he planned his initial headquarters structure *ab initio* as it had not been previously envisaged that the National Controller would deploy out of Wellington. On the morning of 24 February he then moved from the University to the Christchurch Art Gallery and merged the Group and Christchurch City control centres into what became the on-site EOC – subsequently known as the Christchurch Response Centre (CRC). He and his deputy Steve Brazier controlled the response until 30 April when the Canterbury Earthquake Recovery Authority (CERA) was formed and responsibility for recovery was formally passed to that organisation.

Christchurch Response Centre Structure - The initial structure adopted by the National Controller essentially accommodated the two existing EOCs of Christchurch City and CDEM Group. The staff of the CCC EOC were designated as the 'Operations Directorate' and the staff of the Group ECC were designated as the 'Plans Directorate'. Unlike the accepted CIMS integrated approach, however, both these functions operated with a degree of independence and were joined through the National Controller. Both developed various CIMS functions including logistics thereby causing duplication within the one operational structure. The review was advised that in fact, three logistics functions were operating concurrently in the EOC.

It appears that separating elements within the Response Centre, rather than seeking to integrate the CCC and CDEM Group EOCs, was a realistic decision to accommodate two diverse organisations that had not been able to cooperate in recent years and individuals who struggled to work together. The Review recognises the difficulties in amalgamating these two EOCs at a time when the demands of the response allowed no pause in action. The subsequent organisational structure did, however, reduce the effectiveness of the CRC and confused the staff that had completed CIMS training and were expecting to work in a structure they could relate to readily. Those who operated solely within the Christchurch City 'Operations' function were able to identify a CIMS structure within their Section. Those staff who had to work across the Christchurch City and Canterbury Group arrangements – as depicted in the 'Operations' and 'Plans' arrangements in the diagram below – struggled to reconcile the structure and some were still at a loss to explain its functionality to the Review team 12 months on.

The Christchurch City and Canterbury EOCs were combined as below:⁶¹

The Civil Defence Emergency Management Framework and Response to the 22 February Christchurch Earthquake

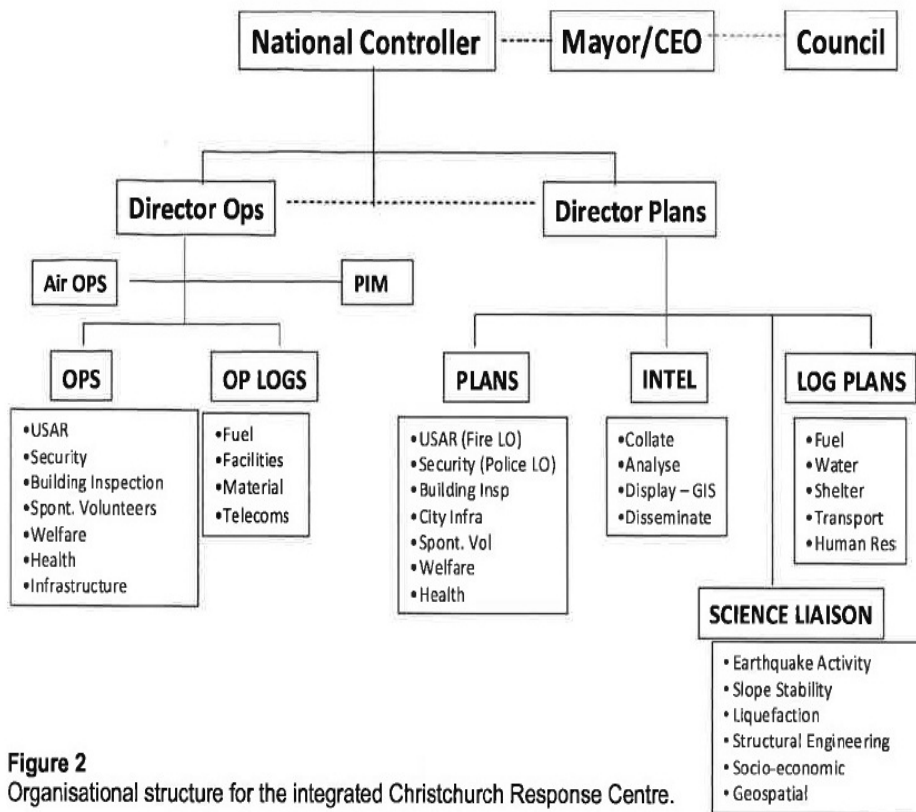


Figure 2
Organisational structure for the integrated Christchurch Response Centre.

61 MCDEM, at <http://canterbury.royalcommission.govt.nz/documents-by-key/20111014.354>

The National Controller gave the following as being key factors in designing the staffing structure of the CDC.

1. **It was critical to meld ECan Operations staff with CCC.**
2. **Amongst some staff a level of dysfunctionality meant there was considerable friction within working relationships.**
3. **CCC were already doing the Operations function so it was best not to alter that.**
4. **Planning was weak and therefore the new staff would be best in that function.**
5. **He was keen to ensure Logistics was involved in the operational planning rather than getting bogged in finding petrol for operational tasks etc. Hence the split of logistics between Operations and Plans. In hindsight it could have been a Logistics function with two elements of Log Operations and Log Plans.**
6. **He used two direct reports to better manage his interactions and avoid too many reporting to him.**
7. **As it turned out the structure needed to be explained to staff more fully (which was very difficult because of the pace of the HQ).**
8. **This diagram is staff functions and not command or control of assigned resources.**

The Review regards it as perhaps the best possible in the circumstances: a blending together of the CCC and the CDEM Group EOCs that had become dysfunctional from a CD perspective, together with the operational requirements as identified by the NC. What further challenged the effectiveness of the structure was the eight hour rotation of staff through key positions.

Almost all the impact of the earthquake, and hence the response activity, was within the Christchurch City boundaries. However the capacity to assist with response was not limited to the city area and indeed considerable assistance was provided, mostly informally, from beyond. Formal assistance was limited primarily to provision of some staff to relieve those in the CRC and a welfare centre at Rangiora. Considerably more use could have been made of the stronger CDEM organisations in Canterbury to support the response.

The Review considers that apart from the structures presented in this section, there was the opportunity to develop sectors across Christchurch City, managed by tactical level incident control teams reporting to Operations. This would have devolved local control during the Response and subsequent Recovery phase. In accordance with the CIMS Manual, establishing sectors (a defined

portion of an overall incident)⁶² would have decentralised some operational control and allowed the CRC to manage the more overarching and strategic issues, while allowing tactical management to proceed.

Perhaps two sectors could have been established dividing the CBD, with a further sector managing in the east and one in the south of the city. Attempting to manage emergency response across a large geographical area, as well as a multitude of tactical and more strategic issues, from the one CRC was highly challenging and not consistent with incident management doctrine.

Evaluation of the Role of National Controller at the CRC

The Review considers that the following features worked well:

Appointment of John Hamilton as controller - The Review received universally favourable comments about the way in which issues, once being brought to John Hamilton's attention, were dealt with decisively and brought him respect. His calm demeanour was a steadying influence in the turmoil of the aftermath of the earthquake. His deputy in Christchurch, Steve Brazier, gave good support and similarly contributed to a sense of direction and purpose.

Deployment of the NC forward - Perhaps because of the challenges between CCC and the CDEM Group, the deployment of the NC forward to Christchurch was an important initiative to pull the elements together. Acknowledging that the response to the earthquake could not have been managed by CCC or CDEM Group **and** warranted national intervention it sent important early messages to all involved and was effective in concentrating and focussing efforts into the one organisation.

Seamless transition from response into recovery - The National Controller oversaw the seamless transition from response to recovery. While this led to a change in organisational structure on 20 March 2011, it effectively commenced on 25 February and reflected an approach and philosophy that both stages of emergency management should develop concurrently.

Media management - While media management was a team effort involving a variety of agencies and individuals, providing information to the large media corps did require the direct involvement of the National Controller. His participation meant the media received information 'from the man in charge' and this provided both authority and confidence to be conveyed at a critical time for local communities.

62 NZ Fire Commission, 1998, p33.

The following aspects of the response could have been better:

- **Chief of Staff** - The National Controller arrived with a small staff who provided his office with immediate support. Two staff members were rotated in a post titled Chief of Staff although the role and function of the position was not clear. Effectively the task was mostly coordinating the National Controller's office and dealing with specific problems for the National Controller. What was needed was a strong character with experience at a senior level as a Chief of Staff in coordinating staff functions, ensuring the Controller's intent is actioned and handling the politics of an EOC or HQ. With the authority of the National Controller his role would be to ensure that decisions once made were put into action, completed and not duplicated across the staff. The underlying local politics, the merging of two distinct and somewhat non-co-operative EOCs and the subsequent disconnect in the CRC made this imperative. Regrettably this never occurred and as a result the Review has concluded the functionality of the CRC was never optimal. The absence of an experienced and capable Chief of Staff led to issues arising that the NC had no time to attend to but in its absence generated friction within the operation of the EOC. These were issues such as:
 - Ensuring that the CRC structure, while not compliant with CIMS, still operated smoothly and that staff understood functions and arrangements.
 - Operations Directorate not accepting the responsibility to implement plans developed by planning or others. A number of plans that were developed were either stalled or handed back to the planner to implement because a Chief of Staff was not available to oversee and direct headquarter functions.
- **Numbers in the CRC** - with up to 500 staff operating out of the CRC it became unwieldy as a work place. Large numbers of these staff (such as up to 50 data entry staff) could have completed their work off site and reduced the numbers and pressure on the EOC within the cordon. This is further discussed in Section 2.5.
- **CRC arrangements not compliant with CIMS** - Establishing the CRC within the CIMS framework would have been likely to have improved efficiency and assisted all staff who had completed CIMS training.⁶³ Introducing a different functional arrangement at the time of a crisis is always likely to be problematic, and during an intense operation such as the Christchurch earthquake response, there is no time to train and familiarise staff. There was an

⁶³ The ICS system in the USA is comparable with CIMS and its strengths have been stated as: The first advantage of ICS is that it offers a robust form of command in which the person in charge, and all appropriate functionaries, are easily recognisable by the wording on their reflective tabards. Spans of control are kept within manageable limits, continuity of command is assured because it refers to the figure, not the person..... Another advantage is that the system can expand to absorb resources (personnel, vehicles, equipment, supplies, etc.) as they arrive on site. This ensures that new arrivals are not left outside the command system without a role. It also gives the opportunity - and the imperative - to ensure that working practices and terminology are homogenised. This provides a ready answer to one of the greatest problems of emergency management: how to ensure that organisations work effectively together under exceptional circumstances: Alexander, p113, 2008.

existing fragility in bringing the CCC and CDEM Group into the same structure. This may have warranted the structure that was first established although it came at the expense of simplicity and functionality.

- **EOC organisation** – There was a widely reported lack of clarity about the organisation of the EOC. There was also confusion about who to contact on various issues and it was reportedly difficult to locate and engage with the relevant CRC person other than by locating and physically visiting the relevant people to maintain communication.
- **Leadership roles** – In key positions in the EOC there were 3 or more appointees to a particular role with the same title, in order to deal with shift arrangements. The lack of hierarchy for these positions ⁶⁴ led to instructions being countermanded and some confusion. This was exacerbated by shift handovers not being well managed.
- **Communication in the EOC** – was difficult. Email addresses changed several times and these and phone numbers were assigned to persons rather than roles or positions which caused confusion especially when shifts changed.
- **Work at Wellington** - With the Director, now National Controller, deployed forward to Christchurch, the role of the NCMC became uncertain. This arrangement had never been envisaged let alone practiced. Further discussion follows in Section 2.6.
- **Fragmentation of EOC** - By the morning of 23 February Council staff at the EOC had exceeded the room previously occupied as the CCC EOC and staff were occupying the Gallery Foyer. This began an unplanned expansion through much of the Gallery complex, requiring Gallery staff to remove art works as emergency management personnel occupied additional space. With the arrival of the CDEM Group ECC staff on the morning of 24 February, they occupied a gallery room quite some distance from the CCC EOC staff, and together with the structure adopted by the National Controller, a divided CRC evolved. The NC and his direct staff moved to a smaller space upstairs in the Gallery building. This meant the NC was being supported by CRC staff who were physically as well as functionally fragmented.
- **Pre-planning of the Art Gallery as the EOC** - The National Controller had overall responsibility for the EOC, although in effect he adopted an existing facility identified by both CCC and the CDEM Group as their alternative EOC. Previously, in September 2010 when the Council building required evacuation, CCC had used only a portion of the building. The Review considers the building had the potential to be a suitable alternate EOC if planned, but its occupation by the CRC required detailed pre-planning and management which never occurred.

64 Instead of having a prime appointee with subordinate shift replacements.

- **Centring of Decisions, Financial Delegations and Contract Authority** - The Review was advised that too many decisions were pushed to the National Controller, perhaps because others either did not feel empowered, were unaware of the National Controller's intent or lacked delegation. This placed additional and unnecessary pressure on the National Controller. In turn, the National Controller needed to maintain good liaison with the NCMC and the Government both through ODESC and directly. The task was most challenging.
- Dividing the tactical control into 'sectors' across the city may have delegated to 'sector controllers' many of the issues raised to the National Controller. These sector controllers could have reported to Operations and managed tactical level issues in recognised sections of the city.
- The National Controller initially limited the delegations of the Operations Directors to \$50,000, when the Review was advised their CCC delegations were from \$100,000 to \$500,000. This further centred decisions on the National Controller and reduced the ability of Directors to fully support the National Controller in implanting decisions. Linked to this, was the confusion that developed when the National Controller approved contracts on CCC letterhead. It became unclear whether this was committing CCC to the contract or Director CDEM, or both. In addition, the CCC staff retained their responsibility to their 'day job' managers, and the CCC leadership was gravely concerned at incurring expenditure which could be charged to CCC.⁶⁵
- **Daily Briefings** - Briefings were conducted twice daily, providing a significant transfer of information, although the Review considered that the CRC never gained all the information available to Police. The Review notes that while Police and the NZFS had liaison officers (LO) in the CRC, there was no LO from the CRC with Police or Fire and no one from the CRC attended the twice daily Police briefings in Police HQ. A transfer of liaison officers would have allowed for greater situational awareness in the EOC.
- No mechanism for electronic reporting was in place. The EMIS system had been bought by MCDEM but was not yet operational at the time of the earthquake. Furthermore with the CRC being created in and around the original EOC of the CCC (CCC), it was dependent largely on the IS systems of the CCC.

Much more use could have been made of the strong CDEM organisations in other TLAs in Canterbury to support the response.

⁶⁵ An example was the kerbside collection of debris from residential households, which was unilaterally cancelled by CCC without reference to the Controller, rather than being continued and discussions held over who should bear the cost.

During an emergency, what counts is your experience and expertise and qualifications as an emergency IMS leader – and that is all that counts.

Source: Leonard, p9, 2006

However, the person with the highest rank in a given office, chosen for capacity to build the organization and its capabilities for response, is not necessarily the person best qualified to lead it in a moment of intense stress and disruption.

Source: Leonard, p10, 2006

Conclusions and Recommendations

The Review concluded that:

- The merging of the CCC and CDEM Group EOCs caused a degree of confusion, inefficiency and duplication. Cohesiveness was never fully achieved despite the efforts of staff involved in the CRC. The disaster zone was perhaps too great an area to be managed by the CRC without dividing the city into sectors.
- As it had not been planned, the CRC lacked operational procedures and training which aggravated the weaknesses and tensions in the structure.
- John Hamilton proved to be an excellent choice as controller for the emergency who exercised his powers consultatively and wisely.
- The lack of a senior and experienced Chief of Staff and the continuing absence of a CIMS structure reduced the effectiveness of the CRC.
- The transition from response to recovery was seamless and detailed proposals were developed under the CRC to establish the Canterbury Earthquake Recovery Authority (CERA). However the lack of legislation in place (or drafted) for recovery from major events caused delay in setting up CERA and hence extended the response period beyond what was desirable.

The Review recommends that:

- In major emergencies, controllers use a CIMS structure with slight modifications as proposed elsewhere in this report, and where EOCs are established on other structures, they move as rapidly as possible to structures reflecting CIMS.
- Staffing of large EOCs include a senior and experienced Chief of Staff.
- Communications within large EOCs for major emergencies be improved. (See Section 7.2)

2.5 The Coordination of Response Activities in Christchurch

This section deals with the overall coordination of response activities by the CRC in Christchurch. The individual contributions to the response by the many organisations participating are discussed later.

The emergency services (Police, Fire Service and St John) work closely together outside of major emergencies. Much of their work in fact is dealing with emergencies together. Thus they bring existing relationships and cooperative mechanisms.

Providing the CRC with greater situational awareness - The Review understands that during the response the emergency services met together twice daily at the Police Coordination Centre for briefings and to plan tactics. Sometimes other agencies like MFAT also attended. The Review considers that the Police Coordination Centre adjacent to the Police and Fire ComCen was likely to have been the most current and up-to-date operational centre. Unfortunately their situational awareness did not always appear to be conveyed to the CRC and inviting a member of CRC operations to attend the twice daily Police briefings would have assisted in maintaining an up to date awareness of the operational situation across all EOCs, subsequently referred to as a Common Operating Picture.

This parallel mechanism for cooperation can have strengths since these briefings were likely to have had the highest level of situational awareness. But separate briefings also created a risk of activities being pursued independent of strategies laid out by the controller.

The senior police officers interviewed by the Review spoke of 'tasking' of the Police. This inherently recognises the overall direction by the controller, but does not imply a potentially significant contribution by Police to the various strategies and tactics being developed in the CRC. Police do have statutory responsibilities relating to the maintenance of law and order and to assisting coroners, and need to exercise these independently. But beyond that, the Police have a capacity to contribute to the response significantly more than can be achieved by attending daily or twice daily briefings, and accepting tasks as directed.

The National Plan provides that: *At regional levels a senior member of each emergency service is assigned to the co-ordinating executive group of each CDEM Group.*⁶⁶ In Canterbury the police officer assigned did an excellent job both in planning before the emergency and in the CRC. However his rank of sergeant did not carry sufficient weight and required him by force of personality to provide adequate representation of the Police.

The role of the New Zealand Defence Force (NZDF) was primarily undertaking tasks as directed by the National Controller. As such it was fully coordinated into the response and a senior NZDF officer was located adjacent to the CRC. An enhanced role for trained officers either from NZDF or Police within the EOC would improve coordination as is discussed in Section 3.5 of the Review.

The CCC provided the bulk of staff within the CRC including the directors of operations and managers of various subordinate functions. Despite that, there were limitations to the coordination of the CCC response as directed by CRC. At a senior level the CCC placed strong emphasis on reverting to business as usual as soon as possible and throughout the period of the response parallel meetings of CCC executives under the CE of the Council were held. These meetings appear to have focussed on BAU and were not formally linked to the processes of the CRC. As with the briefings of emergency services convened by the Police, such meetings could have reinforced the overall response and recovery effort, but without being well coordinated with the CRC, generated a risk of encouraging action by CCC staff independent of the CRC response.

The CRC had little contact with the two TLAs adjacent to Christchurch. There was little coordination of their efforts apart from the provision of a welfare centre at Rangiora and contingent arrangements for such a centre by Selwyn District. More use could have been made of the resources of these two districts, particularly to relieve staff from Christchurch City whose families or homes had been severely impacted.

Coordination with the Ministry for Social Development (MSD) was greatly facilitated by a very senior MSD manager handling welfare planning within the CRC. As with Police, MSD have a strong national organisation, are well prepared for emergencies and can carry out most of their statutory functions quite independent of an EOC like the CRC. Planning needs to facilitate cooperation so that the strengths of MSD can maximise their contribution to the response as a whole.

Coordination of the activities of other departments and government organisations varied. Some like the health sector worked closely with the CRC because of past planning and exercising together. Others were less closely linked.

The coordination of volunteers was difficult, and indeed neither the CIMS structure nor the CDEM Plan and Guide provide ways to make the best use of community groups offering their services.

⁶⁶ See National Plan, cl. 21.2.

Two of the major groups became quite well linked into the response when the liaison person from the CRC responsible for tasking them moved from the Art Gallery to their base at the Show Grounds.⁶⁷

Apart from Neighbourhood Support (whose organiser found himself a place in the EOC) and marae (who were connected by Te Puni Kokiri), coordination of other community groups was almost non-existent for some time. In badly impacted areas different community groups operated almost independently of the CRC. The main links were local Police and volunteer fire brigades so the groups achieved liaison with the CRC quite indirectly. The lack of close liaison led to questionable decisions such as the closure of all welfare centres in the east without their replacement in the heavily impacted area by centres of a different kind.⁶⁸

The challenge for an EOC in coordinating such diverse groups is to empower the organisations to use their initiative and get the job done, but at the same time ensure that they are contributing as part of a cohesive effort.

Specific Issues Affecting Coordination

The Art Gallery as the EOC - The layout of any EOC contributes to its efficiency and effectiveness. Connectivity between CIMS functions, maintenance of 'knowledge walls', displaying current and critical information and maintaining situational awareness all contribute to EOC proficiency. Without planning, these important inter-relationships are hard to establish, or indeed become frustrated, and the geography of the facility hampers rather than enhances operational effectiveness. The existing CIMS manual appears silent on the attributes of an EOC. It needs to be more prescriptive and highlight the importance of planning EOC layout to enhance its operations.

While The Art Gallery was not purpose built as an EOC, it was suitable. The Review received numerous comments that establishing the EOC at the Art Gallery led to difficulties and generated a disparate and unconnected footprint. This is not the view of the Review. Having toured the facility, its assessment is that the Art Gallery is suitable and should be retained as an alternative EOC. Occupation, however, needs to be planned to ensure the key functions of Control, Operations, Information, Planning and Logistics all utilise the generous gallery rooms available and that they are suitably interconnected. A lack of planning and failing to best use the available space, rather than the facility itself, is most likely to have led to difficulties. Simple measures such as signs indicating functions and locations appeared to be lacking. Similarly a reception desk at the EOC would have helped immensely.

Despite the best efforts of the Centre Manager, the Review considers that the unplanned expansion of the EOC into the Art Gallery, including roles such as data input that could have been carried out

⁶⁷ See Section 8.2 on Volunteers.

⁶⁸ For example, centres to provide food, water, or information.

almost anywhere, degraded the efficiency of the centre. It led to poor utilisation of the available space and overcrowding. Many of these people, while contributing to the overall effort, were not needed at the Art Gallery building and hindered the performance of the building and the EOC. This became a highly challenging facility to operate. 100 council staff, focussed on infrastructure recovery, moved out to Fendalton Library on Monday 28 February. This move proved successful and could have been replicated with other staff for whom location within the CRC was not critical to their contribution to the response.

Having an EOC within the Cordon - Likewise the Review reached the conclusion that, while having the CRC within the CBD cordon was not ideal, it was manageable. Of course this could not have been predicted and, once established, moving the CRC was highly problematic. It was a balance between utilising a suitable building within the incident site and dealing with the issues generated. The Review was advised that being adjacent to the 'main effort,' initially of search and rescue within the CBD, and subsequently of assessment of buildings, was a benefit. Issues that appeared to generate friction were:

- Having the cordon pass-issue office at the CRC, rather than at the boundary of the cordon created problems as individuals needed to gain access into the cordon to apply for a cordon pass at the CRC.
- Providing extensive catering at the CRC is said to have drawn many who did not appear to work within the CRC to that location for meals. This meant far more people than needed were congregated around the CRC.
- Pampering CRC workers with massages, while a kind donated offer, generated the perception that those in the CRC were isolated from the distress and hardships of those suffering across the city.
- While domestic media for Christchurch played an essential part in informing Canterbury communities, establishing the total media centre adjacent to the Art Gallery brought a further large number of people within the CBD cordon. This may have been unavoidable under the circumstances, but it increased the already substantial pressure of maintaining an EOC within the cordon at the incident site.
- Undoubtedly, had the pass office been moved to a site on the perimeter of the cordon, and had photographic passes been issued, this single point of friction that generated extensive antagonism would have reduced significantly.

Evaluation of the Coordination of Response Activities in Christchurch

The Review considers that the following features coordination worked well:

Cordon Management - While it took four to five days to establish a cordon fence, during that time the NZDF and police maintained the cordon through patrolling and presence at intersections. The subsequent management of the cordon, including regular adjustment, was managed well by the NZDF and is discussed further at Section 6.3.

Subsequent security of the CBD - The NZDF was tasked with securing each CBD building through constructing a plywood fence around each building and padlocking entrances. This was an effective approach to further limiting building access within the CBD.

The following aspects of coordination could have been better:

Local Politics - Local tensions had impacted on the operational viability of CDEM Group ECC and CCC EOC when they were separate. When merged what resulted was a CRC with a high degree of fragility that limited the potential for robust restructuring at its inception. Unfortunately this led to an EOC architecture that encouraged silos and uncoordinated activity. The fact that good results were achieved overall is due to the manner in which the staff working in the CRC determined to get the job done and surmount obstacles as they arose.

Cordon ID - Initially cordon passes were photocopied and signed by the controller. This was insecure and time-consuming. Eventually several photo ID machines were obtained which enabled a more robust system of cordon passes to be introduced.

Planning and Implementation - There was a lack of process between Plans writing a plan, and Operations implementing the plan into action. Plans were sometimes returned to Plans Directorate for action. On the other hand the need for longer term planning was emphasised to the Review. With such a major event, the planning function needed to focus on 7 and 28 days ahead plans avoiding the inevitable churn associated with shorter term issues. The functional role of Planning, preparing a plan that was subsequently implemented by Operations who coordinated execution and was supported by Logistics, was largely lost.

Right people in the right roles - With the accommodation of the CCC staff in the Operations function and CDEM Group staff in the Planning function, there were people with reasonable CIMS training or emergency management experience to fulfil many of the senior roles. This limited background contributed to the just described overlaps and gaps between the several CIMS functions. While there is a need for local knowledge, the Review reached the conclusion that receiving CIMS training and gaining experience in emergency management can be supplemented by those with local knowledge, but those with local knowledge and inadequate training are less likely to assimilate into a management team such as the CRC during the response to a major emergency.

NZDF collaborative planning tools - The collaborative planning tools and ability to prioritise through structured decision making of NZDF were largely unutilised by CDEM. The NZDF could assist in this regard since it is an integral part of their core business and it could also assist with the development and delivery of appropriate training.

Unwitting Complacency - When the 22 February earthquake occurred, the 4 September event five months earlier became a valuable rehearsal and many who had experienced recovering from the earlier event were familiar with likely tasks. It meant however that some considered this a very similar event and wanted to conduct their role in the same way, not acknowledging that the 22 February event was far more significant and had assumed national proportions.

Liaison Officers - While the CRC received liaison officers from Police, Fire and Ambulance they did not reciprocate. There would have been considerable value in the CRC placing a LO with Police, particularly in the initial week or two so as to improve situational awareness within the CRC.

Rotation of People in roles - In many positions within the CRC, no one individual was the designated person in roles which regularly rotated every eight hours – they were all equal and rotated through on shift. This became disruptive and inefficient as decisions were adjusted or overturned, staff responded to one individual in the role but not others and there was a general lack of continuity. Decisions varied as to who was on shift at any particular time. While the Review acknowledges that there is a need to maintain shifts, it sees great benefit in appointing an individual to each functional role such as Director of Operations, Infrastructure, Planning, etc. Those who manned the positions at other hours would have authority to deal with issues that came up, but only within policies and precedents set by the incumbent. This highlights the need for training and established operational procedures.

Shift handovers - There were usually three handovers a day, 7am, 3pm and 11pm, to accommodate eight hour shifts. The on-going need for handovers needed to be templated to ensure that staff received the necessary information prior to commencing their shift. Handovers are always a vulnerable period and a formatted handover template is required.

Gathering information - Whether it was because of dysfunction between Planning and Operations, the rotation of people through roles, or the lack of training of some people, there was a great deal of information collected but it did not appear to directly assist key decision makers. This information was gathered by NGOs, volunteers or Rescue Teams but the information did not seem to reach decision-makers in the EOC in the form of coherent intelligence. This issue is further discussed in Section 7.2.

Conclusions and Recommendations

The Review concluded that:

- There is no doubt that implementing an untried structure, especially when placed within a building not intended as an EOC, would always be challenging. Overlay the tragedy and distress of 22 February and the difficulties are immense. The Review does not underestimate these considerations or play down the obstacles in place for all concerned. It does however, emphasise the need to rely on training and exercising in emergency management, so as to equip those involved before the event.
- An EOC is an unfamiliar environment for many where people are thrown together with inadequate information to make significant decisions under time pressure. The challenges facing staff in these times, and the expectations placed on them, in part has motivated the Review to recommend that managing emergencies become the responsibility of fewer authorities. Furthermore, developing a small cadre of specialist emergency managers capable of managing large and complex incidents appears a viable approach for New Zealand.

The Review recommends that:

- CIMS include a functional role titled 'Community Wellbeing' in response and recovery operations.
- Authorities ensure that only people who have completed the required training and are suitable for the roles are placed in CIMS functional positions. This should assist in ensuring that both Planning and Operations are able to fulfil their own roles within an EOC.
- Greater use is made of collaborative planning tools to prioritise.
- Controllers ensure that liaison officers are exchanged with other major partner agency EOCs to best gain and maintain situational awareness.
- Controllers appoint individuals to key functional leadership positions and have them supported by others in a shift relief arrangement.
- MCDEM develop a shift handover template and include it in a future edition of CIMS.
- Consideration be given to producing a national CDEM identity card (or badge) available to mandated agencies.

2.6 The Coordination of National Support by the NCMC in Wellington

The NCMC is the permanent operations centre established by the Government. It is located in the basement of the Executive Wing of Parliament Buildings ('the Beehive'). The function of the NCMC is to facilitate 'a whole-of-government response in support of government crisis management arrangements by providing a secure, centralised facility for information gathering and information management, strategic-level oversight, decision making, and co-ordination of national responses.'⁶⁹

During civil defence emergencies MCDEM as the lead agency uses the NCMC as its emergency operations centre. In standard emergency planning it is envisaged that the NCMC would be used to gather, collate, assess and produce information, direct response operations and support, issue public information and conduct media liaison, inform and advise the Government, and, where required, co-ordinate government and non-government resources.'⁷⁰

'The primary support agencies in the NCMC for civil defence emergencies include:

- the Ministry of Health
- the Ministry of Social Development
- the Ministry of Foreign Affairs and Trade
- the New Zealand Defence Force (Joint Forces Headquarters)
- the New Zealand Fire Service
- the New Zealand Police
- the Ministry of Agriculture and Fisheries'⁷¹

Other government agencies become involved depending on the nature of the emergency.

Apart from liaison people from key agencies, the bulk of the staffing of the NCMC, when it is activated for a civil defence emergency, is drawn from MCDEM or its 'mother ship', the Department of Internal Affairs (DIA). Training and exercises are conducted to ensure that staff are familiar with CIMS operational procedures, but the Review was not in position to assess the adequacy of this, especially since most such staff hold positions unrelated to emergency management. Unfortunately in February 2011 a new computerised Emergency Management Information System (EMIS) was still being tested and could not be used.

MCDEM started activation of the National Crisis Management Centre (NCMC) in Wellington within 15 minutes of the first information about the earthquake. This was possible due to the

⁶⁹ National Civil Defence Emergency Management Plan, cl 63 (1).

⁷⁰ Source. The guide to the National Civil Defence. Section 20.

⁷¹ National Civil Defence Emergency Management Plan cl 65 (5).

presence of MCDEM staff in the NCMC at the time. The NCMC was fully activated within one hour, including representation of the major support agencies (Police, NZFS, NZDF, MoH, MoT, MSD). The then delegated National Controller led the NCMC activation and established contact with the local controller in Christchurch. The immediate roles of the NCMC upon activation were:

- To establish a connection with the CDEM Group ECC in order to obtain information and to be ready to provide assistance
- To arrange for emergency air travel for the Christchurch emergency management staff that were attending the conference in Wellington to return to Christchurch
- To collate and present information for the Minister of Civil Defence and ODESC
- To establish an all of government coordination point
- To service media demands
- To consider the on-going management requirements and to start planning accordingly.

The decision to move the Director of Civil Defence to Christchurch with the designation of National Controller caused problems initially while the new working relationships between the Christchurch Response Centre and the NCMC were developed. Of necessity he took a small staff with him and some of these were people who would normally fill key positions within the NCMC. The possibility of locating the National Controller away from the NCMC had never been contemplated and consequently no plans existed.

Offers of assistance from other countries were received at the MFAT desk and were referred to Logistics. However with much of the logistics activity based in Christchurch the Review was told of cases where offers were accepted which were of minimal use. In other cases the appropriate desk at the CRC was not aware of offers made which would have been, in their view, of real value had the offer been accepted - See Section 7.1.

The lesson to be learnt is that planning for the operations of the NCMC must accommodate and exercise the possibility that in a national state of emergency the designated controller may not always be located in the NCMC itself.

As mentioned, the function of the NCMC is to facilitate a whole-of-government response to the management of an emergency. The actual whole-of-government response is directed through a Committee of Cabinet (Domestic and External Security Committee (DESC). The Cabinet Committee is supported by an Officials Committee (ODESC) which is chaired by the CEO of the Department of the Prime Minister and Cabinet (DPMC).

The Terms of Reference for this Review exclude consideration of the management of the whole-of-government response to the civil defence emergency. Nevertheless it is considered necessary to refer to a decision taken at an ODESC meeting.

At an early meeting of ODESC after the Christchurch earthquake, the Ministry of Economic Development (MED), which had a relatively new responsibility for over view of procurement for the total government sector, was tasked to assist with the infrastructure logistics. The effect of this decision is dealt with later in Section 7.1 on Logistics.

The Government Procurement Service (GPS) was able to play a substantial role in the sourcing and procurement, particularly from overseas, of 'portaloos', chemical toilets (and bulk supplies of associated chemicals), specialized heavy equipment and fencing.

One issue, which should have been capable of speedier resolution at NCMC and ODESC, was payment for charter flights. International practice is that 50% of shipping costs be paid when orders are placed. The estimated time given to obtain approvals for this expenditure was unacceptable to the person who had been arranging the shipping of chemical toilets etc., and he took steps to arrange for his parent company to provide the funds as required, and obtained reimbursement in due course. This was in fact a misunderstanding because the NCMC had the financial authority to approve such items of expenditure.

Evaluation of the Response

The Review considers that the following features of NCMC worked well:

- provision of links to and from the CRC for the whole-of-government response
- handling the international offers of assistance
- relieving some external pressures on the National Controller at the CRC, especially some media pressure and liaison with other departments
- provision of support to ODESC
- implementation of government decisions
- the Government Procurement Service slotted in smoothly to support the NCMC and the CRC operational requirements

The following aspects of NCMC could have been better:

- The role of NCMC when the National Controller moved forward was not well defined.
- Staff relieving the assigned role-holders in the NCMC should have better background in emergency management.
- Communication of offers of aid and local needs was not adequate – NCMC knew the offers and the CRC and locals in the response knew the needs, but they were not visible together on one website. (See Section 2.7)

Conclusions and recommendations

Overall the NCMC carried out its function well, despite its role being quite different from that planned because of the transfer of the National Controller to Christchurch.

The Review recommends that:

- Staff to assist in the NCMC should be drawn from those with skills and capability from across all government departments and agencies.
- The responsibility for logistics as between NCMC and other departments should be clarified and the respective roles planned and exercised.

2.7 Management of the International Dimension

The international dimension of the emergency includes management of assistance from overseas, consular type support for families of foreign victims, and various foreign relationship issues.⁷²

Foreign assistance

Extensive offers of support came from around the world, and these were very welcome.

The capacity of New Zealand to manage emergencies is significantly limited by its relatively small population and its remoteness from all other countries. Hence New Zealand has in place various cooperative arrangements with other countries to assist in resourcing management of emergencies. Some of these are formal and some informal, some are multilateral⁷³ and others bilateral. Most involve New Zealand providing assistance when our foreign partners experience emergencies themselves. The informal linkages are particularly important, especially those between organisations in New Zealand and their counterparts in Australia and the United States, and are based on exercising or training together and exchange of personnel.

In addition to the government-to-government linkages, international organisations with a presence in New Zealand play a major part. The Red Cross and the Salvation Army are the leading examples and both contract to provide particular humanitarian services after disasters.

The assistance provided through these arrangements varies. Some is clearly specified and provided almost automatically on request. Other assistance is provided as a result of specific one-off requests made to meet the particular needs of an emergency. A large part of the assistance is a

⁷² The effect of a large international media presence is dealt with in Section 7.3.

⁷³ For example, participation in the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the International Search and Rescue Advisory Group (INSARAG).

result of unsolicited offers from countries with whom New Zealand has close links of one kind or another.

USAR teams are an example of prearranged assistance. 22 February highlighted the challenges, both diplomatic and other, of managing rescue teams from a broad range of countries that wish to assist, especially because their own nationals are missing. Countries that do not have diplomatic relations with each other may need to be managed at the one location. Despite these challenges, the NZ USAR hierarchy managed all overseas teams well.

Offers of assistance from abroad were coordinated by the Ministry of Foreign Affairs and Trade (MFAT). The offers were processed through ODESC, NCMC, the CRC and other government agencies and Ministers also had an involvement. This process took time and inevitably responses to some offers were delayed. Sometimes only the people on the ground could judge whether the materials or services offered would be helpful.⁷⁴

The EMIS now implemented will make offers and needs visible across the whole of a response organisation and should largely solve this problem.

The value of unsolicited assistance to the response varied considerably. Some was vital to the effort, and some was of limited benefit. Some assistance would have cost New Zealand a lot to put in place. Yet it is difficult for a nation to decline generous aid offered by friends.

Although it is a challenge to explain to a donor that their gift is not accepted, the acceptance of an unsuitable gift has the potential to rebound on the donor as well as the recipient. While this task is a most difficult diplomatic task for diplomats, acceptance of unsuitable or counter-productive assistance does nothing to foster relationships between friends.

Australian Assistance

Australia provided very substantial assistance to the response. This included three USAR teams with about 150 members, over 300 police and DVI specialists.

New Zealand and Australia naturally join together in responding to a wide range of national and international emergencies. The Review considers emergency management is another area where cooperation should be more formalised. New Zealand fire officers already support Australia during the management of bushfire emergencies. A cross-Tasman police support arrangement is now in place. This could be further exploited in the future with other equipment support such as portaloos and gurneys.

⁷⁴ The same applied to offers of assistance from within New Zealand. An example was bottled water, which was judged to be unnecessary centrally, but in the Eastern Suburbs was regarded as 'liquid gold'.

The Review sees potential in developing closer links through individual training courses, inviting Australian emergency managers to New Zealand emergency management exercises and supporting Australian emergency management during fires, floods and cyclone emergencies. Such arrangements also assist in building New Zealand capability. Had provision of trained incident managers from Australia been arranged they could have supplemented trained New Zealand staff. This could have avoided installing staff into incident management roles where they had little experience and little or no training. Increased use of the reciprocal provision for trained New Zealand emergency managers to Australia, in terms of the agreement signed in 2009 with Emergency Management Australia, would have the benefit of giving invaluable experience in managing under the pressure of real emergencies.

Victims and their families

More than half of the 185 fatalities from the earthquake were born overseas or were citizens of other countries.⁷⁵ Almost all the international victims were killed in the collapsed Canterbury Television (CTV) building, which had an English-language school on the third floor. Identification of deceased was particularly challenging.

Some administrative systems do need improvement and should be arranged in advance. These include:

- the system for registration of missing people
- the establishment of a call centre of sufficient capacity immediately following an emergency
- the provision of a +64 number to accept overseas calls

Official visitors

At the time of 22 February earthquake the US – NZ Forum was meeting in Christchurch and had just broken for lunch. Fortunately none of the participants who included congressmen and senior officials from USA had gone into the CBD. MFAT is now aware that organisation of such conferences requires preparedness for emergencies. The Review supports this recognition.

A year of disasters

Consideration of the international dimension would not be complete without reference to the series of disasters in 2011. Queensland suffered floods; Japan was struck by a monstrous earthquake and tsunami. The cumulative effect of these disasters on world reinsurance and insurance markets was such that insurance for rebuilding properties in Christchurch was much more expensive and difficult to obtain during the period of the response and since. While premiums for Christchurch would have risen had there been no other major events the price

⁷⁵ A list of names appears at <http://www.police.govt.nz/list-deceased>.

increase and the scarcity were both made worse by the effect on world markets of the external disasters. A local direct insurer (AMI) had to be saved by the Government in order for its claims to be met, and at least one small international direct insurer withdrew from the New Zealand market.

One New Zealand USAR team was sent to assist after the Japanese earthquake and tsunami. Despite criticism that the team left while some recovery and substantial assistance with inspections of damaged buildings were still required in Christchurch, and that there was uncertainty as to the assistance they could offer in Japan, the Review considers that such a dispatch was important as part of international partnership arrangements. The Review is also satisfied that the sending of the team was appropriately approved within government at the most senior levels.

Evaluation of the International Dimension

The Review considers that the following features of the international dimension worked well:

- Assistance was provided from abroad for key roles contributed substantially to the response and was efficiently managed.
- Liaison with families of victims was done well including the large proportion from migrant and ethnic communities. The effort and resources required and the scale of this Police led undertaking could be readily underestimated.

The following aspects of the response could have been better:

- Initial systems for phone contact and registration were inadequate.

Conclusions and recommendations

The Review concluded that:

- Because of New Zealand's size and distance, assistance in specialised fields from abroad is essential in the response to a major emergency.
- The relationship with the Australian emergency services was deepened and this is valuable.

The Review recommends that:

- Phone contact and registration systems be reviewed in the light of experience after 22 February.
- More integrated planning and exchange of personnel take place with emergency management agencies in Australia.
- Assistance that will contribute little to the response, or will cost more to put in place than it is worth or will even hamper the response, should be politely declined.

Chapter 3 - Emergency Services and NZDF

3.1 Police

Background to the February Event

New Zealand Police divide the country into 12 policing districts. Each of these districts, like Canterbury, is responsible for their own emergency planning and response capability, including ensuring plans are tested and stakeholder relationships are established and maintained. It is well recognised that any response to natural disaster will demand a multi-agency response.

Canterbury District provides a 24/7 policing capability for the community with over 1,000 staff servicing greater Christchurch. Police National Headquarters provides strategic support to districts and in this case it established a Police National Coordinating Centre (PNCC) run by the Operations Group to support the District response. At the time of the February earthquake, local plans were being adjusted as a result of the September 2010 event and the Pike River Mine explosion of November 2010 which highlighted the need for a Police coordination centre.

Features of the Response

The Police played a significant leadership role in the Response, and did it well. In the critical first hours and days after the earthquake, police presence and effective action was vital.

The Police response involved a broad range of tasks of varying scale and complexity, but focussed on three areas: emergency response within the CBD, community support to outlying areas and maintaining a 'business as usual' approach to policing elsewhere within the Canterbury District. With the confirmation that a Disaster Declaration had been made, the priorities, as identified by Police in the CBD, were:

- Preserving life
- Public reassurance
- Security
- Disaster victim identification

To achieve this Police took control of rescue situations where other agencies had not assumed that role, coordinated immediate support such as initial first aid and ambulance and directed the public out of dangerous areas while maintaining a high visible presence. Police assisted in searches of

public buildings and private homes; secured the CBD by enforcing an exclusion zone and establishing a cordon; coordinated missing person identification and once deceased victims were extracted from the rubble, assisted with their identification through the Disaster Victim Identification (DVI) unit. Throughout the period the CRC was operating, Police maintained a LO at the EOC and Police considered the relationship with the CRC was excellent.

Where Police took control on the ground, the Police Incident Controller reported to the Duty Inspector. Once the immediate rescue operations were complete and broader searching was being conducted, Police concentrated on ensuring that all buildings had been searched by USAR to ensure there were no trapped or deceased individuals. Cordon maintenance was initially a major task until it was effectively subcontracted to the NZDF. About 350 Australian Police were sworn as special constables and assumed policing roles.

In parallel with the emergency response in the CBD, Police in suburban areas, most notably the Eastern Suburbs, set about establishing a strong presence based at the local police station, leading to highly practical and supportive actions for the local community. As a result, local communities lacking food, water and sewerage who could have responded antisocially, were supported and encouraged into assisting their neighbours and themselves instead.

Outside the immediate areas affected by the earthquake, normal policing duties needed to be maintained and there was a concerted effort to re-establish normal policing in as many areas as possible.

Disaster Victim Identification (DVI)

After the earthquake, the difficult work of disaster victim identification (DVI) was carried out well. The task was complex, emotional, and demanding. Police managed DVI under the direction of the coroner who had legal control of deceased victims until they were identified and released.

DVI was carried out at the Burnham Military Camp which provided excellent facilities and support. As well as coroners, police and military, the work involved pathologists, scientists, dentists, and mortuary attendants. Many of these specialists came from Australia, China, Israel, Japan, Korea and the United Kingdom.

In the majority of cases visual identification was not possible so that the DVI teams were forced to use forensic methods such as fingerprinting, DNA and dental records, which was linked with other information gathered by Police and reported to the Coroner. By September 2011 the process ended with identification achieved for all but four of the victims.

Family liaison was done by police liaison officers who coordinated information and briefed large numbers of family members, many of whom came from overseas. The DVI process was effective and sensitive with family members respected and treated with empathy.

Issues that became apparent during the DVI process were:

- The international form used by police did not exactly correlate with coronial requirements under New Zealand law
- Under the extreme pressure of the first day or so after the earthquake, standard New Zealand practice of accepting visual identification by a relative or known person was not followed in the few cases where it could have been
- Although police manage the DVI process they are not responsible for planning in advance the provision of mortuaries. Responsibility for such planning, in conjunction with the coroner, needs to be determined.

Police use of Intelligence

Police are well versed at collecting information and analysing that data into intelligence to support decision makers. They advised the Review that they had an extensive intelligence gathering process on the ground, that regular updates were provided to relevant partner agencies and the National Intelligence Centre coordinated an excellent information flow that informed organisations nationally.

Because of the apparent anomaly between this viewpoint and the fact that inadequate intelligence was available within the CRC, the Review obtained a sample of the Police Intelligence Reports as supplied in the first week to the NCMC and the CRC, as well as being internally circulated. In our opinion these reports contained an excellent summary of material needed for the police response effort, being concentrated on policing matters and the special police responsibilities in the emergency (such as DVI). Thus they were also significant for the NCMC and CRC in bringing intelligence of the policing aspects of the response.

However these reports were far from providing situational awareness of all the dimensions of the response. For example in the sample of seven reports:

- Welfare was only mentioned twice
- Lifelines were only mentioned twice
- Demolition was only mentioned twice
- Only one item was sourced from the excellent field information available to suburban Police in stations such as New Brighton, Sumner and Lyttelton
- Much of the material came from secondary sources such as news media and CRC, and while useful, was not an addition to the intelligence available to the CRC.

The Review did not have available the items of police intelligence that were reported to be frequently passed to the CRC and agencies, and which would have been of considerable assistance to the wider response. On the other hand the presence of a CRC liaison officer at the Police's own

briefings (which appeared not to have been disclosed to the CRC) should have been of great assistance.

The conclusion reached by the Review was that the Police had good situational awareness of their own field of operations, but that their contribution to the intelligence available in the CRC would have been enhanced by more first-hand material relating to the response as a whole from their own suburban staff.

An example of leadership: Senior Sergeant Roy Appley

After the Christchurch earthquake great leadership was shown by people within organisations and from the community. The Review describes the role one of those leaders because his work also demonstrates how official organisations can empower community action.

S/SGT Roy Appley was at a 'halfway house' away from his base at New Brighton when the earthquake struck. He headed to the central city and moved onto the street assisting where he could. He ended up at the Grand Chancellor building and was the incident controller for the evacuation on that site. 39 people were rescued, predominantly by workers and those passing by at the time. USAR arrived while he was still on scene. Others from his New Brighton station also joined him in the city after assuring themselves that lives were not at risk in their patrol area. He made several return trips to the police EOC to report on the situation.

Next day he resumed work at New Brighton where the Police Station had a back-up generator which was not damaged. Support services were not able to get to them due to damaged roads and liquefaction. There was no power, phone, food, water or sewerage services, and liquefaction had piled silt on streets and in people's homes. There was potential for civil unrest. The Police Station became the centre of focus for members of the community requiring or providing assistance. Areas adjacent to the Police Station became a distribution centre facilitated by Police providing assistance to people who could or would not leave their homes. When doubt existed about the legality of taking any particular action, Appley took a decision (for which the Civil Defence Emergency Management Act gave him wide powers as a sworn police officer).⁷⁶

He accepted an offer on 23 February of a helicopter delivering hot food from Rangiora, although the EOC had refused the offer – perhaps being unaware of the level of hardship being suffered in the suburbs. With the help of Leanne Dalziel MP, an A4 sized information sheet was produced and distributed to local residents to keep them informed and regularly updated, as the lack of electricity meant many were unable to access television, radio or telephones. Through adopting a pro-active, practical approach, Police were able to offer help to individuals suffering, and reassurance and empowerment for the community. It was community policing at its best.

The New Brighton Police Station's normal complement of over 40 Police Officers was supplemented by Australian Police and NZDF. S/SGT Appley ensured all staff were tasked appropriately each day, providing basic needs for the community, while also ensuring life and property was protected and there was no risk to public Health. The station became self-sufficient and was an effective Forward Command Post and Supply Centre. While it did not rescue anyone it focused on the wellbeing of the community. Some 60,000 people were fed out of local community led distribution centres. Informal volunteer groups such as the Student Army and Farmy Army also contributed to this substantial effort. Actions were communicated up the chain of command and over time visits occurred from senior personnel including the Governor General.

76 See part 5 of Civil Defence Emergency Management Act 2002.

Evaluation of the Police Role in the Response

The Review considers that the following features of the Police role worked well:

- **Command arrangements** - While the Christchurch Police Commander attended daily briefing with the National Controller, his tasking and chain of command remained within NZ Police. They were left responsible for policing functions and this lack of interference worked well. A backbone for policing as described to the Review was Police standing command arrangements which supported policing operations throughout the response and recovery operations.
- **Maintaining three campaigns** - Successfully maintaining three operational campaigns concurrently led to effective policing and the gathering of a large amount of information. These were:
 - emergency response in the CBD
 - community policing in the suburbs
 - business as usual in non-affected areas
- **Police and Fire ComCen** - The Police and Fire ComCen remained a consistent source of reliable information that continued to operate through the emergency. It remained robust, flexible and effective, albeit overwhelmed on the afternoon of 22 February. This kept Police well informed throughout the emergency, with their operations centre adjacent to the ComCen as it did Fire, although their operations centre was at the City Station lacking the benefits of co-location with the ComCen.
- **Presence in the CRC** - NZ Police maintained on-going representation in the CRC with a liaison officer. The police officer concerned was responsible for liaison with CDEM structures in Christchurch in peacetime, was well versed in emergency management, and well known to other agencies. More senior police representation occurred during briefings. This liaison could have been further enhanced by inviting a CRC liaison officer into Police Operations, at least during the initial period of emergency response. The Review was advised that this police position linked to the emergency management capability has since been disbanded.
- **Twice daily briefings** - Conducting operations briefs adjacent to the ComCen initially as required and then twice daily with the other emergency services and NZDF and MFAT representatives maintained good situational awareness amongst these agencies. Police tasked their resources and coordinated functions with other agencies. Unfortunately this information was not always available to the CRC, nor was the National Controller made aware that such meetings were being held.
- **Collaboration** - Collaboration with government and non-government agencies was effective through the high level of commitment shown by all. The foundation for this success was pre-existing working relationships.

- **Disaster Victim Identification** - By using a proven internationally recognised DVI process, international assistance was easily assimilated and international victims were more readily identified. It is easy to underestimate the complexity, emotion and demands of the DVI process. It was handled well and greatly supported already traumatised families. The use of Family Liaison Officers, managing the anti-mortem process, coordinating information and briefing large numbers of families all contributed to an effective and sensitive DVI process where family members were respected and treated with empathy – a demand that continued for months after the event.
- **Australian Police Deployment** - The deployment of Australian Police to New Zealand worked well and established the protocols for future deployments should the need arise to either country. The tasking of Australian Police was well coordinated by NZ Police.
- **Public support and reassurance** - NZ Police allocated substantial resources to public reassurance and local community and family liaison and support, which worked effectively.
- **Crime** - While there was some looting at the time of the CBD evacuation, and in some suburban areas, overall crime statistics dropped 20% during the period of emergency response and recovery.

The following aspects of the response could have been better:

- **Emergency Management Training** - Concerns were expressed within police ranks that emergency management has not previously been considered as a priority and there was a lack of training in emergency management for senior police. The rank of the officer liaising with the CDEM Group supported this impression (although all reports indicated that the officer himself did the job very well). While it is noted that other operations and training such as Counter Terrorism test aligned processes and skills, greater priority in emergency management training was sought by operational Police.
- **Incident Management** - There was confusion at the CTV building regarding who was in control. The Review was advised that both a Police and a fire officer thought they were incident controller. This required senior agency personnel to clearly establish incident control at the site in accordance with CIMS.
- **ComCen Redundancy** - Had Police been forced to evacuate the Police building third floor, there was no alternate ComCen facility identified in Christchurch and local information gathering, coordination and tasking would have been significantly impaired if call taking had been transferred to Auckland or Wellington. Police and Fire need to consider whether these alternative arrangements are a viable long term alternative, if a future event disables the use of the ComCen in Christchurch.

- **Police Rostering** - Rostering for Police took some time to implement and 12 hour rosters often became 15 hour rosters with handover and travel.

Conclusion and Recommendations

The Review concluded that:

- The Police response to this event was effective. Where possible, life was preserved through removing the public from harm's way; communities were reassured; security of the CBD was established and maintained and disaster victim identification was carried out thoroughly and as expeditiously as possible.
- While the Review was informed that Police and Fire Service have to operate separately because of their agency command arrangements, there was no doubt the co-location of the ComCen was advantageous.
- Police have an ongoing responsibility with the NZFS and other agencies, to ensure incident command responsibilities and arrangements on the ground are clear during emergencies.

The Review Recommends that:

- The Police EOC ensure that its situational awareness and intelligence products are fully shared with other EOCs operating in support of the same incidents.
- Greater emergency management training be conducted by the Police (and other agencies) to ensure all levels of command are familiar with arrangement and requirements.
- Police and Fire need to consider the merits of an alternative Police ComCen being identified in Christchurch.
- Incident control responsibilities using CIMS be clear for all emergencies.

3.2 Fire Service

Background to the February Event

In the Christchurch metropolitan fire area the NZFS has 12 fire stations: six paid stations and six volunteer stations. In addition, New Zealand has three USAR Task Forces, with one located in Christchurch, largely drawn from the NZFS.

The 4 September 2010 earthquake generated some important lessons for the NZFS. The Review was advised it was in a support role for that event, providing public reassurance, assisting with the consequences of the earthquake such as assisting with the liquefaction clean up, chimney removal and generally meeting community requirements at the time. As such it was not emergency response. Within the NZFS, important lessons were identified regarding the provision of sufficient welfare support and communications with staff.

Because Christchurch had very limited gas reticulation and because there were very few ignition sources, there were very few fires after the earthquake.⁷⁷

Features of the Response

As first responders firefighters reacted courageously to the many challenges facing them.

As outlined earlier, at the time of the earthquake the NZFS Region 4 Manager based in Christchurch and another executive were on leave and the Acting Region Manager was in Wellington. Of the three executives on duty on the day, two were in their offices at the Kilmore St premises housing Regional and Area HQs and the Central Fire Station, and one was out of the office. He also had responsibilities for USAR management in Christchurch.

When the earthquake struck, the three executives operated largely independently. One commenced a tour of the CBD to assess damage; one visited CDEM Group ECC and the third directed crews at the Christchurch City Station to self-respond into the city before going to the CCC building to establish if a local emergency had been declared. Once he had confirmed arrangements were in place and had completed his other immediate operational requirements, he switched to his USAR role and commenced assisting the local USAR Task Force deploy in Christchurch. This left one executive who, after visiting ECan, remained at the City Station, and one continued visiting sites in the city.

Crews with their Station Officers and Senior Stations Officers responded and commenced assistance where they could. Tasking from the ComCen in those initial hours was difficult as communications were both overloaded and intermittent. The executive officer in the field was conducting a crude triage assessment based on what he saw and the resources available.

Individual firefighters self-responded on hearing of, or experiencing, the earthquake and many made their own way to take up roles at rescue sites or with appliances without being formally recalled onto shift and being allocated onto the fireground. This became problematic for NZFS as it was unclear for some time which firefighters were on the fireground, whether they had their Personal Protective Equipment and who was available to assume subsequent shifts.

⁷⁷ One of these was in the CTV building that collapsed with the loss of most lives.

The Regional Fire EOC facility, located at the City Station, was damaged during the earthquake and could no longer be used in that role.

At about 4pm the Region Manager, who had recalled himself from leave, briefly toured the CBD and then located himself at the NZFS EOC adjacent to the City Station. By about 5pm the acting Region Manager also arrived in Christchurch from Wellington. Having briefly visited the sites in the CBD he also located himself at the NZFS EOC adjacent to the City Station. The Executive in the field returned to the City Station with the intention of reporting and quickly gaining updated information before returning to the field. The Review was advised he was directed to remain there by the Region Manager. Additional executive officers started arriving from adjacent districts between 8 and 10pm that evening. The Review was advised that the Region Manager, having returned from leave, was directed by the National Commander to take an 'oversight role' and the acting Region Manager was to continue to assume that role.

The Review understands that both the Region Manager and acting Region Manager considered their role was to coordinate the regional response and they both indicated it inappropriate to assume the role of incident controller at any site, even if they had identified a lack of appropriate incident control in place. Why either officer did not send one or both of the other executives into the field to assume that role and thereby support the Senior Station Officers on scene is unclear.

The concern of the Region Manager as expressed to the Review was that planning was needed for a long operation. From a local NZFS crew perspective they largely resumed business as usual operations while also providing considerable community welfare support and on-going fire protection within the CBD. Significant work to improve community safety was carried out in Lyttelton, Sumner, New Brighton and Brooklands. There was a perception that the NZFS would be required to provide substantial additional resources for a long period, which was understandable in light of the information available on the night of 22 February, but turned out to be mistaken. With the arrival of USAR teams local crews returned to providing protection and support from their home stations. Additional Command Units were redeployed to Christchurch together with additional executive officers, which were coordinated from the Regional EOC. Even so, ensuring adequate incident management was in place needed to have priority over initial regional concerns and did not in the Review's opinion require an acting and extant Region Manager to organise.

The mobile hazmat command unit located at the City Station was retained there to establish the Regional EOC, as the EOC building at the rear of the City Station was damaged. Initially a large number of sites were identified as potential major rescue sites including the CTV, PGC, the Press building, the Grand Chancellor Hotel and the Cathedral. By early morning on 23 February three sites - the Cathedral and the CTV and PGC buildings - were locations where rescue efforts were concentrated.

As detailed in Section 2.3 the Review did not consider incident management arrangements at all sites but chose as an example the CTV site where the greatest loss of life occurred. As there was a

fire at the CTV building, a NZFS Officer should have been the Incident Controller. As indicated earlier, however, there appears to have been two incident controllers: a police Senior Sergeant and a Senior Station Officer. The Police considered the S/SGT was in control and it appeared the SSO may have been too hands-on to be effectively in control of the site. While the Review was advised there can be some flexibility in these arrangements, where it can cause a lack of clarity in command and control, the Review considers this should be avoided.

During the night of 22 February more USAR teams arrived and commenced operations. On the morning of 23 February the acting Region Manager redirected local fire crews from rescue activities and tasked them to resume normal fire coverage duties from local stations, as USAR crews were arriving in the CBD. Local crews were aggrieved by this direction, felt disenfranchised and resented not being able to provide on-going assistance within 'their' city. While the Review accepts the tasking priorities, it notes the manner this was advised was unhelpful. The Review was advised that some local crews did maintain a presence at the CTV building and where other fire risks were present in support of USAR operations.

Evaluation of the NZFS role

The Review considers that the following features of the NZFS role worked well:

- The initiative, efforts and resilience of career and volunteer firefighters and crews on site assisting with rescues and providing support to communities is most commendable.
- The value of professional relationships established over time assisted in the resolution of many issues during the response and recovery phases.
- Volunteer brigades within Christchurch played a significant role in working with community organisations to provide a local response.
- Volunteer crews brought into Christchurch assisted first-hand with rescues and subsequently provided support to career stations. Through their change of stations over extended periods, the volunteer support to Christchurch career stations provided local crews with a degree of flexibility to support local communities as required.
- The eventual use of 11 mobile hazmat command units, from around the country to provide incident control, satellite communications, briefing and record facilities. Rostering arrangements put in place in Christchurch involved a sophisticated overlay arrangement, ensuring crews were replaced with an extended handover and not all crews changed at the same time.

The following aspects of the NZFS role could have been better:

- **Incident Control Teams (IMTs)** – The Review considers that incident management was lacking on at least one major rescue site. CIMS is designed to develop from the bottom up, so the most senior person on site was responsible for establishing incident control at the rescue sites. The Review understands this did not occur at the CTV Building. Regional level staff initially acted independently, and subsequently focussed on establishing a Regional level IMT, when incident control remained inadequate at some major rescue sites. While undoubtedly a challenging scenario and beyond the experience of fire staff, the Review concluded that priority needed to be given to ensuring that tactical level incident control was effective. This should have been done prior to diverting resources to regional and strategic considerations.
- **Command Support of Executive** - At the time of the earthquake there were three fire service executives in the city. Normally there are five based in Christchurch. Two others were on leave and the acting Region Manager was in Wellington at a conference. While the Review accepts the shortage of executives during the first four to six hours after the earthquake, with the arrival of the Region Manager back from leave and the acting Region Manager back from Wellington, as well as executives from other Regions, the Review does not understand why some of these staff did not take up the role of incident controller at the most critical sites, particularly the CTV and PGC buildings.

The Review considers that an Incident Controller to clearly run the incident should have been put in place by either the NZFS or Police.

- **EOC building** - Had the Regional EOC been in a more resilient building, it is likely that the concentration of effort that eventuated at the City Station and establishing a temporary EOC adjacent to it in a Hazmat Command Unit may not have been required. Greater attention could have been focused on incident control at rescue sites. Ideally, having a combined, hazard-resistant EOC for Police, Fire, CD and CCC would resolve many of the issues raised in regard to efforts being diverted to establish the NZFS Region EOC, and would contribute greatly to improved situational awareness across agencies.
- **NZFS Report** - The NZFS undertook an internal review of their response and the report has been made public.⁷⁸ The Review commends NZFS for undertaking an analysis of their response so promptly, and publishing the report. However the Review considers that the following issues should also be taken into account:
 - The need for operational efficiency of USAR, and in particular a very rapid response while trapped victims may still be alive, needs to be taken fully into account. BAU processes within the NZFS are unlikely to be fast enough to meet this need, e.g. administrative support.

⁷⁸ NZ Fire Service Report, 22 Feb 2011.

- As indicated in the USAR section of the report, existing legislative arrangements may require review to meet optimal operational arrangements. Regardless, the authority as to when USAR teams should respond to the National Controller (when appointed) or operate under INSARAG protocols, and when to operate under NZFS control, needs to be clarified. While 'command' of USAR will always remain with NZFS, this does not stop 'operational control' and tasking being completed through alternative arrangements.
- Both general firefighters and USAR technicians (most of whom are firefighters) bravely played an important role in search and rescue during the Christchurch response. The efforts of both need recognition by NZFS and the public. NZFS faces a challenge in building good relationships between general firefighters and USAR.
- If the existing legislation makes effective operations difficult, then this should be amended rather than locking operations into inefficiency because of a legislative straightjacket.
- **Logistic arrangements** - The Review was advised that USAR and NZFS competed for resources both internally and with commercial providers. It is likely this also occurred between emergency services. IMT logistic arrangements need to coordinate the use of available resources.

Conclusions and recommendations

The Review concluded that:

- While the NZFS has much to be proud of in regard to the response efforts of firefighters, as the NZFS Report shows, improvements are needed in the relationship between the Fire Service and USAR. Measures are underway and the Review comments further on these in the Section 3.3.
- The Review reached the conclusion that incident control at the CTV building was ineffective until late into the night of 22 February. This was not the sole responsibility of NZFS since the Police were also engaged in incident control. However, neither agency had clarity as to who was or should have been Incident Controller.
- The Review considers that, once the initial response had occurred and rescue operations were in train, say, four hours after the earthquake, control of the CTV site warranted someone from either NZFS or Police to be directed to take the role of incident controller, or for someone to step forward and effectively assume that role. As, at the time there was a fire, NZFS executives should have clarified incident control arrangements. Leaving it unresolved was problematic.

- The NZFS undertook an internal review of their response to assist with rapidly identifying issues that need to be addressed and the report has been made public.⁷⁹ However, the Review has noted a number of other issues which it considers should also be taken into consideration

The Review recommends that:

- Greater priority be placed on quickly establishing incident control at major rescue sites to clarify arrangements and enhance operational effectiveness. At complex, multi-agency incidents, this requirement is paramount. Even at an incident the size of the Christchurch earthquake, NZFS executives should make every effort to ensure incident control is effective at major rescue sites prior to establishing Regional level arrangements. If this can be completed concurrently, all the better.
- Agency responsibility for controlling designated incidents should be maintained where ever possible, to avoid confusion in command and control arrangements.
- Emergency Services should aim for a single, combined, resilient EOC capable of managing large Regional emergencies.
- IMT and specifically logistic arrangements need to be in place to avoid agencies competing against one another for resources.

3.3 Fire - Urban Search and Rescue

Background to the February Event

Initial international support for major natural disaster emergencies requiring search and rescue capabilities is coordinated through the International Search and Rescue Advisory Group (INSARAG), a network of both disaster-prone and disaster-responding countries with a particular interest and commitment to knowledge sharing in USAR operations. INSARAG activities are guided by UN General Assembly Resolution 57/150 of 16 December 2002 on 'Strengthening the Effectiveness and Coordination of International Urban Search and Rescue Assistance'.⁸⁰

New Zealand has joined the Asia Pacific Chapter of INSARAG which meets annually and the Ministry of Civil Defence and Emergency Management (MCDEM) is the national focal point that acts as interface. MCDEM representatives have been involved in developing the protocols for

⁷⁹ NZ Fire Report, 22 Feb 2011.

⁸⁰ UN General Assembly Resolution 57/150, 16 December 2002.

international deployments. This includes applying for an INSARAG External Classification (IEC) although the Review notes New Zealand does not have that IEC at the current time.

NZFS initiated and has funded the USAR capability in New Zealand over the last 10 years. NZ USAR capability at the time of the February 2011 earthquake were organised into three Task Forces of about 50 personnel each from NZFS, civilian engineers, medics and search dogs. The three Task Forces were based in Christchurch, Palmerston North and Auckland. Their specialist equipment provides capabilities for:

- Physical search-and-rescue and extrication in collapsed buildings
- Provision of some building stabilisation to assist in rescues
- Emergency medical care to trapped victims
- Assessing hazardous materials
- Evaluating damaged structures

The Review was advised that the NZ USAR capability was established to respond only to domestic emergencies but it is apparent that the domestic command and control arrangement had not been clearly envisaged. However the capability was developed fully in accordance with international standards developed and administered by the 'International Search and Rescue Advisory Group' (INSARAG). NZ USAR personnel maintain active engagement with INSARAG in terms of policy, planning, training and exercising.

Perhaps because of international linkages, the USAR capability had developed a degree of independence from the NZFS, even though most of the USAR technicians and funding were sourced from NZFS. While a degree of logistical independence is required (for the first 72 hours) if deployed overseas to interface with other USAR Task Forces, this had translated into the NZ USAR culture. The Review was advised that in part this may have occurred because others in the NZFS chose not to engage with the USAR and as specialists those in USAR saw themselves as being different from general fire fighters.

Features of the USAR Response

Members of INSARAG are expected to have access to the 'Virtual OSOCC' (Virtual On-Site Operations Coordination Centre) and the Global Disaster Alert and Coordination System (GDACS) on the Internet. These provide alert notification in the event of any sudden-onset disaster and real-time information updates and coordination. This may have been how various international teams first heard of the earthquake disaster. Some USAR capabilities self-deployed because of the large number of victims from their country with overall seven international USAR teams arriving in NZ:

- 142 Australia
- 10 China

- 67 Japan
- 55 Singapore
- 24 Republic of China - Taiwan
- 63 United Kingdom
- 80 United States⁸¹

Some teams arrived with significant organic capability – referred to as heavy teams as they brought with them equipment and capability to shore-up and cut into the rubble; others came with minimal equipment and were referred to as ‘light teams’.

Under the INSARAG protocol Geneva should authorise international USAR teams deploying to a foreign country, but this appears to ignore the urgency required in mobilisation of USAR for remote countries like NZ. In addition, diplomatic and cultural requirements have led to bi-lateral arrangements. Teams from several countries prepared to mobilise on learning of the severity of 22 February earthquake. After an informal phone call from USAR in New Zealand they commenced mobilisation and were thus able to travel to New Zealand with minimum delay after the official processes for request and approval by governments took place.⁸² Domestically, the NZFS indicated that USAR activation required formal requests from the Incident Management Team (IMT), the ComCen, or the NZFS National Commander: In this instance it was the National Commander. The Review is comfortable as to how USAR was mobilised, but additionally notes that a controller has the powers to call on the NZFS to mobilise USAR if it has not already been done. The deployment from the North Island of NZ USAR elements was assisted by the NZFS and regional and national IMTs.

The time taken for USAR teams to arrive from overseas (other than from Australia) was such that nearly all the successful rescues from collapsed buildings had been completed before they arrived.⁸³ However, the teams did play a significant and very useful role in search and recovery after the rescue phase was complete.

In addition, some international USAR personnel arrived with little warning and regardless of the need for their services. Such is the nature of the NZ USAR capability that visiting USAR teams were well managed. International USAR teams were met at the airport by NZ USAR personnel who had arranged dedicated transport – both buses and trucks for those teams with heavy equipment. NZDF Movements’ staff assisted with the arrival. They were moved to Latimer Square on the eastern side of the CBD which became the dedicated USAR base. It was here that the On-

81 Numbers from media reports.

82 Informal first contacts are essential for time-sensitive assistance such as urban search and rescue. Furthermore adding the step of a UN Agency approval to those already required by official government channels would need to have great utility to justify the risk of delayed rescues.

83 Caution is needed in extrapolating from the experience in Christchurch to other events. Christchurch was unusual in that most of the deaths were caused by the collapse of only two buildings. Had people being trapped in many more buildings rescue work by overseas teams would have been vital.

Site Operations Coordination Centre (OSOCC) was established by NZ USAR personnel and the international effort was coordinated. The Review noted consistent commendation for the Latimer Square USAR base: its organisation, security, catering and overall suitability and management. Local and overseas USAR teams regarded the base as very supportive and highly effective.

USAR teams were tasked by the OSOCC depending on their capabilities, site necessities and diplomatic requirements. For example, the Japanese team was allocated to the CTV building as there were a large number of Japanese students missing there. They arrived with little heavy equipment but an Australian team was already operating on the site. The Chinese and Taiwanese teams were allocated to separate sites. The balancing of these operational and non-operational demands was well managed by the NZ USAR OSOCC.

The Commander of the NZ USAR reported directly to the National Controller on behalf of the total USAR effort and attended daily briefings with him to update on tasking, accomplishment and challenges. He subsequently attended media conferences when required. This was required by the National Controller but was an uncomfortable arrangement for NZFS as they considered USAR should report through the NZFS to comply with NZ legislative authority. It did also mean the NZFS was unable to track NZ USAR tasking and resource requirements. Further comment on this issue is below.

Most overseas USAR teams deployed for between 8 and 10 days. At the request of the New Zealand Government, Australia sent a subsequent USAR team to replace the first two teams that deployed at the time of the disaster, thereby extending the USAR involvement in the CBD well past the initial search and rescue phase. On departure, the United States USAR team from Los Angeles left their specialised equipment in place as part of their overall contribution, reportedly valued by the USA at over US\$1.4 million.

Volunteer Emergency Rescue Teams

New Zealand has 18 registered NZ Response Teams, with five located in Canterbury Region, all sponsored within the CDEM structure. They are organised, trained and have protective equipment. They have an excellent reconnaissance capability. All were deployed to Christchurch. There appears to have been little liaison between NZ USAR and these teams prior to the Christchurch earthquakes. Much of their tasking, which included assisting in the establishment of the EOC, initial search and rescue at some of the collapsed buildings and subsequent searching of buildings and houses, was a result of CDEM not USAR tasking.

Evaluation of USAR in the Response

The Review considers that the following features of the USAR role in the Response worked well:

- **Involvement with INSARAG** - New Zealand's familiarity with INSARAG was an advantage and meant that NZ USAR was aware of the capabilities arriving from overseas and in turn, overseas USAR team expectations were met. The seven overseas teams integrated effectively and were familiar with the tasking arrangements through the OSOCC and the cooperation required between teams. USAR teams used common standards, protocols and procedures. It confirmed the benefit of New Zealand investing in the INSARAG arrangements.
- **Successful Rescues** - There were a small number of positive technical rescues completed. These were unlikely to have been successful without the employment of the USAR teams. A large number of deceased victims were located, removed from the site and subsequently identified through the Disaster Victim Identification (DVI) unit.
- **Searching** - Once rescues had been completed USAR teams spent much of their time searching all buildings and structures in the CBD and critical buildings elsewhere to ensure that they were vacant. This proved a time-consuming and relentless task, at times leading to repeat searches. At all times care was required to check that further building collapse was not imminent. At the completion of all searches, NZ USAR had to certify that all buildings and structures were clear. This was done and subsequently proved correct.
- A criticism was put to the Review that some USAR teams were 'heavy handed' in gaining access to search some buildings, specifically hotels, and used forced entry to ensure all rooms were vacant. The Review pursued this issue:
 - USAR needed to sign a certificate for every building within the cordon indicating that it was free of trapped or deceased persons. No other agency was prepared do this and the Police were insistent that it was required as some people remained unaccounted for throughout the period of the Response and Recovery.
 - This required a thorough search of all buildings within the CBD and the square mile of 'the Avenues' and other buildings assessed as high risk outside the city centre.
 - Due to shift changes and incomplete record keeping, some buildings were searched on more than one occasion. While the first search may have had a locksmith or building owner in attendance to unlock doors, this may not have been the case on subsequent occasions.
 - Police requested that force be used to gain access if there was no alternative. Generally Police accompanied USAR teams although this was not always the case.

- USAR teams used locksmiths and non-forceful means to gain entry wherever possible. Causing the least amount of damage was emphasised. To fulfil their requirement of giving an assurance the premises were clear, they needed to gain entry when being tasked with a building search.

The Review was satisfied there did not appear to be a disregard for private property in the conduct of these searches. With more systematic tasking of USAR and some acceptance of re-visits the amount of forcible entry could have been reduced.

- **Internal USAR Tasking** - Advice received by the Review indicated that tasking across USAR teams, through the OSOCC, was effective and command was competent. There did appear to be a lack of capacity within the NZ Task Forces to maintain this OSOCC staffing for extended periods and existing staff were exhausted in this role. The Review was advised that overseas USAR members were cautious of assisting in the OSOCC function due to concerns over liability within NZ. It is not clear to the Review why NZ USAR did not request NZFS support or NZFS did not offer support to assist with OSOCC functions especially once technical rescue was completed.
- **USAR Base** - Latimer Square, which was developed as a USAR Base, was very successful. Both domestic and overseas USAR teams complemented NZ USAR on the development and maintenance of the Base and the support it provided.

The following aspects of the Response could have been better

- **Domestic Deployment** - The NZFS appeared ill-prepared for commanding a domestic USAR deployment and how these teams would be managed and tasked. Not surprisingly, the NZ USAR teams, particularly when hosting seven international USAR teams, adopted their INSARAG training as if they were deployed overseas. While the Review understands the NZFS has since reviewed these concerns, it considers it should not be criticising USAR for completing operations as they had been trained. Further, the Review found no fault in the actions of the local USAR National Management Team member in Christchurch in first fulfilling his NZFS responsibilities and then assuming his USAR role.
- **NZFS USAR, Command and Control** - The NZFS has concluded that: 'To operate effectively USAR must sit within the command structure of the NZFS.'⁸⁴ The Review understands this is because USAR is required to draw its legal authority for tasking from the NZFS legislation – there is no distinct USAR legislation. The Review accepts and acknowledges this. It proposes however, that distinction should be made between agency command and legislative authority for USAR, that should always remain with the NZFS, and operational control and tasking on site, which should be sufficiently flexible to meet the requirements of the next (unforeseen)

84 NZ Fire Service Report, 2011, p17.

emergency. This may require operational tasking through a National Controller, or through the Fire Service, or through a foreign fire service if deployed overseas, maintaining flexibility depending on operational requirement. This is an approach commonly adopted within the NZ Defence Force and if existing legislation does not accommodate such an approach, the Review suggests it should be amended. The National Controller should have the flexibility to receive directly USAR technical advice and also operationally task USAR directly during such emergencies. Inserting an additional layer of control through NZFS may delay response and cloud responsibilities.

- Flexibility in command requirements are likely to be the most appropriate in future USAR operations, varying from operating independently as part of INSARAG if deployed overseas to reporting as part of a NZFS sector for domestic deployments. The requirements of the National or Incident Controller at the time should not be ignored and international USAR teams may be less willing to operate as a sector within the NZFS. These issues require further exploration and the Review recommend that administrative 'command' and operational control and tasking be separated, as a single command template for all future USAR operations through NZFS is not favoured by the Review.
- **Structural Assessment Advice** - The NZFS Report highlighted the role NZFS USAR (and presumably other USAR Teams) had in undertaking structural assessments and deconstruction advice over and above that required for search and rescue. It highlighted that: 'While the NZFS has powers to deal with dangerous buildings where there is an imminent threat to life and property, this must be exercised within the scope of the FSA 1975 powers.'⁸⁵ For example, it would include making structural assessments where this is needed as part of an emergency response.

Much of this work, particularly after the initial emergency, was not strictly 'emergency response' and was technically the responsibility of the territorial authority. Definition is required of the boundary between the roles of structural engineers and that of USAR in assessing the danger of entering buildings. USAR personnel did assist in facilitating and supervising entry into damaged buildings to retrieve property and such work is clearly best done by them. However there is a need to clarify the statutory responsibilities of the NZFS during a civil defence emergency and for this to be communicated throughout the NZFS and on training courses.

- **Building Searches** - Maintaining better records of when buildings were searched and the results of these searches, through improved use of GIS capabilities would have avoided the need to re-search building and structures. In turn this may have reduced the need to forcefully enter premises causing damage.

85 NZ Fire Service Report, 2011, p8.

- **Removal of local firefighters from the CBD** - The issue of removing local firefighters from search and rescue efforts within the CBD became a controversial decision and the Review received mixed advice. Providing fire coverage across the whole of Christchurch and the Canterbury Region remained a requirement but in the first few days – nothing was ‘normal’ and resources needed to be deployed to where there was the greatest need. With the arrival of hundreds of USAR personnel, there was less demand for firefighters in the CBD and this became a factor; albeit some remained tasked with providing fire cover at major rescue sites. The Review was advised that non-USAR firefighters were allocated tasking appropriate to their knowledge and training. It appears that poor communication by senior commanders of this decision clearly aggravated firefighters.
- **Second deployment of Overseas USAR Teams** - After the initial deployment of overseas USAR teams, New Zealand requested a second deployment of teams from Australia and Japan to replace those initially in the country. As acknowledged by NZ USAR, this was not needed as international teams’ primary focus was on catastrophic building collapse in the CBD. While these second deployment teams were utilised, the tasking they completed could also have been actioned by NZFS and NZ Volunteer Rescue Teams.
- **New Zealand Response Teams** - The OSOCC did not engage or employ volunteer New Zealand Response Teams that had deployed to Christchurch because as advised to the Review, NZ USAR was unsure of their capabilities. These teams were under-employed and under-utilised and could have been engaged more in searching less vulnerable buildings, thereby reducing the need for second rotation of USAR teams to deploy from overseas. NZ USAR needs to understand and acknowledge how these teams can enhance the search and rescue effort in order to better employ these teams during future operations and enhance the national search and rescue capability.

Conclusions and Recommendations

The Review concluded that:

- The need for USAR capability in New Zealand has been substantiated through the outcomes of operations following both the September 2010 and February 2011 earthquakes and the Review supports maintaining the capability for both domestic and overseas deployments.
- The Review was advised that NZ USAR was being restructured from three Task Forces and a National Management Team into one Task Force of three teams, broadly adopting an Australian approach to organisation. While the NZFS clearly seeks to ensure future domestic USAR deployments are ‘commanded’ within the NZFS structure, the Review was less dogmatic and considers a degree of flexibility is wise regarding ‘operational control’ and tasking to accommodate future National Controller requirements, overseas contributions and the operational requirement.

- How the NZFS internally administers the USAR capability is not a matter for the Review. It appears efficient to link administration, purchases, catering, transportation and arrangements for domestic deployments provided that USAR has the authority to make mission-critical urgent arrangements where necessary.⁸⁶

The Review recommends that:

- Statutory responsibilities regarding the role of NZFS USAR in conducting structural assessment and deconstruction advice be clarified.
- NZFS consider flexible 'operational control' and tasking arrangements for domestic USAR deployments depending on the operational requirement, National or Incident Controller expectations and overseas contributions.
- NZ USAR gain a better understanding of the capabilities of the New Zealand Response Teams and better integrate them into domestic training and operations where appropriate.

3.4 St John Ambulance

St John provides the ambulance services in Christchurch. The 22 February earthquake caused many injuries and an extraordinarily high level of demand for ambulance services. Work was made extremely difficult by blocked streets, traffic congestion, and communication difficulties.

In the chaos of the city after the earthquake the work of St John was complemented by that of many citizens, health workers and the other emergency services who also provided immediate first aid and transported injured to hospitals or medical centres.

The main operations centre for the service and its communication centre was a building in Durham Street built to an importance level 4⁸⁷. It remained functional until 5 p.m. when continued after-shocks detached air conditioner units and made it unsafe to inhabit. Operations continued under tentage from the site

Poor radio coverage was a problem as was an inability to use cellphones. For 3 to 4 hours communications were overloaded. IT channels were crowded because of the number of incidents, and St John was unable to establish a landline to other EOCs initially. Durham Street was linked in at 3.15 to some extent when a senior sergeant arrived with communications and sat in a car with

⁸⁶ For example, stationing a NZFS travel agent at the USAR base during operations would facilitate the booking of travel as well as providing compliance with NZFS processes.

⁸⁷ The standard in the building code which is designed to ensure that a building can survive and continue to provide services in all likely earthquakes. See NZS 1170. 0:2004.

a St John staff member and with a radio from each system. However the channel was blocked much of the time with traffic from 30 to 40 incident sites.

It was about three hours before operational contact was made with the CCC EOC. It was difficult to gain intelligence but a staff member was sent to the EOC within about 30 minutes.

Communications with St John outside Christchurch were through Auckland, who had a direct line to the NCMC and through this, a link to the Ministry of Health. For the first six hours the main issue was preservation of life and linkage with civil defence was not considered by St John as so important at that stage. However road closures and congestion were significant problems.

St John sought to establish evacuation centres, and decided to use Hagley Park and a triage centre in Latimer square. The public were heading out of the CBD towards Hagley Park anyway.

St John provided liaison staff at:

- the Art Gallery (the CCC EOC)
- initially the Group ECC
- the District Health Board (DHB) EOC
- the police EOC/ComCen

as well as staffing their own EOC.

The work required of St John fell into several different phases:

- Phase 1 on Day 1 was preservation of life;
- Phase 2 on Day 2 was evacuation and provision of medical supplies; and gradual resumption of normal service.
- Phase 3 was gradual resumption of normal service.

On behalf of MSD St John contacted all medical alert holders to check on their safety and provided transport for the large scale evacuations of residents from residential care homes.

Immediately after the disaster St John organised 100 staff to come to Christchurch to phase in a replacement of all local staff whose family situation was unclear. Not all people from out of town filling relieving positions were familiar with the operating procedures for a metropolitan city like Christchurch.

The St John operations were overseen by a national incident controller in Christchurch and a local controller in Christchurch.

Relationships established before the event were important particularly with Police and NZFS, with a good understanding of capabilities. Support from the CRC was good. Experience during the flu pandemics was of significant help in building relationships in the health sector. Ambulance services are not specifically mentioned in the CDEM Act but are obviously one of the 'hospital and

health services' included in the definition of 'emergency services'. In the National CDEM Plan ambulance services are given specific responsibilities. Within government administrative arrangements, technically St John is not a lead agency, although it provides ambulance services throughout New Zealand apart from the Wellington area. However, despite these differences in legal and organisational status, during the response to emergencies St John operates as a 'first responder' in a similar manner to both Police and NZFS. It did this in Christchurch and the Review sees no requirement to change current arrangements.

Throughout the emergency St John was frustrated by lack of good intelligence and by difficulties in communication with other agencies. It would be helpful to have all emergency services operate a single emergency radio network.

Evaluation of the Response

The Review considers that the following features of the St John Response worked well:

- St John staff responded well to the immense challenges and like the other emergency services reinforced their local staff promptly.
- Despite all the difficulties it appeared that those who were injured received the assistance they needed, through the efforts of St John, members of the community and other agencies.
- The pre-existing relationships between St John and other emergency services were excellent and facilitated cooperation during the response, although a lack of exercising for events of this nature was identified as a deficiency in maintaining operational readiness.

The following aspects of the Response could have been better:

- The St John ComCen, although built to the standard of importance level 4, did not perform to this level and had to be evacuated because of failure of fittings.
- The St John ComCen was not co-located with the police and NZFS ComCen, and if it had been, cooperation between the emergency services would have been enhanced. This hampered effective communications.
- Better intelligence would have assisted St John to more effectively cope with the difficult situation.

Conclusions and Recommendations

The Review concluded that:

- The St John ambulance service performed well in the response and contributed significantly to the good performance of the health sector.

The Review recommends that:

- Ambulance ComCens should be co-located with Police and NZFS ComCens and become part of the same communications network.

Regular exercises, including senior managers, need to be conducted to maintain operational readiness.

3.5 The New Zealand Defence Force (NZDF)

Background to the February Event

The Guide to the National Civil NZDF Emergency Management Plan 2006⁸⁸ does not place obligations on the NZDF in the same way as it does for the Police and the Fire Service. Despite this the NZDF has promptly and substantially assisted local and regional emergencies over the years.

The mission of the NZDF is 'to secure New Zealand against external threat, to protect our sovereign interests, including the Exclusive Economic Zone and to take action to meet likely contingencies in New Zealand's area of strategic interest.'⁸⁹ With over 800 NZDF personnel overseas as at 31 December 2011,⁹⁰ this is a significant deployment of NZDF capability and limits the support available for unplanned commitments at home.

NZDF had involvement in the Response to the 4 September 2010 earthquake, but it was limited. They were therefore familiar with likely tasks and requirements. A lesson for the NZDF in Christchurch in September 2010 was that they needed to be proactive in identifying suitable tasks to best use their expertise, rather than being used primarily as unskilled labour. They should expect however, to be tasked by the CDEM controller who will rely on the NZDF Liaison Officer to advise how best to employ NZDF resources.

88 <http://www.civildefence.govt.nz/memwebsite.nsf/srch/760E12EDD381AB9FCC2570DF00045851?OpenDocument>

89 <http://www.nzdf.mil.nz/at-a-glance> accessed 16 March 2012

90 <http://www.nzdf.mil.nz/at-a-glance> accessed 16 March 2012

Local NZDF commanders can deploy their local resources in response to a natural disaster such as flooding, searches and local emergencies when requested by the CDEM controller. Such support can also be directed through the NZDF chain of command, as it was during the Pike River mine disaster.

By good fortune, at the time of the earthquake, the NZDF had forces mobilised around Christchurch on the largest joint training activity in New Zealand for a number of years. As soon as the earthquake occurred troops returned to Burnham and were available to assist in the Response. HMNZS Canterbury was at Lyttelton and provided the core of the Response there in conjunction with local organisations. Appropriately they assumed roles where communications with local CDEM control were weak at the time and this worked well, so the CRC did not have to organise the response in Lyttelton itself.

Features of the Response

Fire and medical teams, including elements of the 2nd/1st Battalion of the Royal New Zealand Infantry Regiment, deployed from Burnham Military Camp Barracks soon after the earthquake on 22 February. Liaison officers were sent to Police Headquarters and the CCC EOC. This was not as a result of any formal call out at that time, but through local NZDF tasking as a result of experience after the September 2010 earthquake and a correct assumption that their services would again be required in the city.

In the first instance, the NZDF effort was centred on assisting the Police establish and staff a cordon around the CBD to maintain the safety of the public from falling debris resulting from aftershocks and to establish security within the vacated but insecure city centre. The cordon management issues are discussed further in Section 6.3. This became the main effort of the entire 2nd/1st Battalion and was labour intensive. On his arrival the CO became the 'Project Manager, Cordon Management and Reduction' on behalf of the Director of Infrastructure within the CRC for a period of over two months. NZDF involvement in the cordon continues and 12 months after the earthquake Army Reserve soldiers still manned the entrance points to the remaining cordon.

The 2nd/1st Battalion also became involved in what was known as Operation Reassure, generating a presence in suburban areas to reassure the public, particularly at night, that authority and law and order were being maintained despite the absence of power supplies and other utilities.

Substantial logistical assistance was provided by 3rd Logistics Battalion, both to other deployed military elements and directly to communities as part of the response effort, including transportation of a variety of stores including portaloos. A tented camp for housing 500 displaced people was established in Burnham Camp and separately a temporary morgue, containing a DVI facility and also a Coroners Court was established. 150 military vehicles assisted with movement in areas affected by liquefaction. Army and Air Force movements staff assisted in the reception and staging of over 400 USAR personnel from seven international

teams through Christchurch Airport. P3 Orion flights commenced aerial reconnaissance to provide situational awareness and support local and national decision making. Air transport was provided using Kingair, B757 and C130 aircraft. Helicopters were placed on standby in support of both NZDF, Civil Defence and other agencies. Singaporean soldiers, also present for the exercise, were able to contribute to the initial emergency Response.

Concurrently, at Lyttelton NZDF elements involved in the military exercise took the initiative and provided assistance to the local community. HMNZS Canterbury, Resolution, Pukaki and Otago had been engaged in the exercise and were available to respond. Hydro-graphic survey of the Lyttelton Port commenced. HMNZS Canterbury had just been appointed a 'disaster-relief ship' and provided meals for 1,000 people left homeless in that town and accommodation for a small number of locals.

It appeared that NZDF was at times frustrated that other tasks were not asked of it, or allocated to it. It had latent capacity that was not harnessed, such as the provision of potable water by HMNZS Canterbury. In addition, NZDF could have enhanced the staff effort within the CRC – as it later did on request, supporting the Rena emergency. There is alignment between CIMS and military staff functions although notably there is a difference in culture which needs to be bridged. Cultural differences in the application of planning tools also exist and are a factor to consider in EOC management.

NZDF was also represented at the NCMC in Wellington and maintained their own situation room, together with liaison, in the main Operations Room. During the first 48 hours, nearly 1,800 NZDF personnel from all three services, regular and reserve, and civilian, were involved supporting the Christchurch earthquake Response. The NZDF considers that it is during this period that it can have its greatest impact, although the Review considers that while the early intervention by NZDF personnel was beneficial, their on-going support was also vital and required.

Future policy

The primary guidance for developing NZDF capability starts with the Defence Act 1990. The Act allows the use of Armed Forces to provide public service or to assist civil power. The Defence White paper 2010 articulates that the NZDF must have the capabilities necessary to contribute to whole-government efforts at home and abroad in resource protection, search and rescue, disaster relief, and humanitarian assistance with response to 'natural and man-made disasters' being an output for the NZDF.⁹¹ It is considered non-discretionary for the NZDF in New Zealand.

NZDF personnel highlighted that it is prepared to adapt to CDEM requirements and indeed, the NZDF responds as required to NZ Government tasking. NZDF staff indicated it is not seeking to

91 NZDF Output Plan 2011-12.

'militarise' civil CDEM processes, and it cannot sustain maximum effort during emergencies for extended periods, nor is it funded to do so. This assistance in the past has been provided on an opportunity basis and limitations exist regarding the length of any deployment. A more stable basis would be useful.

The Review understands NZDF is exploring how they can best support future natural disaster response. They clearly have niche capabilities such as cordon provision, command and control capabilities, planning and logistical staff support. They have expressed a willingness to adapt to new requirements should they arise at the time. NZDF indicated to the Review they are likely to provide optimal support if given discrete tasks. They emphasise forewarning, prioritisation, clear tasking and coordination and consider they could assist CDEM EOCs in these areas. It was indicated that NZDF did not want or intend to become the primary orchestrator.⁹² Military capability and capacity should seek to plug capability gaps and enable more rapid recovery but not replace other organisations when civilian capacity is available.

The Review raises a note of caution regarding the potential for NZDF integration into EOCs, noting there is clear potential for benefit. Because the culture of NZDF and CDEM is different and the response of CDEM staff may not align with NZDF expectations, the right NZDF personnel need to be selected for these roles. As such, involvement of NZDF personnel would need to be monitored and those best suited selected for the roles. Moreover in order to carry out their tasks effectively, military personnel would need to participate fully in CDEM exercises beforehand.

Evaluation of the Response

The Review considers that the following features of the NZDF response worked well:

- The contribution of the NZDF highlighted its responsiveness and self-sufficiency. This was enhanced by having provided support some months earlier for the September 2010 earthquake, highlighting the value of practicing for these emergency response roles. This not only included ground troops, but Navy support, P3 Orion reconnaissance, helicopter support and ground movement staff.
- NZDF had significant forces near Christchurch at the time of the earthquake which responded quickly and in significant numbers to assist the civil authorities.⁹³ They were of considerable assistance to the Response.
- Burnham Military Camp provided troops and logistical assistance and was an excellent facility for the DVI team.

⁹² Debrief slides used by NZDF.

⁹³ The Navy had a ship in Napier at the time of the 1931 earthquake as well. <http://www.teara.govt.nz/en/historic-earthquakes/6>

- The NZDF is a disciplined, flexible force which promotes initiative in emergency situations. Their presence carried with it a degree of authority, which was recognised by the public, even though there was no statutory authority on the domestic streets of Christchurch. Once having established the cordon around the CBD, and commenced conducting patrols in military vehicles, local communities respected their authority and the sense of calm they were able to deliver. This directly contributed to law and order compliance and released police to undertake other activities.
- NZDF maintained commanders in their roles and delegated authority to others when required. They generally did not rotate personnel through key positions. This was in contrast to the policy within the CRC where full authority appeared to transfer at each shift change.

The following aspects of the NZDF response could have been better:

- NZDF staffed the cordon throughout the response period and indeed for over a year after the earthquake. The argument was that the uniformed presence provided reassurance to the city. However, in practical terms soldiers could have been replaced by commercial security services very much sooner. Because the cost of using NZDF does not fall on the tasking agency, there is a great temptation to regard the Military as cheap labour when used after the immediate emergency has passed. This also applies to other tasks such as catering where commercial operators were in a position to supply meals after a reasonably short time.
- The NZDF planning and centralised tasking staff tools, together with their ability to operationally prioritise, could have been more utilised by CRC and better utilised in an EOC. Likewise greater use could have been made of NZDF capability to produce maps and images for the CRC although that capability should have come from the CCC in the first instance.
- There was a lack of communication inter-operability with the rest of the Response agencies. The sophisticated encrypted NZDF communications proved somewhat cumbersome and were replaced for cordon management with commercial portable handheld radios.
- Support from relatively sophisticated sources such as P3C Orion did not appear to benefit local decision makers in the early stages of the Response when this information would have been most useful, because of technical challenges transferring data. Other assets such as helicopters were underutilised and could have provided valuable assistance conducting reconnaissance and transporting food and personnel during the response phase and early stages of the recovery.

Conclusions and Recommendations

The Review concluded that:

- The NZDF contribution to the earthquake Response was overwhelmingly positive.
- NZDF training makes it well suited to enhancing CDEM capabilities with both incident management and field capabilities.
- While assets were serendipitously available at Christchurch it may take significantly more time for NZDF assets to be available on scene for future disasters, depending on their location.
- NZDF is willing and prepared to do more to support the response to natural emergencies where the capacity is available, and this falls within the NZDF broader responsibilities of supporting national interests as identified by the Government.
- A more stable basis for NZDF support of emergencies would be useful so that support is not dependent on availability of resources and the discretionary directions of commanders at all levels.

The Review recommends that:

- The priority of support and the potential capabilities expected of the NZDF during emergencies be clarified.
- Closer links be established between NZDF and MCDEM with the appointment of an NZDF officer as liaison **within** MCDEM (See Section 9.2).
- NZDF take part more fully in CDEM planning and exercises.
- The following potential NZDF roles within an emergency be developed:
 - Provision of a Chief of Staff for EOCs.
 - Assisting with the intelligence function
 - Explicit support where the military have specific expertise such as mapping and reconnaissance.
 - Specific operational tasks such as cordon management.
 - Assisting with the planning function
 - Physical planning and management of an EOC.

Chapter 4 - Lifelines - General

Prior earthquakes, particularly that of 4 September 2010, had a significant effect on the preparedness of many lifeline services at the time of the February earthquake. While lessons were still in the process of being learned and evaluated in February 2011, many organisations did show significant improvements in their responses to the February event.⁹⁴ This Review concentrates on the management of the Response rather than the technical learnings which may result from the Response except where those learnings may be of wider applicability.

The Review noted one particular feature which applies to most lifelines, namely that where the organisation employs outside contractors on other than an 'embedded' basis the restoration of lifelines is more difficult. The management and tasking of contractors and own staff with respect to emergency response must be embedded and practiced.

Lifelines include the essential services described in the following sections.

4.1 Water and Waste Water

As a result of the September 2010 earthquakes, the water and wastewater lifelines team had experience in the activation and operation of an emergency management centre and had already instituted some changes, such as zoning the city in terms of the water supply, so that responses could be zone-based and targeted to the areas of probable need. In addition there were a number of contract forces in the city already working on that recovery so there was a contingent of experienced contractors available with whom relationships were well practiced.

In Christchurch the Control Centre for both water and wastewater operations is at the Sewage Treatment Plant at Bromley, a point of potential vulnerability.

When the 11 February earthquake occurred there was significant damage to both the water and wastewater systems partly due to liquefaction in the Eastern Suburbs. This caused embankment and stop bank collapse, as well as extensive fracturing of underground pipes. Consequently on the day after the earthquake there was no wastewater flowing into the treatment plant but rather into the local rivers and estuaries. The sea outfall and its associated pumping station were fortunately largely undamaged.

⁹⁴ See: Middleton and Westlake, May 2011 and CCC, Sep 2011.

The EOC was activated quickly and communications to Bromley checked to confirm they were still intact. Once the system status had been determined the principal contractors were briefed and priorities set for the Response. Liaison with, and action for, emergency responses were also activated, e.g. water supply using Fonterra tankers. Additional staff, who eventually relieved those staff controlling water and wastewater recovery operations, were obtained through the Water Executives Forum, an industry body. These rapid actions were only possible because the relationships had been developed prior to the event. It is perhaps significant that in this, as in many other areas of the Response, action was taken based on pre-existing, often informal relationships, using networks already established rather than through the formal emergency communication channels through the CRC, the NCMC or the NC.

It quickly became apparent that alternative waste disposal systems would be needed. Portaloos had been tried in the September event and the disadvantages learned included possible health risks, lack of security and reluctance to use them at night, particularly by women and children, which militated against their general use on this occasion. Chemical toilets were decided upon.⁹⁵ This issue is dealt with in Section 7.1.

The chemical toilets also required the establishment of local collection points where home owners could empty the toilets and the provision of onward transport to sewage treatment facilities. Consideration had to be given to the possible effect of chemicals on sewerage plant operations.

It is likely that this scenario in Christchurch could apply to a number of other cities in New Zealand in the event of a similar earthquake and further evaluation and planning for the use of temporary toilets in an emergency would be appropriate.

Industrial waste streams with possibly dangerous or toxic elements had not been considered in detail prior to the event as it was assumed that the Regional Authority and HASNO specialists were dealing with sites that had dangerous chemicals. However, this was not the case and a plan had to be developed by the team in the CRC. This demonstrates the need to develop shut-down and containment procedures for such sites as part of the CDEM planning.

In terms of water supply, some pre-planning had already been done in zoning and GIS mapping of services but this was not complete at the time of the February earthquake.

The extent of the damage, particularly in the Eastern Suburbs, was such that chlorination of the local water supply was required.⁹⁶ This was designed and organised by a team from another local authority elsewhere in New Zealand which maximised the effective use of local resources.

The management of the work force and logistics of repair had some important features. The state of the roads proved a significant impediment to the delivery of resources to the repair gangs. In

⁹⁵ On grounds of security, self-management of disposal to street collection systems, no electricity requirement, etc.

⁹⁶ Christchurch water supply is normally un-chlorinated. It is a pump pressurised system with limited storage capacity.

order to maximise the effective use of these gangs, the delivery of equipment and materials was reversed in that suppliers delivered these directly to the requirements of the gangs on site. This model was possible because of the pre-developed relationships between the City Council and contractors.

As in most cities the piped infrastructure varies in age from zero to about 100 years old. Thus to improve resilience requires careful consideration of vulnerability and other factors. Since the February event CCC has developed, in conjunction with a university, a pipe break predictor based on ground liquefaction probabilities, pipe types, etc. On the basis of this, alternative piping systems can be selected depending on the risks.

Lifelines restoration depends on having up to date information on the lifeline status. Consideration should be given to establishing reconnaissance teams with their own communications (in addition to the actual response teams) to gather data. It is important that data on the system status is gathered in an efficient way. For example road damage data is an important indicator of likely subsurface pipe and service damage and must go into both road and services data bases or into a common data base accessible to both.

The ability to generate damage maps (amongst others) is important for communication to the EOC and the public and needs to be an embedded capability for EOCs.

Evaluation of the Response

The Review considers that the following features of the water and wastewater response worked well:

- Water supplies were restored within a short time having regard to the extent of the damage.
- Sewerage restoration was handled expeditiously and its restoration was as fast as could have been expected in light of the huge amount of damage.
- The restoration work was based on using the contractors normally engaged for maintenance and construction, and this enabled repairs to be completed much more rapidly than would otherwise have been possible.
- Organisation of the delivery of materials directly to contractors rather than to CCC depots facilitated the restoration.
- Relationships with sister organisations around the country were used to bring in support, especially for specific management tasks.

The following aspects of the water and wastewater response could have been better:

- More business continuity planning could have been done in advance.

- Communications with households where supplies were disrupted were inadequate. (See Section 7.3.)
- Better damage maps could have been prepared especially for other activities within the EOC.
- Aspects of the provision of alternative sanitation could have been improved. (See Section 7.1.)
- Better communication with the CRC through the Lifelines Utility Coordinator.

Conclusions and recommendations

The Review concluded that:

- The restoration of water and wastewater was competently and effectively managed.

The Review recommends that:

- More emphasis be given by water network managers to business continuity planning, and to exercising in emergency management.
- When systems of wastewater are disrupted, the management of the Response should provide adequate advice on alternative sanitation while portaloos or chemical toilets are being obtained.
- Consideration be given to establishing reconnaissance teams with their own communications to gather data for multiple lifelines in the same reconnaissance, for example, road, water and waste water.

4.2 Solid Waste

Solid waste in general does not seem to have been given the attention in pre-planning that it merited. Included in solid waste are silt from liquefaction,⁹⁷ normal solid waste, waste from demolition, solid waste from emergency toilet arrangements and putrescent waste from food and other facilities.

Each of these has their challenges. For example, silt must be treated to remove water. Waste from demolition, which may be a considerable volume,⁹⁸ may have to be retained for forensic purposes or disposed of in various ways to avoid contamination. The disposal of building demolition waste

⁹⁷ 54,000t after 4 Sep 2010 and 322,000t after 22 Feb 2011: Resilient Organisations Research Report, Table 1, 2011/04

⁹⁸ One estimate is 4.5 million tonnes: IPENZ Insight, Jan/Feb 2012, p6.

needs particular attention as the large volume will require proper planning and consideration of environmental effects in order to determine the disposal sites and methodology. This planning must be done before the emergency. For example, the disposal of building demolition waste as reclamation material at Lyttelton Port would probably have had much greater difficulties than it had if the pre-planning for reclamation had not been done even though all the consents were not in place at the time of the earthquake.

In Christchurch the normal three wheelie bin domestic collection system (green, recyclable and normal domestic waste) was adapted to allow the emergency disposal of bagged faeces in the domestic waste bin. This entailed doubling the collection frequency to weekly and inoculating the refuse collection staff.

The cleaning of food premises which had been closed for some time, often inside the cordon where access had not been possible, produced a 'tidal wave of putrescent waste'. It was quickly realised that the cleaning of these premises was best done by companies specialising in cleaning.

Evaluation of the Response

The Review considers that the following features of the solid waste response worked well:

- disposal of debris did not delay silt removal, demolition or road clearance
- some planning was in place for disposal of non-toxic solid waste
- preplanning of reclamation at Lyttelton port had been done

The following aspects of the solid waste response could have been better:

- There was no pre-planning for disposal of putrescent waste from rotting food.

Conclusions and recommendations

The Review concluded that:

- Disposal of solid waste was generally well handled despite limited preplanning.

The Review recommends that:

- All aspects of solid waste disposal be given attention in the development of lifeline plans.

4.3 Electricity

The electricity supply to the region was by Transpower. In the February earthquake this system suffered only relatively minor damage with full power being restored (albeit with lower security at the Bromley substation) by 1729 hours on 22 February 2011, only 4 hours 40 minutes after the earthquake⁹⁹ Electricity supply to the earthquake affected area was inside the area served by the electricity distribution company Orion New Zealand Ltd. Subsequent to the earthquakes Orion commissioned an independent study which analysed the impacts, the responses, Orion's risk management and lifelines engineering, and produced recommendations for improvement.¹⁰⁰ From this thorough report and discussions with key personnel it is clear that the company performance in preparing for, and in response to the earthquake, was excellent and contains some useful lessons. Significant aspects are:

Preparation

Orion is a commercial company, in which risk management practices are embedded in normal operations with emergency management integrated with normal operations, treating them as core business. It has explicitly adopted the '4 R's'¹⁰¹ in its emergency management arrangements.

Orion had invested in the investigation and analysis of the weak points in the network and addressed these both before the 4 September 2010 earthquake and again before the February 2011 event. For example, the mitigation measures put in place after a vulnerability study (1994-97)¹⁰² cost \$6 million but are estimated to have saved \$60-65 million in direct asset replacement costs as result of the earthquakes in addition to the contribution to rapid restoration of services.

Orion's pricing policies encourage large consumers to manage energy costs, with many installing in-house generation totalling about 50MW which could be used in an emergency.¹⁰³

Damage Effects

- 50 % of Orion's 66kV underground cables suffered multiple damage (about 10-15% of all underground cables). Overhead network damage was light.
- Although supply was restored less than 5 hours after the earthquake it took 10 days to restore power to 90% of customers.

99 http://www.aelg.org.nz/shadomx/apps/fms/fmsdownload.cfm?file_uuid=E81F3088-14C2-3D2D-B99D-60782144C518&siteName=aelg accessed 9May 12 Presentation to Auckland Lifelines Conference Nov 2011 Andrew Renton

100 Kestrel Group, September 2011.

101 Risk reduction, readiness, response and recovery.

102 Christchurch Engineering Lifelines Group, CAE, 1997.

103 In fact, reportedly only about 20 MW was used in Sep 2010 for a variety of non-electricity related reasons.

- An emergency 3.5km 66kV overhead line was required to supply an Eastern Suburbs substation.
- Orion lost 630 million customer minutes as a result of the February event compared with 88 million minutes for September 2010.
- The control centre was damaged but an alternative was available.
- Flexible supply design with extensive interconnections assisted restoration by providing routing options.
- There is likely to be a reduced life of some underground assets and on-going higher than usual fault levels.

Evaluation of the Response

The Review considers that the following features of the electricity response worked well:

- Electricity supply was restored very quickly, thus facilitating the rest of the Response.
- Orion had the internal organisation and emergency procedures as well as the in-house capability to respond effectively, i.e. the importance of having an outage management system.
- Orion had the relationships with outside organisations and suppliers to be able to obtain additional staff and resources quickly, including through mutual aid arrangements.
- Organisational culture and leadership are important, including aspects of HR management such as ascertaining staff status after the earthquake, feeding staff and contractors, seeing to medical care needs, management of the staff workload and ensuring timely relief.
- The size of Orion¹⁰⁴ was sufficient to enable the mobilisation and management of the necessary resources to respond effectively to the challenges that resulted from the emergencies. Several observers noted that in general larger companies coped better than smaller companies in the Response and restoration of business. This raises the issue of the desirable minimum size and the appropriate governance arrangements and structure of infrastructure service companies best able to deliver results in an emergency.
- Although mutual aid arrangements worked well, the introduction of staff gave rise to challenges of accommodation and feeding among others. Altogether about 40 companies and 700 workers contributed to providing support.

¹⁰⁴ Orion is the third largest electricity line business in New Zealand.

The following aspects of the electricity response could have been better:

- The main Orion Operation Centre was inside the cordon which was a significant issue. Cordon management was inconsistent and inflexible for staff who had to work inside the cordon with, for example, frequent changes to access arrangements.
- Power supply to mobile phones, cellular systems and other telecommunications systems was vulnerable in some cases.
- After the February event much of the interface between Orion and the CRC was at CEO level. Contact with the relevant decision makers/command structures in the CRC was reportedly somewhat confusing with difficulty in contacting the correct person to address issues.
- Demolition coordination improved between the September and February events in respect of advising on power disconnection and transformer facilities in buildings to be demolished, but overall demolition management could be improved with the development of demolition protocols.

Conclusions and recommendations

The Review concluded that:

- Orion has well practised emergency management arrangements with supporting contractors and managed the emergency well.
- This effective emergency management relied on high level principle-based emergency structure and plans acted on by trained and motivated staff using initiative to make effective decisions at all levels, i.e. management at the lowest practical level as close as possible to the front line.
- The key to resilience of Orion's services was that it understood its assets and their vulnerabilities.

The Review recommends that:

- Emergency protocols and procedures be worked out between the electricity distributors and telecommunication companies. The heavy reliance on mobile phones and the cellular systems for both voice and data transfer makes protocols for power supply to telecommunications systems for these facilities a matter of high priority.
- Protocols regarding power disconnection and transformer facilities in buildings to be demolished be improved by the development of demolition protocols.
- The mutual support arrangements between power companies be further developed.

4.4 Telecommunications

Telecommunications is one of the services for which demand can temporarily increase astronomically during an emergency and that proved to be the case in February where the cellphone network in particular rapidly overloaded. Fortunately connectivity was never lost.

Preparation

Telecom had a recovery and priority plan and had, as the result of the September earthquake, done 70-80% of the work to set up an alternative operating centre in Linwood to provide an alternative to the main exchange which was inside the cordon.

Emergency Operations

When the earthquake occurred, Telecom staff recovered essential equipment before evacuating the building -- for example, laptops -- and walked to the Linwood Centre. The conflict is obvious between personal safety and the need to recover essential equipment and data quickly. The lesson learned from the September quake was that if essential equipment/data was not retrieved early, i.e. before cordon restrictions, then it may subsequently be difficult to access.

Most of the cellphone and lines networks remained intact so the main priority was to provide a power supply to cell sites and exchanges as their back up capacity was limited to 1-3 days. Telcos worked closely with Orion on restoring power supply. Where back up was supplied by generator, fuel supply limited this to about 3 days without fuel replenishment but only about 24 hours where back up was by battery. Getting generators to all sites took three days in the case of Telecom. It was reported that around 200 generators were used in February and Vodafone needed eight people working 12 hour shifts to keep their generators refuelled in the days immediately following.¹⁰⁵ Most Telecom facilities were up and running within a week of the earthquake although fault levels one year after are still being reported as being 30% above normal.

The cordon operation was described as 'the biggest potential derailer of operations' with initial access difficulties. Access was essential 24/7 as the main exchange was inside the cordon. There was no pre-plan for the cordon. Access arrangements and cordon management must be pre-planned as far as possible.

Privacy issues were significant. Because buildings to be demolished often had sensitive equipment or cables on or under them¹⁰⁶ it was important the telecommunications infrastructure companies were involved in discussions on demolition and requested access to the schedule of which

¹⁰⁵ Telecom note after previous snow emergencies they had installed plugs on remote cabinets and arranged via Federated Farmers for local farmers to plug their own portable generators into these.

¹⁰⁶ For example, older pressure-filled Telecoms cables, which may serve whole streets, needed to be retained.

buildings were to be demolished. However this information was withheld on grounds of privacy, apparently mistakenly. A privacy policy for an emergency had been established but does not seem to have been promulgated widely enough.

While there was reported to be early uncoordinated demolition of buildings (which might contain cellphone towers, cables, etc.) eventually this was resolved. It does however point to the need for a well thought out and controlled demolition plan and a willingness to share information on the network.

Almost immediately after the event Telecom deployed two of their EM staff into the CRC with no defined role other than 'to make things happen' with respect to telecommunications. They brought their own laptops plus T sticks as the CRC 'had no effective communications'. They also prepared Telco sitreps for the EOC. After about two weeks they self-demobilised as the job ran out of steam. There was no formal handover or change of status.

One lesson was that in September 2010 recovery assistance personnel were pulled in from outside the area too early without the necessary planning, having been done on their deployment. This caused consequent confusion and delay. In February the reconnaissance and planning was done and the extra assistance then mobilised about 48 hours after the event, to much better effect. Outside help was used to relieve exhausted locals.¹⁰⁷ One side benefit of this is that there is now a country wide pool of staff and managers that have some experience of emergency management in the telecommunications sector.

Industry structure

In the case of Telecom, the organisation has changed as the result of government broadband changes. Telecom recently split and broadly speaking is now a retail organisation with ownership of the exchange equipment and the XT mobile network, whereas Chorus owns the exchange buildings and sites and is responsible for in-ground cables and connections to customers. Chorus was managed by Telecom in a BAU model during the emergency and this evidently worked well as the relationships were well known to both parties, i.e. there was effective embedment. In the future this functional separation has potential for loss of effectiveness in an emergency should that close relationship become less coherent.

The CRC telecommunications links were through the CCC arrangements with their supplier, Telstra Clear. It was noted that this is a point of vulnerability and consideration should be given to security or robustness of communications in the event that the primary supplier is out of action, for example, the availability of a ladder network to enable alternative routing.

¹⁰⁷ It was observed that after one week of emergency management staff were exhausted. c.f. other observations that 4-5 days should be the maximum continuous duty period.

Evaluation of the Response

The Review considers that the following features of the telecommunications response worked well:

- The cellphone networks provided texting service with very limited disruption in the hours immediately after the earthquake. Cellphone voice service was restored within a matter of hours and the Response generally depended almost entirely on cellphone for internal communications for some days.
- Reconnaissance and planning had been done for the use of personnel from outside the disaster zone and the extra assistance then mobilised about 48 hours after the event. Outside help was used to relieve exhausted locals.
- Deployment of telecommunications staff in the CRC with a broad brief and their own independent data communications was valuable.

The following aspects of the Response could have been better:

- The cordon operation was described as 'the biggest potential derailer of operations' with initial access difficulties. Access was essential 24/7 as the main exchange was inside the cordon. There was no pre-plan for the cordon. Access arrangements and cordon management must be pre-planned as far as possible.
- Early on there was uncoordinated demolition of buildings which potentially contained sensitive equipment or cables on or under them.

Conclusions and recommendations

The Review concluded that:

- The cellphone system proved remarkably resilient and provided the core of communications for the Response. Without that the response efforts would have been severely hampered.
- Some vulnerabilities exist in the manner in which other response activities such as access control and demolition can inadvertently affect telecommunications systems and demonstrate the need to share network information.

The Review recommends that:

- As protocols are developed for building demolition, provision be made for buildings with sensitive equipment or cables on or under them.

- The need to service and restore telecommunications equipment be taken into account in cordon access arrangements.

4.5 Roads

The State Highway network is managed by NZ Transport Agency (NZTA) and the local road network by CCC. NZTA is part of the Transport Response Team which can be activated by the Ministry of Transport in an emergency to provide intelligence on road and other transport status. The main roading system is well understood and the weak points and priorities well known. While the response to the more significant (in road terms) September 2010 earthquake was reportedly a bit 'stuttery', the response in February was smooth and functioned well. Roading emergencies are regarded as part of BAU and well-practiced for example through rain, flood and snow events. In September rockfalls closed the Lyttelton tunnel but these had been dealt with by February when the tunnel was only closed for about one hour while inspections were undertaken.

The tunnel services are managed by Serco for NZTA. However the access issues raised by the Lyttelton Port Company, which should have been raised with NZTA, indicate that the correct channels of communication may need better dissemination among principal users. The main state roading issue after the February quake was the need to raise parts of SH 74 through the Eastern Suburbs of Christchurch which had sunk below mean high water spring tide level.

The local roading issues in the Christchurch area after the February event were mainly blocked access as the result of liquefaction, damaged bridges and, in central areas, roads blocked by debris. However the principal routes were cleared quickly although access was restricted and slow in some areas. This was facilitated by the maintenance contracts CCC already had with two major contractors, Fulton Hogan and City Care. Written into the contracts was a requirement to provide assistance in the event of an emergency and a schedule of payment rates for work. Thus after initial reconnaissance by air and by staff on the ground, priorities could rapidly be determined and work gangs deployed. On-going information was received from work gangs and entered into the data base.

The organisation and contact points in the CRC were reportedly not well understood.

Evaluation of the Response

The Review considers that the following features of the roading response worked well:

- The roading system is well understood and the weak points and priorities well known.

- The principal routes were cleared quickly (even although access was restricted and slow in some areas).
- Success was in large part due to preparation and the pre-planned embedding of major contractors in the response team.

Conclusions

The Review concluded that:

The response in February was smooth and generally functioned well.

4.6 Air

Air operations were affected in two ways. Firstly the main New Zealand-wide airways management is based in Christchurch. Secondly operations at the airport were affected.

Air Traffic Control

The main airways traffic control for New Zealand is located in Christchurch with a secondary/standby centre in Auckland normally used for international flight areas. Prior to the earthquakes Airways Corporation had commenced a risk review. At the time of the September earthquake there were only 7 planes in the air but in February there were about 70. The control building had only minor damage and the control system was off the air for about 1½ hours. During this time air traffic control reverted to TIBA (traffic information broadcast by aircraft) procedures. It was observed that pilots did not appear to be as familiar with these procedures as they should have been.

Lessons Learned/Issues:

- **Personnel support** – As a result of the September event it was perceived that personnel support and management could be improved which was done in February. One aspect is the need to carefully manage the loading up of the system after an emergency. Personnel may be shocked or have family/personal issues and not be operating with normal productivity, alertness and judgment.
- **Communication** – It was necessary to contact other control centres around the country but the cellphone system was effectively inoperable/overloaded during the critical phase. Satellite cellphones have since been purchased.

- **Longer term considerations** – If the Auckland Control Centre had to be activated on a longer term basis then about 100 staff would have to be transferred from Christchurch to service the centre. That would require priority transport from Christchurch to Auckland which should be written into the overall national CDEM plan. Another consideration is whether a contingency management centre should be constructed closer to Christchurch.

Airport Operations

The Christchurch Airport Company had undertaken a real time business continuity exercise in May 2010 and further developed the emergency plan to include the selection of the Incident Controller and detailed emergency operations procedures. These included daily meetings of all airport stakeholders during the emergency and formal processes for handover and resumption of BAU. The airport can be completely independent in respect of electricity, water and communications.

After September 2010 the company installed accelerometers¹⁰⁸ that together with other methods allowed immediate assessment of probable consequences and triggered predetermined emergency responses. In February the runway was inspected using a procedure which took three hours and the airport was opened after about 3-4 hours. The runway inspection procedures have since been modified to reduce the inspection time to about one hour.

One issue in February was the weather, which deteriorated while about 1,000 people were outside. This was dealt with via stakeholders and external companies (e.g. with portaloos, camper vans, meals from the hotel, etc.) but the airport company has since put two containers on site containing emergency shelter tarpaulins.¹⁰⁹ One mistake in September was to resume BAU too early with consequent staff overload. In February the crisis management team was kept in place until a formal planned handover was appropriate.

Evaluation of the Response

The Review considers that the following features of the immediate response worked well:

- The Air Traffic Control (ATC) system safely handled the 70 odd planes in the air, despite some unfamiliarity with the fall-back TIBA system.
- The loading up of the ATC system was carefully managed in case personnel were shocked or had family/personal issues and were not operating with normal productivity, alertness and judgment.

¹⁰⁸ If the acceleration is more than 0.25g then the terminal is evacuated and the aerodrome closed for inspection. Accelerations in February 2011 were over 0.5g at the airport.

¹⁰⁹ One of these is airside to cope with passengers, etc., who have not been through immigration, customs, etc.

- The airport had a well-developed and fully practiced emergency management plan which worked well.
- The airport was resilient in that it is completely independent in respect of electricity, water and communications.
- The airport crisis management team was kept in place until a formal planned handover was appropriate in order to protect against staff overload.

The following aspects of the response could have been better:

- No provision was pre-planned to protect against inclement weather the people using the airport who were forced to evacuate buildings.

Conclusions and recommendations

The Review concluded that:

- The ATC system coped with the earthquake well.
- The airport was open very quickly after the earthquake, considering its impact. This was because of its preparedness with well-planned and well-practised emergency management procedures, together with physical resilience.

The Review recommends that:

- National CDEM planning include provision for priority transport of ATC staff from Christchurch to Auckland to service the alternative centre. This arrangement would be activated if the Christchurch centre were disrupted for an extended period of time.
- In airport emergency planning consideration could be given to rapid evaluation of runway status to enable early emergency operation of military aircraft¹¹⁰ even if runway status did not allow resumption of commercial operations. This would require such runway standards to be developed in conjunction with the RNZAF.

¹¹⁰ Such as C130 aircraft.

4.7 Rail

The rail network throughout New Zealand is controlled from the National Train Control Centre (NTCC) in Wellington on a 24/7 basis.¹¹¹ The Centre controls signalling and points throughout the country, with only some local control possible in Auckland. Responses to emergencies are led from NTCC through well-defined protocols and procedures. There is a well-defined crisis management response but emergencies are regarded as BAU in most cases, for example, derailments, crossing accidents, rail blockages, etc., with well-established communications channels.

There is a radio link throughout the New Zealand wide rail system through a network of repeaters as well as a strong VOIP network. There is a direct link to NCMC via the Transport Response Team. The Interislander ferries are a separate business unit but are represented by KiwiRail at the TRT/NCMC.

Some organisations have links at several levels to disaster management. Railways, for example, have two connections to an emergency through lifelines (the infrastructure) and logistics. Previous CDEM exercises in which rail had been involved had been at national level only.

The September 2010 earthquake resulted in some learnings. In particular KiwiRail realised they did not fully understand the vulnerabilities of parts of the network, for example, bridges, and consequently developed a graduated inspection response to earthquakes of varying shaking intensity based on the Modified Mercalli scale. The September event was considered to have had more impact on rail than the February 2011 earthquake but the company did not declare an emergency in either event which would have triggered their crisis management actions.

Following 22 February 2011 and initial reconnaissance, sitreps were sent on a frequent basis to NCMC and about 2 days after the event a rail representative was sent to the CRC. The Lifeline Utility Coordinator (LUC) in the CRC did not receive the sitreps and was unaware that the rail representative was in the CRC. This is significant in that, for example, in the September earthquake KiwiRail used their own initiative and client relationships with Fonterra to move rail milk tankers around the country to provide water to Christchurch, a significant activity of which the LUC should have been aware.

Interestingly it was observed that, as a ro-ro ship, HMNZS Canterbury could have used the Kaitaki berth in Wellington to speed loading operations but although this facility was offered by KiwiRail/Interislander it was not used.

From the national point of view a significant weakness is that there is only one national rail control centre in Wellington with almost no local control in the remainder of the country. This is a major

¹¹¹ This is analogous to the national Airways Control from Christchurch.

weakness because if manual control, i.e. written control, had to be used, the freight capacity would be catastrophically degraded.¹¹²

Evaluation of the Response

The Review considers that the following features of the rail response worked well:

- Rail's well-defined crisis management response for emergencies is regarded largely as BAU and with well-established communications channels.

The following aspects of the rail response could have been better:

- Rail depends on only one national rail control centre in Wellington with almost no local control in the remainder of the country.

Conclusions and recommendations

The Review concluded that:

- The KiwiRail response was well organised and managed and worked well.

The Review recommends that:

- Communication protocols between NCMC, EOC and LUC be reviewed and upgraded along with the EOC organisation.
- An emergency standby rail control strategy be investigated and implemented to lessen the current control system vulnerability in the event of the main control centre being unavailable¹¹³
- Kiwi rail be urged to take part in local CDEM exercises as well as those at national level, and through lifelines links.

4.8 Sea

The Lyttelton Port Company (LPC) had done extensive emergency pre-planning and modelling of the infrastructure. The actual behaviour of the wharves in the earthquakes was close to predicted

¹¹² One estimate was to 20% of normal levels.

¹¹³ A UPS power failure in the NTCC on 26April12 shut down the Auckland rail network for some hours.

which gave confidence in the structures and the planning.¹¹⁴ By chance New Zealand Navy vessels were in port on 22 February 2011 and these vessels and personnel could be put to almost immediate use in surveying the draught of the harbour and approaches as well as inspecting the infrastructure using divers. These measures enabled the company to state that the port would be operational within 96 hours of the event.

Issues Arising in the Response

Relationship with the CRC - The Port felt that not only did the city not understand the importance of the Port to the economy but that dealing with the CRC was difficult. For example the CRC reportedly issued a public statement that the Port would be closed for a month without reference to LPC. This required considerable effort to counteract and advise shippers, etc., of the true position. This demonstrated the need for closer cooperation and better communications between LPC and CRC and in emergency planning.

Tunnel Operations - Difficulties were encountered with tunnel operations as a result of different perceptions of risk between the tunnel managers and the Port, although the tunnel owners, NZTA, should have been involved. This showed the need for open, pre-planned and practiced emergency management communications and knowledge of responsibilities.

Reclamation - LPC had been planning further reclamation for some time but did not have resource consent. When building demolition debris was initially dumped in the harbour by agreement and with permission, there was some misunderstanding over the permissions granted which eventually required political intervention. This emphasises the need for pre-planning before an emergency.

There had been no previous CD exercises involving the Port although LPC had done exercises with the army and navy.

Media - were positive and helpful in general but the rumour mill needed constant monitoring e.g. unfounded rumours of an oil terminal fire and fuel supply difficulties.

The practice and the issues dealt with in September improved the response in February, a theme common to nearly all organisations and businesses.

HR issues are extremely important and if managed properly during the emergency can actually improve relationships and productivity.

¹¹⁴ For example wharf piles were predicted to deflect 200mm vs. actual 265mm.

Evaluation of the Response

The Review considers that the following features of the Port response worked well:

- The extensive emergency pre-planning and modelling of the infrastructure.
- Planning for reclamation enabled disposal of debris (after a misunderstanding in approvals).

The following aspects of the Port response could have been better:

- Communications with the CRC and prior exercising with the local CDEM structure which would have developed relationships.

Conclusions and recommendations

The Review concluded that:

- Because of preparedness the Port was able to reopen very quickly.

The Review recommends that:

- LPC join in local CDEM planning and exercises.

4.9 Fuel Supplies

The oil companies have had long standing practice in cooperating through jointly owned companies such the NZ Refinery, Coastal Oil Logistics Ltd, as well as through shared supply facilities, etc. In addition the nature of the oil industry had meant that considerable effort is invested on an on-going basis into the management of risk and emergencies with most, if not all, having Emergency Response Teams.

The oil is supplied by pipeline over the hills from Lyttelton to a tank farm at Woolston, though diesel fuel could be transported through the tunnel.

When the February earthquake occurred there was relatively little damage to the tank farm but there was rockfall damage to the pipeline and the electricity was not available for a short time. The pipeline was repaired in about 10 days, but the danger of rockfalls meant the use of helicopter survey initially, and care was needed in carrying out the repair work. With the Sumner road out of action, alternative arrangements had to be made to use the tunnel¹¹⁵ for fuel tankers which would normally not be permitted to use the tunnel. This was managed through tunnel scheduling.

¹¹⁵ The tunnel does not have a drench system. These tunnel arrangements for fuel transport were put in place after Sept 2010.

There was liquefaction in the area surrounding the tank farm which cut off the water supply for fire fighting without which the farm could not operate. By contacting the LUC a temporary water supply was arranged by the Army. In the June aftershocks water was again an issue but temporary solutions were not available. The company now has standby fire-water supply and pumps.

During the emergency fuel was also brought into Christchurch by road tanker from other South Island locations but there were reports of fuel not being available for essential services as far afield as Kaikoura. Thus the effects may be spread far more widely than the immediately earthquake affected area.

As the fuel companies have national management systems most contacts with the fuel companies were coordinated through the NCMC in Wellington and worked well.

Fuel restrictions, panic buying, security and forecourt staff - There was panic buying until the public was convinced that fuel was available, which took some days. The list of priority customers for fuel was promulgated by the NCMC and available at petrol stations. Some stations had priority lanes. These lanes were also used for normal traffic when priority traffic did not require them. However the junior level staff who manage most forecourts are ill equipped to cope with aggressive customers and some stations had a security guard in attendance. These guards were often removed by others for other CD duties. In addition the LUC noted that during fuel restrictions there were potential issues around the allocation of fuel for evacuees.

Evaluation of the Response

The Review considers that the following features of the fuel supplies response worked well:

- The on-going investment in the management of risk and emergencies by the oil industry and their emergency response teams helped in the Response to the earthquake.
- Most contacts between the CDEM structure and fuel companies were coordinated through the NCMC because the fuel companies have National management systems.

The following aspects of the fuel supplies response could have been better:

- Few fuel stations have standby electricity

Conclusions and recommendations

The Review concluded that:

- Overall, fuel supply and distribution was restored quickly after the earthquake, with alternative supply points used.

- Fuel was however difficult to obtain in some parts of Christchurch because of damage to service stations.

The Review recommends that:

- The issue of fuel distribution and management and the procedures to be used during any restrictions should be addressed at national level.
- Fuel supply companies develop the links with utilities to minimise and mitigate outages of essential supporting services such as electricity and water.
- Since the integrity of tanks and piping at service stations has to be checked prior to fuel delivery there is a need in lifelines response planning to identify the location of priority stations.

4.10 Lifelines Coordination

The organisation of Lifeline Utilities Coordinators (LUC) within the EOC¹¹⁶ is covered elsewhere. The operation of the LUC during the emergency has been reviewed in several reports.¹¹⁷

The Lifelines Utility Coordinators (LUC) Team in Christchurch was staffed mainly by personnel from one consulting engineering company whose office in the CBD became inaccessible after 22 February. All the critical contact data and LUC operational data was in the office which impeded the initial set up of the LUC organisation in the EOC.¹¹⁸ This dependence on personnel from a single company in a single location has advantages as well as obvious risks such as the loss of the LUC team in the event of a building collapse.

The LUC post was manned from about 0700 to 2230, with normally two staff on duty, but it was reported that at times more were necessary. Night shifts were not considered necessary. Even so, additional staff were required from outside the areas to provide relief services.

As has been reported elsewhere a consistent message is that emergency response performance is superior where the necessary personal relationships have been pre-established and exercised. That was true of the LUC in this case. Pre-established sector coordination responses worked well, for example, the Telecommunications Emergency Planning Forum and the Transport Response Team.

116 <http://www.cdemcanterbury.govt.nz/cdem-group-plan.html>

117 Including: Fenwick and Brunsdon, 7 Dec 11, and Smith, G. Jason, 2011.

118 Subsequently the Canterbury LUC staff now carry all set up data on memory sticks with them at all times.

It was reported that while the operational role of the LUC is reasonably well defined in the Guide to the National CDEM Plan ¹¹⁹ it is sometimes not well understood by controllers nor lifeline utilities.

The lifelines companies that performed best were those that already had embedded operational and maintenance relationships which transferred smoothly into emergency mode. This is supported by the international literature.¹²⁰

Evaluation of the Response

The Review considers that the following features of lifelines coordination worked well:

- Personal relationships had been pre-established and exercised by the key LUCs and helped the role to work well.
- The contribution by LUCs from other regions in both the CRC and NCMC was of significant benefit.
- Pre-established sector coordination responses worked well, e.g. the Telecommunications Emergency Planning Forum and the Transport Response Team.

The following aspects of the lifelines coordination could have been better:

- Water and road lifelines (whose own response was very good) communicated with the CRC through existing corporate arrangements so the LUCs had an incomplete view over lifelines as a whole. This led to some loss of overall effectiveness of lifelines response.
- The LUC team depended on personnel from a single company in a single location which had the advantage of providing cohesion but increased vulnerability.
- Information was being provided from multiple sources but there was little opportunity or ability to coordinate reconnaissance information to produce useful intelligence. Much LUC time and resource was spent in preparing and publishing sitreps and other reports, often to changing requirements as many parties tried to control report contents and structure. Many reported considerable time (perceived as wasted) preparing responses and reports for all levels in government that could have been obtained from sitreps and other reports prepared for the CRC.
- **LUC systems** – As noted, the lack of initial documentation (e.g. availability of contact lists) impeded the initial set up and it took some time to set up the necessary document and

119 Section 10.3 et seq.

120 PERI, p 41.

information management and recording systems. The CCC based CRC information systems were not highly regarded and the LUC team used their own computers.

Conclusions and recommendations

The Review concluded that:

- The lifelines companies that performed best were those that already had embedded operational and maintenance relationships which transferred smoothly into emergency mode.

The Review recommends the following actions of a national nature:

- The principles and practices surrounding lifeline relationships with EOCs be reviewed and publicised with a view to clarifying the roles of LUC and individual lifelines. This should include relationships between individual lifeline companies and EOCs, TLA-owned lifelines and EOCs, national lifeline companies and the NCMC.
- Nationally based (or at least nationally consistent) training of LUCs should be undertaken.
- LUCs should exercise regularly both nationally and locally in a meaningful way.
- The role of MED in the LUC should be reviewed and if necessary formalised.
- National policies be developed and promulgated in respect of fuel allocation and distribution in an emergency.
- Disposal of solid waste, in particular liquefaction silt and demolition debris should be incorporated in lifelines plans.¹²¹
- The resilience of infrastructure providers in the main centres in New Zealand should be evaluated to provide a national picture of vulnerabilities and a basis for improvement.

¹²¹ Although solid waste has not hitherto been considered a lifeline.

Chapter 5 - Health and Welfare

5.0 Health and Medical Services

The health response was very good, largely because of the high level of preparedness in the Canterbury District Health Board (CDHB), Pegasus Primary Health Organisation (PHO), and the Ministry of Health locally.

CDHB had strong leadership. Management was used to dealing with emergencies and had operational plans which had been exercised. In being prepared, testing plans was even more important than planning itself, for example, the main hospital had the confidence to pull the plug on power in hospital to test the back-up. ED and clinical leaders had exercised a sudden large influx of serious trauma through the programme EMERGO, funded by the Ministry of Health. The commitment of CDHB was serious – senior management had attended training.

Networks have been created going back to the potential SARS epidemic. These networks linked:

- CHDB and primary care, who worked together well
- clinicians in Christchurch with their counterparts in other regions
- emergency managers in the health sector and their counterparts in the Group CDEM
- Medical officers of health had spent a lot of time over the past five years encouraging hand-washing to reduce the spread of influenza and this had built resilience in the community.

Impact on the Sector

131 cases were registered in the Emergency Department of the hospital in the first hour and possibly 100 more not registered. 87 were registered in the second hour and 46 in the third hour. There were 18 admissions to ICU and 171 hospital admissions.¹²²

Primary care treated thousands of people but presentations to general practitioners (GPs) were not heavy in the weeks after the earthquake. A large part of the city was without water supply or sanitation. It was 6 weeks before the water supply was chlorinated, and many months before sewerage was restored to most homes.

¹²² An excellent account of the response of the health sector is in McColl and Burkle, 2012.

The Health Sector Response

Christchurch Hospital was never really overwhelmed by the amount of trauma presenting. Triage at sites where many were injured, and in the primary sector, diverted less critical cases to Southern Cross and Princess Margaret hospitals. Hospital facilities were remarkably resilient, but some, such as the main hospital, only just held together. The top two floors of the ward block were evacuated because lifts were not working and access to the adjacent building did not exist at these levels, rather than because of structural damage. All hospitals had generators but Orion had power back on at the hospital in 4-5 hrs. A feature of hospitals is that they cannot evacuate easily and hence a heightened level of safety is needed.

Staff came from hospitals around New Zealand, especially to provide relief, with 3,058 person/days of support from other DHBs.¹²³ The Australian field hospital was accepted but essentially as a contingency. The main hospital was very fragile especially since its operating theatres could have become unusable if the tunnel conveying services had collapsed. This use of the Australian field hospital was prudent.

Clinical networks, which had strengthened during the H1N1 epidemic, were valuable. The Emergency Departments of the hospitals worked well. Aged care was the most problematic with 635 beds lost. Vulnerable people were placed around New Zealand and private providers throughout the country allowed their booking lists to be manipulated by CDHB so that evacuees could be placed satisfactorily. None were abandoned in rest homes.

The public health response was excellent as was shown by total absence of gastroenteritis despite major shortages of water and primitive sanitation arrangements. This was in part due to consistent messaging during the emergency and prior to it.

The high level of trust within the sector in Christchurch allowed for considerable autonomy¹²⁴ both within CDHB and Pegasus PHO. The CDHB did not 'nickel and dime' but required no co-payments from GP patients or for prescriptions for a period. The Ministry of Health supported this.

After the earthquake, DHBs throughout the country provided assistance without raising the question of cost. Since then, the question of 'who pays' after an emergency has become significant. Most costs have rested with DHBs providing the assistance. But some issues have arisen such as the cost of sending next of kin to visit evacuated people.

123 Source: National Health Coordination Centre data supplied to the Review

124 The value of autonomy was shown by the example of Wal-Mart in New Orleans in responding to Katrina: Wal-Mart Chief Executive H. Lee Scott, Jr. said, 'This company will respond to the level of this disaster. A lot of you are going to have to make decisions above your level. Make the best decision that you can with the information that's available to you at the time, and, above all, do the right thing.' His words flew down the line to store managers and set the tone for how the company's response was a conscious example'. http://www.semp.us/publications/biot_reader.php?BiotID=569

The Ministry of Health activated its NHCC and placed a liaison officer with the CDHB. NHCC role was supportive and CDHB led the health role in most respects. NHCC led the relocation of 330 disabled people. It was a challenge to the staff of NHCC, involving 173 individuals, 28 on each day shift and 12 on night shifts. Many did only one shift.

Other features of the Response were:

- An access point for methadone was set up at a central pharmacy
- The health situation in marae was excellent
- Mental health was not a significant issue despite the huge impact of the earthquake on the community: 'If you want to fix my mental health get me a drain layer'.

Public Health Criteria for Welfare Centres

Several welfare centres were closed on public health grounds because of a lack of sanitation or running water. This contributed to the negligible incidence of gastroenteritis. On the other hand there was no readily accessible alternative for some of the people using the centres to obtain food and water. The alternative of keeping centres open with portaloos and tankers for water was rejected. With damaged homes lacking sanitation or water, supermarkets mostly closed in the Eastern Suburbs and transport was difficult to welfare centres in the West the closure of the welfare centres placed people at risk.

The situation was comparable to that after 4 September when a proposal was made in the EOC to evacuate several thousand people whose homes lacked sewerage connections or water. Fortunately wiser heads prevailed and pointed out that it was much more effective and less risky to provide some form of sanitation and water to people in their own homes rather than displacing them to makeshift welfare centres.

The underlying issue is that health inspections, particularly those by inspectors rather than medical officers of health, are based primarily on compliance. If a shop fails to meet health standards it may be given time to comply but the essential action is to close it down. The Review suggests that in situations, such as the Eastern Suburbs of Christchurch after 22 February, a more facilitative rather than compliance approach would have been helpful. The well-being of the people using say, Aranui Community Centre, to obtain food or water and information would have been enhanced by that centre remaining open. A decision to close it should have taken into account the health and well-being risks of the alternatives rather than narrowly evaluating the centre, perhaps against business as usual criteria.

Evaluation of the Response

The Review considers that the following features of the health sector response worked well:

- CDHB had strong leadership. Management was used to dealing with emergencies, had a well-developed and practised emergency plans.
- The surveillance system using sentinel GPs provided good information on the health status of the community.
- Pre-existing networks within the health sector in Christchurch and between clinicians across New Zealand were the basis of cooperation.
- Medical officers of health had spent a lot of time over the past five years encouraging hand-washing.
- There was no outbreak of gastroenteritis despite major shortages of water and primitive sanitation arrangements.
- The availability of the Australian field hospital was sensible as a precaution against forced evacuation of the somewhat fragile Christchurch Hospital facilities.

The following aspects of the health sector response could have been better:

- Power for pharmacies was an issue because without power, prescription records were inaccessible.
- Regulations needed to be breached by all pharmacies and rest homes and an advance recognition of this in legislation would be helpful.
- Closures of welfare centres on public health grounds may not have taken into account the total risks facing the population using the centres and the alternatives available.
- Paper health records from red stickered buildings were dumped rather than being retrieved.
- In the Response to the emergency generally, the health sector found that many other players had not planned or exercised.
- Not enough advice was supplied to people who had no access to sanitation of any kind.
- Lack of coordination and consistency of data (including health status and the needs) from surveys of households.

Conclusions and recommendations

The Review concluded that:

- The health sector response was remarkably successful in providing timely and highly quality treatment for those injured in the earthquake
- The manner in which the health sector responded to the February earthquake can be used as a model for future emergencies. This was because of the preparedness to deal with major emergencies, as well as the very good on-going cooperation between the primary and secondary health sectors in Canterbury.

The Review recommends that:

- The successful experience of the health sector be used as a template for the Response in other regions.
- Protocols be developed to facilitate the continued safe operation of welfare and other centres even where running water is not available and sanitation is of a lower standard than would normally be acceptable.

5.2 Welfare

The Review considers that the term 'welfare' as used in emergency management should be replaced by the term 'Community Wellbeing'. This better conveys the intent of this support given during the response and avoids any negative connotations in the term 'welfare' that may inhibit some people requiring support from seeking or receiving it. While financial support is needed together with water, food and housing provisions, much of what this function is seeking to generate is a resilient community whose members can best manage the impact of the emergency on their personal lives, support their neighbours and contribute to their local community recovery. This aligns closely with what the Review understands is the common international use of the term 'Wellbeing' and is considered the most appropriate term for this community support function.

Impact of the Earthquake on Well-being

When the 22 February earthquake struck many people in Christchurch were still recovering from the September earthquake. Most houses in Christchurch had suffered at least slight damage, and repairs were slow. Families living in damaged houses in areas where liquefaction had taken place were particularly affected. However sewerage had been effectively fully restored.

The impact of the 22 February earthquake on the well-being of the people of Christchurch was severe. The deaths and injuries, the damage to houses and the lack of electricity, water and sewerage, and the closure of many supermarkets all obviously affected well-being.

In the days immediately following the earthquake when electricity supplies were disrupted, especially to the eastern part of the city, television was consequentially not available in these areas and relatively few people had battery radios apart from car radios. Some telephone landlines were out of action for a time, but cellphones came up quickly. Because of these communication failures many people felt isolated and threatened not knowing what was happening around them.

Many churches were damaged or destroyed, sports grounds were damaged and unavailable, and clubs, bars, restaurants and coffee shops were closed, particularly those in the CBD. Schools were closed and on reopening, some schools shared buildings with a 2-shift programme. All business activity ceased in the CBD as did a lot in other parts of the city so that many jobs were immediately at risk. 635 aged residential care beds became unavailable.

The earthquake was no respecter of persons affecting both rich and poor. Lower income suburbs between the CBD and the sea were amongst those hard hit. People on lower incomes and less well connected into society had less resources to cope, e.g. even as to not having a pantry stocked with food. The relatively severe impact may have been one factor in nearly one third of people receiving a government benefit at the time of the earthquake, relocating away from the city in the four months afterwards.¹²⁵ On the other hand the Review was advised that middle-income people, who had never expected to be welfare recipients, found it hard to seek assistance when they needed it.

The Welfare Response

Prior to 22 February, the pre-September, arrangements between various authorities and NGOs for welfare in an emergency were little altered and remained with the Group, despite the Group having played little role in the September event. CCC appointed as Welfare Manager a person with little seniority. The MSD had refined its welfare planning based on what had been learnt in September.

¹²⁵ The Canterbury Earthquakes, 2011.

The overall official welfare response to the earthquake was very good but with some significant gaps. The worst of these were filled by local community organisations. Strong leadership in the official Response, in local communities and by volunteers was the factor that made the welfare response effective.

Enough welfare centres were established to meet the need for shelter. The demand was not large in proportion to the population.¹²⁶ Most people preferred to stay in their own houses wherever possible, despite very severe discomfort due to extensive damage. Some officials were sceptical about self-activated community welfare centres and failed to appreciate the contribution that these could make. All official welfare centres in the eastern part of the city were closed by 25 February, and while the need for accommodation had mostly passed by this time, there still was a need for meals. It was unrealistic to suggest that centres on the other side of the city, only accessible along damaged and congested roads, were suitable alternatives, especially for lower income families often without cars.¹²⁷ The Response itself gave little support to the self-activated centres. The closure of centres on public health grounds is discussed in Section 5.1 on Health.

The contractual arrangements in place pre-emergency for the supply of meals were inadequate for an event of this magnitude. For example, one pre-existing contract with the Salvation Army provided for meals for two welfare centres each with a capacity of 100 people. In fact, official welfare centres had many times that number at a maximum.

Water and food were distributed with a considerable amount of the supplies being organised or provided by voluntary organisations of one kind or another. Sanitation was an on-going problem. The issue of supply and distribution of portaloos and chemical toilets is discussed elsewhere in this report. When it became obvious that adequate supplies of these would take a month or more to arrive, there does not seem to have been an adequate programme to educate or assist people to devise makeshift alternatives – especially where liquefaction was severe or where families had to make arrangements themselves. In other words portaloos were seen to be the problem rather than sanitation.

Limited temporary accommodation was required and more was available than was used. NGOs and voluntary organisations played a significant part in the welfare response. Both the Salvation Army and Red Cross had been contracted prior to the event.

126 A major factor in the relatively low demand for shelter was the fact that the residences in Christchurch are nearly all low-rise-houses (mostly single storey) rather than multi-storey apartments. Thus the low demand for shelter should not be extrapolated to cities with more apartment blocks.

127 Medical Officers of Health considered that people were safer in their own home without running water than they would have been in welfare centres without running water, but where ample hand sanitiser was available. This attitude without doubt contributed to the absence of gastroenteritis. However the need for some form of social contact, and the need for cooked meals for some people indicate that meal centres would have been desirable across the badly impacted suburbs. In the northern part these centres were self-activated by community organisations.

In several suburbs voluntary groups provided major assistance in the most critical early days of the Response work. Examples are New Brighton, Sumner, Aranui and Lyttelton.¹²⁸ In each case the Response grew out of local community organisations: churches, the Coast Guard, marae, or unique local community organisations as in Lyttelton. In some cases the volunteer effort was built around, or supported by, the local presence of formal government organisations: the Police in New Brighton and the volunteer Fire Brigade in Sumner. Marae played a significant part in providing warm secure temporary accommodation. More effective links between marae and the management of the Response are required. For example, one marae found that it took a long time to be approved as a recovery centre.

The contribution made by community organisations to well-being or welfare can be immense. It is part of what is described as *resilience*, the capacity of the community itself to deal with the impact of an adverse event. What is interesting and significant about the examples in Christchurch is the way in which organisations in the community that were created for quite different purposes and pursuing quite different goals were involved. They channelled their strengths and resources into helping people suffering as a result of the earthquake. In each of the examples noted the official response was not in a position to provide assistance. In several respects the local community response was of higher quality than the official Response could provide, e.g. in disbursing information rapidly to local people. Yet the voluntary organisations did need support from the central Response, particularly specific resources and information about services being provided, For example, restoration of sewerage and water, availability of financial support, etc.

The use of volunteer organisations is discussed elsewhere in this report. The central issue is how to link such organisations sufficiently to the official Response so that their work is resourced and is cohesive and coordinated, and yet at the same time not frustrate or destroy their effort by misguided attempts to bureaucratise it.

The prompt government decision to provide a subsidy for wages was a highly effective and successful innovation. It was paid where businesses were unable to function because of the earthquake and jobs would otherwise have been lost. The Earthquake Support Subsidy (ESS) was paid through businesses and was based largely on trust. Subsequent audits found that a very low level of abuse had occurred. In the first three weeks the wages of 57,144 people were subsidised. The subsidy played a major part in ameliorating the immediate financial impact of the earthquake on workers and indeed helped to keep the city afloat financially. In addition the Job Loss Cover (JLC) was paid to workers who had lost their jobs - 5,935 in the first three weeks.

MSD played a major part in meeting the needs of its existing clients and also providing emergency financial assistance to those affected by the earthquake through the wage subsidy and otherwise. CYF assisted well, both in welfare centres and beyond the centres.

¹²⁸ At Lyttelton the HNZZS Canterbury and its NZDF contingent provided the only 'official' response, and as discussed elsewhere, did that very well.

Evacuation issues

- Evacuation of vulnerable people was a major part of the Response. Some 700 were evacuated, mostly by air. Both Air Force and Air New Zealand aircraft were used.
- A staging post was needed at the airport to safely care for disabled or frail people while awaiting flights. The Sudima hotel was taken over and fulfilled this purpose well.
- People being evacuated ideally should be accompanied by any equipment they rely upon (such as specialised wheel-chairs) and by records much more complete than their name and date of birth.
- Flight diversions were a particular challenge but the Salvation Army responded magnificently at short notice.
- Commercial passenger aircraft were more suitable for carrying disabled elderly people than were military aircraft.¹²⁹

Surveys

Surveys of people in the affected areas were undertaken at least twice by official organisations on behalf of the Response (Operation Eastern Suburbs and later by the Police with the assistance of the Fire Service). Neighbourhood Support also did an early survey and reported the results. Other surveys were undertaken by the Red Cross, the Salvation Army and by several community or voluntary organisations.

Four days after the Response, only 4,000 homes had been visited as part of operation Eastern Suburbs. Of those, 489 were identified as having people short of food over the following 24 hours. It took another six days to build the number visited up to 70,000. In that time had people been trapped rescue might not have been available. The disabled and those in need of assistance, or without food or water, were at severe risk.

Each survey was conducted with the best of motives, but because they were carried out unsystematically, and because the data was gathered in different forms, there were three effects:

- Many homes were called upon several times by different organisations asking similar questions.
- There was no certainty that people in need would get a follow-up call.

¹²⁹ This is a particular example of a general principle put to us: do not create a CDEM structure when there exists a business as usual solution – such as using motels, hotels, Housing New Zealand properties, for short term temporary housing.

- The intelligence gathered from surveys was of limited use as a guide to the response planning and operations.
- The gathering of information about the safety and needs of people in badly affected areas needs could have been done better.

Conclusions and Issues Arising

- Information about the safety and needs of people in badly affected areas needs to be gathered sooner and more systematically. The information then needs to be better collated and analysed for use in planning the Response:
- Full surveys need to be done as soon after a disaster as access is possible in order to determine if people are trapped or injured in their homes.
- These surveys need to be done systematically to gather the minimum of data necessary. In particular, the temptation of trying to gather all the information that multiple agencies may require should be avoided. The priority must be a speedy check on people's welfare.
- Arrangements need to be in place to follow-up immediately with people in need.
- Data collected needs to be analysed promptly and collated to guide the Response.

Two methods of doing such surveys are possible:

- Use Neighbourhood Support or a similar community organisation if it is well enough structured and reliable.
- Use an agency like NZDF to plan the survey but carry it out with staff from local authorities, the Red Cross, or volunteers.

The role of MSD in an emergency of this kind needs to be further developed as a Department with large staff across New Zealand. It has the resources to be able to respond in force to an emergency. MSD has shown that it is prepared to do so and to do so efficiently.

Issues Arising

- It is dangerous and inefficient for the MSD effort not to be linked fully into the CDEM Response. The welfare response requires support from many other aspects of the CDEM Response e.g. sanitation arrangements. On the other hand the CDEM Response needs information from the welfare response. Furthermore duplication of functions (for example, a separate PR organisation for MSD) is wasteful of scarce resources in a disaster zone.

- MSD needs to 'rebrand' its effort in an emergency and to develop new services. The welfare or 'well-being' part of the Response has a much broader ambit than MSD is responsible for in normal times.
- The registration form used at welfare centres needs to be further developed. It is based on the Red Cross International form with some New Zealand customisation. The form needs to be able to collect the key information related to people's needs so that sequential interviews by different agencies are rendered unnecessary. The Waimakariri District Council initiated work on a revised form and we understand this work has been taken up by the Canterbury WAG. It should be completed and ready as a template for all New Zealand. A hardcopy form is necessary in case internet access is not available, but where connection to the internet is feasible, that method of registration would be much more efficient.

Welfare or Well-being

As discussed earlier, the CCC EOC structure as advised to the Review included a community centred function referred to as 'Welfare'. The Review supports this intent but considers this should be titled 'Community Well-being'. The CCC EOC 'Welfare' structure consisted of elements responsible for: Neighbourhood Support, Work and Income, Housing New Zealand, Salvation Army and Welfare liaison officers. This is a combination of emotional and practical support for community members.

Furthermore the CRC Structure in place at 20 March had a 'Director Community Wellbeing' and the Review supports this initiative. The Review considers 'Community Well-being' should be a CIMS function for response and recovery operations.

Evaluation of the Response

The Review considers that the following features of the welfare response worked well:

- The needs for shelter were well met, and the need for food and water mostly met, albeit with difficulties in some areas and the official Response requiring supplementation.
- In several suburbs voluntary groups provided major assistance in the most critical early days of the Response. Examples are churches, the Coast Guard, marae and unique local community organisations. The local presence of police and volunteer fire brigades complemented the leadership.
- Waimakariri CDEM provided valuable assistance with a welfare centre as did Tuahiwi marae.
- MSD had a well organised structure and played a major part in meeting the needs of its existing clients and also providing emergency financial assistance.

- The Job Loss Cover scheme, providing cash within days and built largely on trust, was a remarkable innovation that preserved jobs, kept businesses afloat and helped the whole community to survive financially.

The following aspects of the welfare response could have been better:

- Information about the safety and needs of people in badly affected areas needs to be gathered sooner and more systematically. The information then needs to be better collated and analysed for use in planning the Response.
- Surveys of households need to be carried out more promptly, more systematically, with better data management and better analysis. To achieve this they need to be simpler and more efficient.
- People being evacuated ideally should be accompanied by any equipment they rely upon (such as specialised wheel-chairs) and by records much more complete than their name and date of birth.
- More effective links between marae and the management of the Response are required.
- The Response itself gave little support to the self-activated centres. Where welfare centres providing temporary accommodation are closed, every attempt should be made to continue with centres providing such other assistance as is still required (for example, meals, food, water and information – and showers if possible).
- Water and food were distributed with a considerable amount of the supplies being organised or provided by voluntary organisations of one kind or another and these efforts need more official support.
- MSD effort should be better linked into the CDEM Response. The welfare response requires support from many other aspects of the CDEM Response e.g. sanitation arrangements. On the other hand the CDEM Response needs information from the welfare response. Furthermore duplication of functions (for example, a separate PR organisation for MSD) is wasteful of scarce resources in a disaster zone.

Conclusions and recommendations

The Review concluded that:

- The combined efforts of the CDEM Response and voluntary organisations resulted in the suffering caused by the earthquake being very greatly reduced.

The Review recommends that:

- A structure be developed within CIMS by which Community and voluntary organisations can 'plug into' the official Response so that they can enhance the major part that they play in the local response.
- MSD needs to 'rebrand' its effort in an emergency and develop new services. The welfare or 'well-being' part of the response has a much broader ambit than MSD is responsible for in normal times.

Chapter 6 - Buildings and CBD

Many aspects of building design adequacy and assessment are included in the wide ranging Terms of Reference of the 'Royal Commission of Inquiry into Building Failure Caused by Canterbury Earthquakes' but specifically excluded from their Terms of Reference is:

(c) the role and response of any person acting under the Civil Defence Emergency Management Act 2002, or providing any emergency or recovery services or other response, after the 22 February 2011 aftershock.

The Terms of Reference for this Review require examination of the management of building safety evaluations and the management of building demolitions and cordoned areas.¹³⁰ Some of these matters were however dealt with in submissions to the Royal Commission and information from them is used in the preparation of this Review. Particular references include:

ENG.NZSEE.0001: Building Safety Evaluation Following the Canterbury Earthquakes. New Zealand Society for Earthquake Engineering, September 2011¹³¹

EBG.CCC.0001: CCC Building Evaluation Team – Processes used and lessons learned following the Darfield Earthquake of 4 September 2010. Sisirc/McNulty January 2011¹³²

ENG.BRU.0001: Integrating Professional Engineering Within Emergency Management Planning and Response in New Zealand. Dave Brunson, January 2012¹³³

130 Terms of Reference:

'10 (h) Management of building safety evaluations - This will include the effectiveness of the colour based building classification system, public understanding of these classifications, the collection of assessment data and how this data was used for the purpose of needs assessment and welfare support. It will not include how this data related to the recovery process, nor any aspects related to land zone classifications or re-building in any areas.

'10 (i) Management of building demolitions and cordoned areas - This will include the process for the deconstruction and demolition of buildings, the establishment and management of cordons, including public safety issues. It will not include the longer term planning for the recovery of the red zone.'

131 Available at <http://canterbury.royalcommission.govt.nz/documents-by-key/20111003.44>

132 Available at <http://canterbury.royalcommission.govt.nz/documents-by-key/2011-09-2391>

133 Available at <http://canterbury.royalcommission.govt.nz/documents-by-key/20120207.2703>

6.1 Management of Building Safety Evaluation

Status Pre-February 2011

The building safety evaluation system is designed to rapidly assess the safety of buildings during an emergency and to inform owners, tenants and the public of their safety status by, among other methods, a building placard system.

The New Zealand building safety evaluation system is based on California practice with further developments reflecting European practice and the experience of New Zealand building evaluation teams in Gisborne, Indonesia and elsewhere. The guidelines had been developed over 20 years by the New Zealand Society for Earthquake Engineering and in 2009 National Procedures¹³⁴ were published with the support of the Department of Building and Housing.¹³⁵

A revised draft of the guidelines had been prepared in July 2010 together with a draft Field Guide which included an induction module for 'on the day' operational briefing. These drafts had not been reviewed and signed off by the time of the 4 September 2010 earthquake.

Some important features of the New Zealand approach which affect the management of building evaluation are:

- The procedures are deliberately aligned with the US Applied Technology Council building evaluation system (ATC 20)¹³⁶ both for consistency of methodology and in recognition that in the event of a major earthquake any overseas engineers who may arrive to assist with building evaluation are likely to be familiar with this approach. There are some differences.
- The placarding operation is limited in New Zealand to being implemented only during a declared emergency in order to provide appropriate liability protection for the volunteer building professionals undertaking the assessments.
- The procedures are not yet mandated through any legislation and there has only been very limited central government resource allocation for territorial authorities to implement the procedures via the provision of nationally uniform information and training and the setting up and maintenance of a data base of capability and resources.

There is no register of trained and pre-warranted engineers prepared to undertake rapid building safety evaluations. This is partly due to a lack of legal mandate which inhibits the development and maintenance of an effective organisational structure and appropriate systems. While some

134 NZ Society for Earthquake Engineering, Aug 2009.

135 A brief description of the process and the placard system is on Report to the Royal Commission of Inquiry, pp48-49, 2011.

136 ATC-20, 1989, plus ATC-20-1, Field Manual, ATC-20-2 Addendum, ATC-20-3, Case Studies.

building control officials had received training in building evaluation, only a limited number of engineers had been trained prior to September 2010.

The Response in February 2011 was very much affected by the Response to the earthquake on 4 September 2010 and the subsequent aftershocks, particularly on 26 December 2010. In summary by 14 September 2010 the CCC building evaluation teams had posted placards on 1,236 commercial buildings and 6,686 residential buildings.¹³⁷

NZSEE report on Issues¹³⁸

The New Zealand Society for Earthquake Engineering (NZSEE) in a report to the Royal Commission included the following issues:

- Difficulty in communicating the meaning of the placards to the public.
- Inconsistent skill sets, knowledge and confidence of evaluation team members.
- Lack of integration of owner appointed engineers with the Council led process.
- A clear approach to the managing of changing of placards was not established in the early stages.
- The register of building placards was not publically available.
- The transition to normal building regulatory processes on the lifting of the state of emergency required legislation¹³⁹ to address the extra time required to process the large number of buildings to be transferred from status under the declared emergency to the normal CCC building processes. The CCC also set up a Building Evaluation Transition team to manage this transition. This operated until 30 Nov 2010.
- After the 26 December 2010 aftershocks, although a state of local emergency was not declared, a form of rapid evaluation and placard system was used for the first two days but this was replaced by the normal process under the Building Act, e.g. the issuing of s124 notices for dangerous buildings.¹⁴⁰

By 22 February 2011 some of these identified issues had been addressed but others remained.

137 ENG.NZSEE 0001: p19

138 Ibid

139 Canterbury Earthquake (Building Act) Order <http://www.legislation.co.nz/regulation/public/2010/0315/14.0/versions.aspx>.

140 Up to 25 Dec 2010 148 s124 notices had been issued. A further 177 notices were issued after 26 Dec 2010 ENG.SEE.0001: p26

The Response to 22 February 2011

The collapsed buildings and extensive damage meant that the immediate Response concentrated on search and rescue within the locked down CBD. The building safety evaluation was planned over 23 and 24 February and substantial evaluations commenced on 25 February 2011 though some evaluation commenced immediately on 22 February 2011. The planning was led by the CCC building control officials.

Features of the Response

- Early inclusion and warranting of consulting engineers who had worked on building evaluation following September 2010.
- Specific evaluation plans developed for evaluation of the CBD, key shops and critical community services (pharmacies, supermarkets, medical centres, hardware stores, etc.) and the arterial routes into and out of the central city.
- A Critical Buildings Team was established to review major buildings in the CBD and establish stabilisation measures as well as to assess the effects of aftershocks on indicator buildings. Re-evaluation of indicator buildings post aftershocks was used to inform the evaluation teams of potential changes of building status and hence the need for further inspection.¹⁴¹ The information was also used to inform the establishment and extent of the cordon. Significant leadership and advice was provided through engineers associated with DBH.
- Only experienced Chartered Professional Engineers were used for evaluations in the CBD due to the requirement for higher level expertise and the significantly heightened risk.
- A limited pool of engineers provided for evaluation of suburban residential dwellings (Operation Suburb) and suburban commercial dwellings (Operation Shop).
- The number of the building evaluations required a planned team of up to 100 engineers and 50 building control officials. In fact a total of 352 professional engineers were involved in the rapid building evaluation process.¹⁴² As a result of the linkages developed through the September 2010 earthquake many of the engineers were sourced through IPENZ¹⁴³ and the building officials through the Building Officials Institute of New Zealand.
- Whilst normally an evaluation team consisted of an engineer and a warranted building official, limitations in the supply of building officials because of the high demand for building officials for Operation Suburb meant there were not sufficient of these available for all teams and

141 Some local engineers developed ad hoc guidelines for clients as to the need for building evacuation and reassessment following aftershocks.

142 ENG.NZSEE 0001: p28

143 The Institution of Professional Engineers, New Zealand.

experienced engineers acting as building safety evaluation team leaders were temporarily warranted.

- Following the September earthquake an Indicator Building procedure had been developed where specific buildings were re-evaluated post aftershocks to assess the effects of these aftershocks and make decisions on whether general building re-evaluations were required. This proved invaluable in the safe and efficient use of resources.
- The management of large volumes of assessments (9,300 over 21 days in September 2010 compared to 130,000¹⁴⁴ over a corresponding period in February 2011) would not have been possible without the experience and process improvement as the result of the September 2010 earthquake.
- The data base used in September was further developed with the data inputting management and mapping outputs resourced by CCC.

Issues Arising

Significant issues relating to the management of the building evaluation response included:

- Inconsistent results of assessment by evaluation teams. Many engineers turned up voluntarily to assist with building evaluations. Most had not been trained in the evaluation protocols and required training, briefing and safety induction on site prior to being tasked. Notwithstanding the pool of engineers who had participated after the September 2010 earthquakes and those that were trained in-house within their companies, inevitably the hasty training gave rise to variation in understanding. This led to inconsistent evaluations with some judgements being unduly conservative but with others more liberal. The result was that the status of some buildings seesawed between classifications when re-inspected with some consequent confusion.
- There was reportedly widespread confusion among the public, tenants and building owners as to the meaning of the placards. There was a tendency to regard the green 'Inspected' placard as safe¹⁴⁵ with no restrictions, despite the responsibility for having the buildings checked to ensure that they are not dangerous lying with the building owners. The placard states that:

'While no apparent structural or other safety hazards have been found, a more comprehensive inspection of the exterior and interior may reveal safety hazards', and also states: 'Owners are encouraged to obtain a detailed structural engineering assessment of the building as soon as possible.'

¹⁴⁴ Various reported as 71,000 or 130,000.

¹⁴⁵ Apparently this is also a problem in the USA. See ENG.NZSEE.000: p37

- Clearly the wording and colour of the placards needs to be revisited to reinforce not only the building status but also the obligations on owners for further inspections.
- This is also linked with the need for defined processes for further detailed engineering evaluation of placarded buildings which is not defined in the 2009 NZSEE Guidelines. Although information is available it is not in an easily available form.¹⁴⁶ Detailed Engineering Evaluation Guidelines are required together with consideration of which buildings must be or should be further evaluated after placarding, particularly bearing in mind the possibly significant further deterioration due to aftershocks.¹⁴⁷
- A related issue is the uncertainty surrounding the processes for changing the placarded status of a building. As a result of the 4 September 2010 earthquake considerable work had been done by the CCC Building Evaluation Transition (BET) team to develop processes and procedures which could possibly be used as the basis for future incorporation within a national guideline.¹⁴⁸
- Green and yellow placards were not posted by residential building evaluation teams. This was because the focus of residential evaluations was to determine which houses could not be occupied. A decision was made to use only the red placard where it was required on residential buildings. A black and white leaflet was used to inform residents that their building was safe to enter. Although yellow/green assessments were done and entered into the CCC data base they were not generally posted on houses leaving some aspects of the safety status of buildings unclear.
- **Identification of buildings and coordination** - In certain areas there were evidently difficulties in consistently identifying buildings correctly. Some were evaluated more than once, sometimes with inconsistent results. There was also a lack of coordination in the Port Hills, e.g. between geotechnical and structural evaluation teams. Hence the ultimate overall classification of the building might depend on which was the worst classification, but this was not clear to the teams, and confusion in placarding resulted.
- **Mobilisation and management of volunteer engineers** - Because of the large numbers of buildings to be evaluated suitably qualified engineers were sourced and mobilised from around New Zealand, mostly by IPENZ. There were reportedly issues with mobilisation and management including:
 - Difficulties in communication with the EOC and uncertainty as to who to contact (a common theme)

¹⁴⁶ See ENG.NZSEE.0001: p37

¹⁴⁷ Ibid: p38, Discusses the criteria.

¹⁴⁸ ENG.CCC.0001 BETT Report Sisirc/McNulty contains details of this work.

- Too many engineers arriving at the wrong time instead of being programmed so as to allow for graduated relief
- The lack of prequalification/warranting meant some additional confusion as engineers sought confirmation of their CPEng. Status
- Training/safety briefing was repeated every day even for those who had been through it before thus wasting some time
- Transfer from unpaid volunteer to paid status was not clear although the general assumption was that volunteers would give up to three days on an unpaid basis.

The number of chartered engineers required to be available in New Zealand for rapid building assessment has been estimated at over 600.¹⁴⁹ There are suggestions that greater efforts be made to link normal engineering operations with emergency management response, including exposure to emergency management issues, during education and professional development.¹⁵⁰

- **EOC roles and communications** - The widespread confusion as to roles, contact points and communication in the EOC has been discussed elsewhere and reportedly existed with respect to building assessment. It was clear how important it was for both the Local Controller and later the National Controller to have access within their respective EOCs to high level engineering expertise with respect to building evaluation and engineering. The ability to clearly communicate technical issues to the public is also important.
- **Data gathering and the use of multidisciplinary teams** - In Operation Suburb multidisciplinary teams consisting of an engineer, building control official and 1 or 2 social workers were used to visit homes in affected areas to assess dwellings and gather information on the needs of the people. However the times required for these different tasks were often radically different. The building assessment might take 10-15minues but the social needs assessment often took longer. It was reported that the forms on which the information was recorded were not entirely appropriate and the quality of the information entered problematic. Data processing lagged behind and resulted in 'weeks of work post event to fix inaccurately entered records'.

Data management in the EOC did not seem to keep pace with the incoming data and data in respect of particular buildings was difficult to access and relate to earthquake prone buildings.

149 ENG.NZSEE 0001: p40

150 ENG.BRU.0001, Jan 2012.

There is a need to pre-plan the gathering of data and the subsequent analysis to produce useful intelligence.

- **Demobilisation and Transition to Recovery and BAU** - A universally reported theme is that the demobilisation and transition to recovery and BAU was often haphazard and seemed to be based on personal preferences and other pressures, for example, BAU pressures, rather than in a coordinated and structured manner. When asked what happened to the information gathered during the emergency most of those involved did not know, suggesting a need for a more structured approach to transition management and data transfer.

Evaluation of the Response

The Review considers that the following features of the immediate response worked well:

- Early inclusion and warranting of consulting engineers who had worked on building evaluation following September 2010.
- Specific evaluation plans developed for evaluation of the CBD, key shops and critical community services (pharmacies, supermarkets, medical centres, hardware stores, etc.) and the arterial routes into and out of the central city.
- The establishment of a Critical Buildings Team using experienced Chartered Professional Engineers.
- Following the September earthquake an 'Indicator Building' procedure had been developed where specific buildings were re-evaluated post aftershocks to assess the effects of these aftershocks and make decisions on whether general building re-evaluations were required. This proved invaluable in the safe and efficient use of resources.
- Over 130,000 assessments were done over 21 days compared with 9,300 over 21 days a corresponding period in September 2010.¹⁵¹

The following aspects of the Response could have been better:

- Most engineers who turned up to assist had not been trained in the evaluation protocols and required training, briefing and safety induction. Despite the training and experience (especially after the September 2010 earthquakes) of some engineers, the hasty training inevitably gave rise to variation in understanding.

¹⁵¹ Various reported as 71,000 or 130,000

- Confusion amongst the public and building owners as to the meaning of the placards and the need for further action. There was a tendency to regard the green 'Inspected' placard as safe¹⁵² with no restrictions.
- Mobilisation and management of volunteer engineers had issues because suitably qualified engineers were sourced and mobilised from all around New Zealand.¹⁵³
- In certain areas there were difficulties in consistently identifying buildings correctly. There was also a lack of coordination between geotechnical and structural evaluation teams on the Port Hills.
- Data gathering using multidisciplinary teams was problematic because of differing time and data requirements.
- The demobilisation and transition to BAU was often haphazard and seemed to be based on pressures such as BAU pressures, rather than being coordinated structured. The final fate of the information gathered during the emergency was unknown to most of those involved.

Conclusions and recommendations

The Review concluded that:

- Despite the recommendations in this report for improvement which might suggest otherwise, the building evaluation was done effectively and relatively efficiently. On the one hand the inspection was conservative enough in that no injuries have been reported from the collapse of buildings that had passed the inspection. On the other hand the subsequent condemnation of so many buildings on detailed examination indicates that the initial inspection was generally not overly conservative.

The Review recommends that:

- Consideration be given to the development of a high level national team to manage building safety evaluations in major emergencies including formalising the provision of high level engineering advice to the Controller.
- The preparedness of local and regional authorities be improved by the development of local organisational structures and appropriate information and data management systems for an emergency that link with existing systems in order to better manage both the emergency operations and the transfer to normal operations.

¹⁵² Apparently this is also a problem in the USA. See ENG.NZSEE.0001: p37

¹⁵³ The Institution of Professional Engineers, New Zealand

- A national system be developed for the selection, training, warranting and mobilisation of building professionals for building safety evaluation in an emergency. The logical focal point for engineers would be IPENZ, which already maintains data bases of capability as the registration authority under the Chartered Professional Engineers Act. Because this would be a national resource this activity should be properly funded by government rather than by the members of such an organisation.
- The Guidelines for Building Evaluation continue to be revised in the light of the experience in Christchurch with particular attention to revision of the placarding system, building re-occupancy criteria and education of the public in the meaning and use of the placarding system.
- The improvements that have already commenced, with MCDEM and DBH supported by NZSEE, be carried through.¹⁵⁴

Other recommendations are:¹⁵⁵

- That building evaluation during an emergency be given a legal mandate and that this address the issues of:
 - authorisation and mechanisms for implementation of building evaluation both inside and outside declared states of emergency
 - appropriate liability protection for those undertaking assessments in both circumstances
 - clear legal status of posting, maintaining and removing placards
 - practical transition to normal building control arrangements
- That the DBH accelerate the development and maintenance of a common approach, organisation and training for building evaluation in local authorities as tasked as the lead agency by ODESC in April 2009.

6.2 Management of Building Demolition

Neither the CDEM Act, the CDEM Plan nor the Guide to the Plan recognise the extent and scale of possible building and other demolition in the event of an earthquake in a major urban centre. There were no national protocols for demolition management and no detectable evidence that particular demolition protocols or alternative methodologies for demolition had been considered

¹⁵⁴ See ENG.NZSEE.0001: p32

¹⁵⁵ Ibid p45 et seq. for discussion on recommendations.

in planning, e.g. deconstruction versus explosive demolition,¹⁵⁶ etc. Neither the CDEM guidelines nor the NZSEE evaluation guidelines consider in any detail the possibility of demolition though the Building Act s124, 127, etc., clearly envisage it.

As a result of the February earthquake a considerable number of buildings in the CBD were considered to require demolition. Some exhibited increasing damage as the result of aftershocks which changed their status as repairable buildings.

The opening of cordoned areas is intimately related to building status within the cordon. If buildings are so unsafe as to be collapse risks then cordons must be placed around the building or around the area if there are many of them. Hence building demolition and the speed with which it is done can have a major impact on the speed of cordon reduction and the resumption of business. Initially there were no protocols for deciding which buildings should be demolished, how it was to be done or how the owners, tenants and insurers were to be involved in the process and the timelines for doing so. In this early phase 31 buildings in the CBD were reportedly demolished, mostly without contacting the owners. It was quickly realised this was unsatisfactory and a demolition protocol was developed in 48 hours which was used for the remainder of the emergency.

Most building owners and tenants spoken to understood the need for urgent demolition of buildings but had objections about the process for doing it. The number of incidents anecdotally relayed by businesses and business groups to the Review indicating lack of control of demolition was concerning. Whether this reflects reality or the result of public misperceptions, or misunderstanding of demolition contracts is unclear.

An issue was how to contact tenants. The CCC database records only owners and not tenants. Owners of buildings did not invariably pass on to their tenants warnings about impending demolition. Provision of an interactive but secure web-based database on which tenants could register their interest in a particular property, and on which potential demolitions would be notified is worth exploring.

Reported issues included:

- Inadequate notice before demolition to allow owners and tenants to recover property, or to obtain a second opinion on whether demolition was necessary, or to check that the quoted costs of demolition (which are chargeable to the building owner) were reasonable.
- Tenants recognising their goods appearing on TradeMe after demolition.

¹⁵⁶ Explosive demolition was investigated with the advice of a world expert from the USA. In the case where it was particularly feasible and could have been done with saving of time and earlier access to neighbouring streets it was rejected because the quite short time savings did not justify the higher cost.

- Alcohol drunk by demolition crews, etc.
- A secondary consideration is the disposal and, where possible, recycling of the considerable volumes of waste resulting from demolition, dealt with elsewhere in this report. Clearly there is a need for better demolition protocols and guidelines in CDEM plans.

Evaluation of the Response

The Review considers that the following features of the building demolition process worked well:

- Once problems were identified a demolition protocol was developed in 48 hours.

The following aspects of the building demolition process could have been better:

- There were no national protocols for demolition management and no indication that demolition protocols or alternative methodologies for demolition had been considered in planning, etc.
- Neither the CDEM guidelines nor the NZSEE evaluation guidelines consider in any detail the possibility of demolition.
- Initially there were no protocols for deciding which buildings should be demolished, or how the owners, tenants and insurers were to be involved.
- An issue was how to contact tenants. The CCC database records only owners and not tenants and owners of buildings did not invariably pass on to their tenant's warnings about impending demolition.

Conclusions and recommendations

The Review concluded that:

Despite no pre-planning and significant public hostility (sometimes based on inadequate consultation or a well meant desire to save the historic but irreparable) demolition proceeded fast enough to enable the cordon to be gradually contracted and access gradually increased within the larger CBD.

The Review recommends that:

- National protocols, procedures and plans be developed for the demolition of buildings and structures under a state of emergency and be incorporated in CDEM plans.

- The demolition protocols be developed in conjunction with representatives from building owners, local authorities, MCDEM, USAR, engineers, the insurance industry and business groups.

6.3 Management of Cordoned Areas

The extent and control of cordons is largely related to the risk of building collapse or partial collapse. Thus cordons can be for specific buildings only, or for an area where there are multiple collapse risks, or where the access to an area is subject to those risks. There are other possible reasons for cordons that are clearly envisaged, for example, in the powers of Police under the National CDEM Plan:

23 (1) Police roles related to civil defence emergency management are:

- (a) maintaining law and order; and*
- (b) taking all measures within their power and authority to protect life and property and to assist the movement of rescue, medical, fire, and other essential services; and...*
- (d) co-ordinating movement control over land, including communications and traffic control; and...*

(2) To fulfil these roles, police may do the following...

- (c) control access to and within an affected area so as to assist rescue, medical, fire, and other essential services; and*
- (d) protect property and provide security of evacuated areas, including the establishment of cordons.*

From the available documentation and discussions it would appear that no specific thought had been given to the setting up, management and contraction of large scale area cordons that eventuated in Christchurch after 22 February 2011. Thus the cordon response and procedures were designed as events unfolded.

Cordons were used after 4 September 2010 but these were small scale and evidently manned by Police where necessary, with some NZDF reinforcement.¹⁵⁷ After the initial emergency these cordons were managed by the CCC Buildings Evaluation Transition (BET) team who developed some procedures for cordon or barricade management.¹⁵⁸

In February 2011 the cordon was established almost immediately and NZDF took over management of the cordon and manned the check points in support of the Police.¹⁵⁹ It should be noted that the use of the NZDF has no statutory power to require or enforce compliance. The CBD cordon was initially extensive, being bounded by the 'four avenues' with many entry points, but

¹⁵⁷ GEN.MCDEM.0002, Middleton and Westlake: p32

¹⁵⁸ ENG.CCC.0001, McNulty: pp11, 20 and attachments 12, 13

¹⁵⁹ Army personnel were still manning the cordon checkpoints in February 2012 a year after the event.

with no coherent management plan. The NZDF developed the cordon management plan including the zone reduction and transition plans in conjunction with personnel from CDEM, CRC, Police, contractors, USAR and demolition. The cordon took considerable resources¹⁶⁰ because it had to be manned 24/7 with all the concomitant requirements for shift relief, food, management, resolution of issues at check points, cordon changes etc. The responsive, self-contained and readily deployable nature of the NZDF forces meant that in reality they were the only body suited to this task, which they performed well.

However, because the cordon management was necessarily designed as the emergency progressed, there were many issues.

Access through the cordon was an issue for many different organisations and people ranging from organisations such as Orion, who had essential operating centres inside the cordon, to businesses seeking to recover essential data or continue business, and people wishing to return home or recover property. The stories are legion of unofficial entries, often by subterfuge, or entry gained through influence, as well as pressure being brought to bear by individuals and businesses whose assessment of the risks did not coincide with those setting and maintaining the cordon.

Allied with this are access identity cards for the cordon, which was described by those in charge of the cordon as being one of the most significant issues. It reportedly took some time to set up the policy, authorities and processes for issue and printing of passes. The number of passes also became an issue with over 4,500 being in circulation at one stage which resulted in changes to the pass issue criteria. In addition there were anecdotes of very uneven understanding of the status of access passes among supporting services such as NZFS and the Police. For example for the Police a cordon means exclusion of every unofficial person and there were reports of threatened arrest of some who had passes.

Cordon access policy, pass issue and policing are important issues for further national consideration in emergency management.

Dissemination of up to date information on the cordon policies, status and the future contraction of the cordon was a key aspect of the CRC operations. Discussions with business and the well-publicised televised protests about access by some businesses indicate this could have been better handled. Pictorial information is essential for those manning the cordon as well as to respond to public enquiries and the media. A public information centre outside the cordon is essential.

Cordon reduction is governed mostly by safety considerations and therefore building safety status. Protocols were set up for determining when streets could be opened after inspection by USAR, engineers, etc. and a zone opening plan prepared. One criterion was to have no buildings of

¹⁶⁰ Reportedly 120 personnel were required to man the large cordon at any one time, thus with shifts, cordon manning took most of the battalion resources.

coronial interest in the zone to be opened. One of the features of the plan was the access provided to businesses which were given only 24 hours to secure their premises before an area was opened to the public. This proved insufficient time to be able to organise access, including passes, as well as to organise trades-people to do the work. It is estimated this period should be 72 hours minimum. It was also observed by businesses that there was a tendency to open blocks rather than open street by street which might have happened sooner.

Communications among the cordon management team was an issue. Military radios with encryption capability do not interface with civilian radios and were not well suited to the role. NZDF ended up issuing hand held civil radios for cordon communications. This relied on having suitable repeaters available on the Port Hills.

In respect of cordon management, the CRC was variously described as 'cloistered from reality', 'reluctant to deal with the public', 'not good at collaborative planning', 'an untried organisation'. This is consistent with observations by others and indicates the need for further development of EOC organisation and procedures.

Clearly, design and management of cordons, particularly large cordons or cordons dispersed over a large area, needs further consideration in CDEM plans.

Evaluation of the Response

The Review considers that the following features of the cordon worked well:

- The task of cordon management was an ideal NZDF task. Staffing of the cordon and management of its reduction were both done well by the NZDF and Police.

The following aspects of the cordon could have been better:

- Management of cordons was not pre-planned. It appears that no specific thought had been given to the setting up, management and contraction of large scale area cordons, and that the cordon response and procedures were designed as events unfolded.
- Passes were initially not photo ID and issue caused confusion.
- Entry through the cordon was determined by the individual soldier or police person at the gate, and they used their discretion variously. Entry was difficult at times for those with essential tasks to do in the CBD.

Conclusions and recommendations

The Review concluded that:

- Cordon management was generally effective but was hampered by a total absence of pre-planning which caused considerable tensions with those seeking access.

The Review recommends that:

- MCDEM set up a working group to design CDEM guidelines for the setting up, management, contraction and demobilising of cordons in an emergency. This working group should include business organisations, NZDF, Police, CERA, USAR and others with cordon experience from Christchurch.

6.4 Business Restoration

The impacts of the February 2012 earthquake and aftershocks on businesses in the CBD were such that all businesses were forced to relocate or suspend operations for a time with access to the central CBD still not available in February 2012, one year after the event. There have been a number of studies by the Resilient Organisations Research Group¹⁶¹ on the effects on business of the series of earthquakes in Canterbury and on the recovery from these.

A survey of Christchurch business showed that the median time businesses were closed was 15.5 days with 11% of those surveyed indicating they were permanently closed, of which 75% of the 11% were in the CBD.¹⁶² Of the 360 members of the Canterbury Employers' Chamber of Commerce (CECC) inside the four avenues, 90% were still in business 6 weeks after the event. This compares favourably with experience in the USA.¹⁶³

This relocation of so many businesses put pressure on rentable business space in the west of the city with consequent increase in rental costs. Whilst the decision to relocate was inevitable because of lack of access to the CBD, the associated decision as to whether to break existing lease agreements was much affected by building status, and the likely financial penalties if the building would be able to be reoccupied within a period specified in the lease. This was often unknown when the decision had to be made.

Some larger central city companies had to split operations over several sites which increased communication and management costs. This and the relocation and personal stress of the

¹⁶¹ See <http://www.resorgs.org.nz/>

¹⁶² Resilient Organisations Research Report, 2011/04: p 23

¹⁶³ For example, see Tierney, 2007.

earthquake resulted in widely reported changes in staff emotional well-being,¹⁶⁴ as well as significant initial decreases in productivity and increases in the requirement for personnel management and support. Businesses that provided strong support to staff reported a more rapid return to BAU with enhanced staff morale.¹⁶⁵

In general, businesses appeared to self-relocate without significant assistance from CRC. There was strong leadership from the CECC and Recover Canterbury.¹⁶⁶ CECC and Ministers had negotiated the Earthquake Support Subsidy (ESS) for wages and other assistance for employers.¹⁶⁷ Without this support it was reported that some small to medium enterprises would have had difficulty in paying staff during the period of disruption with no revenue.

The Canterbury Market Connections Grant (\$4 million) under New Zealand Trade and Enterprise (NZTE) provided assistance to allow exporters to get offshore to meet with customers and provide reassurance that they were still operating and able to meet obligations. Anecdotal feedback has been that this was critical to ensuring contracts were not cancelled through lack of information.

The Government invested \$2.5 million in the Business Recovery Trust which allowed viable businesses to apply for funds to relocate, re-market, replace plant or stock or undertake other activities that would support their on-going viability.

The Government also funded access to business mentors, waived the co-funding requirements for training and development through NZTE and provided \$2.25 M funding for the provision of Business Recovery Co-ordinators and \$500,000 for promotional activities.

Staff from IRD, MSD and NZTE were seconded into Recover Canterbury to support businesses directly.

The IRD and banking industry responses were reported by business as good with authorised delays to payment of GST and provisional tax and increased cash availability from banks. Business mentoring was also available through government departments.¹⁶⁸

Issues and Observations

It was frequently reported that without the September 2010 earthquakes the Response to the February event would have been much worse. There was also strong mutual support both in the

164 Ibid, p3.

165 There were several reports of businesses providing daily hot meals and personal support for up to a month after the event.

166 A joint venture between CECC and Canterbury Development Corporation (CDC) with support from government departments, <http://www.recovercanterbury.co.nz>

167 By mid-March 2011, 6,000 companies and 31,000 employees as well as 6,500 sole traders had received assistance; Stevenson, Kachali et al., Apr 2011, p9.

168 Ibid, p9.

community at large and within the business community. Staff welfare was considered the most important issue for many businesses.¹⁶⁹

CDEM planning and the CRC operations seemed to largely ignore business and there was little systematic connection between the business community and the CRC. It would appear small businesses were sometimes unaware of the assistance available through Recover Canterbury and other organisations. This may be because many such businesses do not belong to business groups through which information is disseminated

Notwithstanding September 2010, there were still significant issues in February 2011. Access through the cordon was a major issue for businesses as discussed elsewhere. The inability to access the considerable volumes of written documentation still in the red zone¹⁷⁰ demonstrated the need to have off site IT back up and to have as much information as possible in digital form to simplify portability and recovery.

The restoration of business in the CBD is markedly influenced by the status of surrounding buildings so that businesses in undamaged buildings may not be able to recommence operations because of the risks posed by adjacent buildings or those on the access route to the area.¹⁷¹

Information to businesses during the Response phase was patchy and it was widely acknowledged that this could have been better if business liaison had been embedded in the CRC. This raises the question of who represents business and the desirability of recognised, singular leadership in a disaster liaison context. The need for clear, accurate, easily understandable, pictorial and timely information was regarded as essential by businesses. This was complicated in some cases by the lack of information about the businesses in the affected areas and the privacy of such information held on private business organisation data bases which the organisations considered could not be released to third parties. The lack of functional well practiced communications between some sectors of the business community and between the business community and Emergency Management tended to produce unhelpful silos.¹⁷²

Business interruption and relocation insurance were important for many businesses but the restrictions in some policies provided challenges. For example, business insurance policies often funded businesses for one relocation only and also restricted business interruption insurance to 12 months from the date of the causal incident. It was reported that some businesses did not understand their insurance policies which may account in part for the descriptions by some of the

169 Resilient Organisations Research Report Table 12, 2011/04.

170 This seemed to affect legal firms in particular.

171 Resilient Organisations Research Report 2011/03: p11

172 For a fuller discussion of this phenomenon, see Resilient Organisations Research Report 2009/01.

insurance industry response as 'dysfunctional', or 'not very helpful' although overall the business view of their insurers was positive.¹⁷³

In general it was clear that those businesses who had prepared well survived and responded more effectively but that many businesses had only given very limited attention to developing resilience for an event of this magnitude and duration.

Evaluation of the Response

The Review considers that the following features of business restoration worked well:

- The Earthquake Support Subsidy(ESS) and other Government schemes.
- The move by businesses to relocate, especially in the west of Christchurch, with little or no involvement by officialdom.

The following aspects of the business restoration could have been better:

- CDEM planning and the CRC operations seemed to largely ignore business and there was little systematic connection between the business community and the CRC.
- Small businesses were sometimes unaware of the assistance available through Recover Canterbury and other organisations.

Conclusions and recommendations

The Review concluded that:

- Most businesses survived despite the earthquake: apparently a larger proportion than are believed to survive comparable events in the USA. This was due to the initiative of businesses and the support of the Earthquake Support Subsidy scheme.

The Review recommends that:

- CDEM plans include early restoration of business (including preservation of jobs) as an objective of the Response. The planning should be developed in conjunction with business organisations.
- That a senior business liaison person be included in the organisation of EOCs.

¹⁷³ Resilient Organisations Research Report 2011/04: p34

6.5 Business Continuity Preparedness

It was observed by many that without the preceding earthquakes from September 2010 business preparedness on 22 February 2011, and the consequences, would have been much worse and response more chaotic. This indicates that at least some organisations had taken steps to improve their resilience and to practice the relationships set up as result of the first earthquake.

There is little data available on business preparedness for the February earthquake but according to the literature predictors of poor organisational recovery include:

- smaller businesses
- businesses that rely on discretionary spend
- businesses that rent rather than own premises
- businesses that are in buildings that sustained structural damage¹⁷⁴

The business assistance uptake data suggests that many SMEs took advantage of the assistance offered and hence had the greatest need. A survey done after the September 2010 earthquake probably gives a realistic picture of the state of disaster planning by New Zealand businesses. This survey¹⁷⁵ indicated that while 61% of fast moving consumer goods retailers and 83% of lifelines companies thought that having a business continuity, emergency management or disaster preparedness plan was important in mitigating the effects of a disaster, only 37% of Christchurch CBD respondents felt it was important. The average over all sectors surveyed with respect to this question was 39%. On the other hand, in respect of other factors, an average of all respondents thought being in well designed and well-built buildings (74%), the relationship with staff (69%) and the rapid restoration or no interruption of lifelines (59%) were important. Interestingly the all group average in respect of insurance was only 42%.

This suggests that pre-planning and the development of emergency plans is not given the attention by businesses that it needs in order to produce a robust response in an emergency. But planning cannot be forced on people. The survey suggests that the method of involvement of the business community needs care:

The way authorities interact with and engage organisations strongly influences the way individual organisations participate in the process. Building partnerships and avoiding processes which exclude businesses will help avoid conflict and disengagement which slows the recovery process and leads to sub-optimal outcomes.¹⁷⁶

174 Stevenson Kachali et al. Apr 2011: p2.

175 Resilient Organisations Research Report, Table 15, 2011/03: p31.

176 Resilient Organisations Research Report 2011/03: p40

However planning can only augment a business, it cannot replace the three essentials for resilience: the right leadership and culture, strong networks and relationships, and readiness for change.

The Review recommends that:

- MCDEM encourage businesses to prepare emergency response plans, including templates for those areas considered important by business, such as post-disaster human resource management.

Chapter 7 - Logistics, Information and Science

7.1 Management of Logistics

The current guide to the National Civil Defence Emergency Plan does not have a section dealing with logistics.

This section of the Review deals with the logistics of goods and services required for the Response effort itself. The supply and distribution of key goods and services to the people of Christchurch is dealt with in the sections on lifelines. The basic issues of providing food, water and shelter were generally well handled, albeit that in some of the worst hit areas the resilience of some communities was sorely tested for the first few days.

The procurement and distribution problems for the CRC after 22 February related mainly to two categories of goods: cordon fencing, and portaloos and chemical toilets. In addition CCC had a large procurement requirement in the repairs to waste water and water systems and roading which was dealt with efficiently through established relationships with contractors and suppliers.

It is apparent that the scale and diversity of procurement and other logistics requirements after the February earthquake went far beyond anything that had been envisaged in local CDEM planning or even at a national level. In particular the need to purchase abroad, together with the need for a very speedy response, demanded knowledgeable and experienced logistics expertise, together with access to resources available in commercial logistic companies.

Under CIMS the logistics function follows a logical process. Operations or Planning identify a specific problem and identify ways to resolve that problem and obtain the necessary approvals. If the agreed solution requires goods or services then logistics is tasked with identifying suppliers and sourcing the goods or services required, agreeing on a price, placing an order, arranging delivery (freight, and if from abroad customs, bio security, etc.) and on arrival arranging storage or distribution.

Within the CRC three distinct groups were involved with some or all of these functions. In normal circumstances these would have been processed in a single logistics pod. Communications were further complicated because the different logistic groups and procurement sections were not co-located. Information sharing upwards and the passing of specific tasks to NCMC were sub-optimal.

Given the extent of damage to roading and underground infrastructure it made sense to change the standard CCC/EOC structure and designate a separate reporting function dedicated to restoration of that infrastructure. The group tasked with the restoration of the water and sewerage infrastructure quickly identified the extent of damage and recognized that sizable supplies of portaloos and chemical toilets would be needed. Staff attached to that unit, using contacts which had been built up particularly after September, sourced and obtained quantities of portaloos from within New Zealand.

There was one instance where an effort by the infrastructure group overreached in its efforts to source portaloos from USA and the proposal was rejected for valid reasons by the central logistics group and the process started again. The order was eventually placed and the 960 flat packs arrived by airfreight on 14 March. Student Army volunteers were used to assemble the units at the rate of 150 per day. At worst the delay may have cost 3-4 days in the arrival of the units in the country.

It was clear from the outset that sanitation was going to be a major problem. Portaloos were a finite resource and chemical toilets would meet the sanitation needs much better when they became available from abroad. Yet there is no evidence to suggest that the initial distribution of portaloos, as they became available, was based on systematic appraisal of what might be the best use of this limited resource. In many ways the initial distribution can best be described as 'first up best dressed'. Any attempts to subsequently redistribute were fraught with difficulties. There were also problems with servicing portaloos which had been sourced from different contractors but placed in the same street. Contactor A would not service those supplied by Contractor B and vice versa. This was sorted over time but caused many complaints until it was resolved. By the time the first chemical toilets arrived a detailed plan for distribution was in place.

In Section 4.1 the involvement of the Ministry of Economic Development in supporting the task of restoring water and waste management services is mentioned. Another branch of MED - the Government Procurement Service (GPS) - had been tasked by ODESC with facilitating/procurement of water and waste management products/services. This was in parallel to the standard logistics function operated by MCDEM and the NCMC. Although established in 2009 GPS had not been involved in any CDEM exercises previously but by all accounts smoothly integrated with NCMC operations. DIA procurement provided advice on contracts and financial tracking.

A significant event for the eventual success of logistics in the CRC was the arrival of the General Manager for Toll Logistics New Zealand (Toll GM). He describes his involvement as a 'fluke'. He had been informed by a KiwiRail acquaintance that there was a need for experienced logistics know-how at the EOC/CRC. Arrangements were made for him to get a pass to get through the cordon and he went to the EOC and offered his services. He had the full support of his Australian Head Office and was able to use their resources. In the event he spent nearly six weeks providing

his expertise in the CRC and the Review was told by several people just how significant was the contribution he made to sourcing, procurement, delivery and distribution activities.

His ability to negotiate with overseas suppliers, coupled with his detailed knowledge of arranging international charter flights and sea freight, of customs clearance and bio-security import requirements were critical in minimising the time needed to get assistance for Christchurch. In order to ensure rapid deployment of goods on arrival it was, for example, necessary to arrange customs clearance while the goods were still in the air and coordinate Ministry of Agriculture and Forestry (MAF) inspection and fumigation (where necessary) immediately on arrival.

As referred to earlier in this Review the payment requirements for international air charter flights raises a particular issue. Air charter companies require a 50% payment on confirmation of the flight with the balance paid before take-off. Toll Logistics made a fund of \$5 million available to their NZ manager to use for the necessary up-front payments. These up-front payments for the air charters were subsequently reimbursed to Toll through GPS/NCMC. Acting on the advice that it would normally take up to 14 days to get financial approval for up-front payments of the type required which clearly was unacceptable his solution was pragmatic and appropriate but should not have been necessary.

NCMC had held all the appropriate financial authority to deal with such expenditures.

In an emergency situation time-consuming standard procedures need to be set aside. MCDEM should consult with the Treasury, the Auditor-General and GPS to develop appropriate protocols to deal with similar issues should the need arise in emergencies in the future.

Toll GM established contact with the GPS in Wellington and they managed the paper work and the interface with NCMC. This did mean that to some extent NCMC were not always completely in the loop in a timely manner. Despite that the desired results were achieved.

By 26 February an initial assessment that 30,000 chemical toilets would be required had been approved by the National Controller. The background to the proposal is outlined in Section 4.1. A schedule listing the quantities and country of origin for portaloos and chemical toilets and related supplies acquired follows;

Portaloos:

- 1,758 from NZ contractors
- 200 from Australia
- 960 from USA

Chemical Toilets:

- 5,100 from Australia
- 7,500 from Netherlands
- 30,000 from China

Chemicals:

- 10,000 x 1.5 litre bottles
- 429,240 sachets from USA

Storage Tanks:

- 400 of 1,800 litre capacity

In addition 37 kilometres of security fencing for cordon purposes were acquired. It is interesting to note that the quantity of fencing required increased as the original simple square shaped cordon reduced and changed to one which enclosed old city blocks.

'Sucker trucks' needed to clear liquefaction, silt, etc. from sewer pipelines and were obtained from around the country and leased from Australia. The Australian vehicles had to meet bio-security import requirements and complete local vehicle registration. The driver operators needed New Zealand driving licences. All of this was organised through the CRC logistics under the active guidance/leadership of Toll GM and NCMC.

Evaluation of the Response

The Review considers that the following features of the logistics in the Response worked well:

- The expertise provided in the CRC by a (volunteer) general manager of a logistics company, together with the support of his own company staff, enabled portaloos and chemical toilets to be obtained and transported promptly.
- The strategic planning for portaloos and chemical toilets was sound, the initial distribution was flawed, but the procurement was effective.

The following aspects of the logistics in the Response could have been better:

- The current guide to the National Civil Defence Emergency Plan does not have a section dealing with logistics.
- Too many distinct groups were involved in the logistics function within the CRC, NCMC and departments.
- Communications were further complicated because the different logistic groups and procurement sections were not co-located. Information sharing upwards and the passing of specific tasks to NCMC were sub-optimal.

Conclusions and recommendations

The Review concluded that:

- Logistics needs to be included in CDEM planning more effectively, and extra skills including those of the private sector and the NZDF are needed.

The Review recommends that:

- The Guide to the National Civil Defence Emergency Management Plan include a section dealing with logistics.
- For significant emergencies, the expertise available in commercial logistics companies be incorporated into EOCs at an operational level.
- MCDEM establish a national resource database of providers of essential goods and services complete with at least three emergency contact points in each organisation.
- Protocols be developed to deal with abnormal payments needing urgent decisions in an emergency situation.

7.2 Information Management within the Response Organisations

Background to the February Event

The provision of timely and accurate information has become as great an expectation of the community during emergency response as operational actions such as physical rescue and firefighting. Because of this, information management is no longer a means to an end, ensuring that the emergency response is informed, coordinated and delivered appropriately: it is a specific outcome of the emergency response. This has become a consistent finding in major reviews in Australia and the United States in recent years.¹⁷⁷

Features of the Response

For Police and emergency services the hub of information management when the earthquake struck, and for some hours thereafter, was the Police and Fire Communications Centre (ComCen) in the Police building. For the afternoon of 22 February 2011 that facility was the main source of information and the primary method of distribution and tasking.

¹⁷⁷ For example, Victoria Bushfire Royal Commission Report, 2009 and Victoria Flood Review Report, 2011.

Police continued to rely on that facility as its key source of information. This was also the case for Fire, but its operations centre was based at the Christchurch City Fire Station in Kilmore Street. Each morning and afternoon police briefings and tasking were conducted adjacent to the Communication Centre on the third floor of the Police Building, although no one from the CRC was ever present. The Review was unable to identify anyone in the CRC who was aware those briefings were taking place.

This in itself is not an issue if the pertinent information from these briefings was received by the CRC. The Review understands that much of the Police briefings were internal tasking and reporting. It appears that the Police through these briefings, with Fire, Defence and MFAT present, gained situational awareness quite adequate for their own response. The Police produced 50 intelligence reports which were released to the NCMC and the CRC. What was apparent to the Review was that the Police were more comfortable with their level of situational awareness than was the National Controller.

The CRC received large amounts of information - This was from the Police and emergency services, 111 calls, initially from the Red Cross and then the CCC Call Centre, from surveys conducted in the field, contractors, individuals passing on knowledge of infrastructure by word of mouth and subsequently from the media itself. The volume of information was impressive. This was subsequently enhanced by 'Operations Suburbs' which was a major information collection activity involving visiting households in the suburbs most affected and asking a series of 12 questions. This was done using MSD, Red Cross and volunteers. The information collected was subsequently collated by up to 50 data processors located in the CRC. Unfortunately the weaknesses in the design and implementation of Operation Suburbs limited its effectiveness. See Section 5.1.

While information collection was impressive, internal information sharing was problematic for the CRC because of the way that it had evolved and its internal capabilities. There did not appear to be one area within the CRC which was considered the most reliable source of information and the Review was advised that information was not generally well displayed. Briefings tended to be the main source of information together with email traffic once internet capabilities were in place. It appears that no one at CRC knew the Police EOC was conducting twice daily briefings.

Situational Awareness - This is a military term that has been adapted to emergency services and is very apt for EOC operations particularly during emergency response. It refers to the perception of the environment where there is a great deal of information, rapidly changing issues and complex environments when decision makers need to have a good perception of what is happening and how decisions and changes will affect critical outcomes. Maintaining the same situational awareness in different locations can be referred to as a 'Common Operating Picture'.

The Review was advised that the situational awareness between functions and individuals varied considerably and there was little development of a Common Operating Picture. This was because of a number of factors including:

- a lack of training and experience in EOC operations
- individuals unaware of the importance of developing situational awareness
- the CRC being geographically spread across the Art Gallery building, thus impeding the rapid transfer of information
- the Police and Fire EOCs operating out of buildings separate from the CRC
- a lack of CRC liaison officers with Police, Fire and USAR
- staff changing shift too regularly.

Situational awareness can be developed and maintained through training, exercising and promoting simple practices such as:

- **calling people in the EOC to attention when a critical piece of information is received e.g.: a successful rescue or identification of a gas leak**
- **displaying up to date information on knowledge boards and on electronic situation reports**
- **effective briefings across staff functions within the EOC**
- **exchanging liaison officers with functions off-site to ensure CRC personnel are receiving up-to-date information**
- **Effective handovers**
- **Reducing shift changes**

Information and Intelligence - There appears to be a lack of understanding regarding information and intelligence. Many CRC staff referred to both interchangeably. The Review considers if these related products are better understood, they will be able to improve the support provided to decision makers.

Information is the raw data that may be acquired from a wide range of sources. For the CRC this could have been areas such as:

- weather advice
- information from the Police EOC

- reports from USAR
- data from 'Operation Suburbs'
- information from contractors reporting on buildings and infrastructure
- advice provided by callers to the CCC hotline
- reports from spontaneous volunteers
- reports from the media
- reports from business owners and residents
- NZDF advice

The Review considers there was a large amount of information available to incident managers at the CRC.

While information is potentially useful, it can easily swamp decision makers and in its raw form is often unhelpful. Trained staff need to analyse the information to produce intelligence – information which has been evaluated and analysed. This requires information to be verified and information from different sources is compared and reviewed. Incident management personnel who have been trained in intelligence management provide EOC staff with their priorities to enable intelligence staff to direct their efforts in specific areas. One week after the earthquake an incident controller's intelligence priorities would have included:

- accounting for all missing persons
- providing support to badly impacted suburban areas
- confirming building safety to allow business owners to retrieve vital assets
- restoring essential lifelines services

This would have informed intelligence staff to focus on information sources that generated information for these priorities. They could have then analysed that information to identify trends, potential outcomes, and likely challenges. Intelligence informs decision makers to make the best possible decisions. The Review identified bountiful information but too little intelligence product.

This did not appear to be due to a lack of able people or sufficient staff numbers. The capacity was in place. The staff lacked capability because they had not been trained in producing intelligence. Information from the field and call centres was being emailed to the Intelligence Section within the Planning function together with requests for intelligence support. This proved an ineffective approach.

Linked to this lack of capability was a lack of a strategic plan for information collection and intelligence analysis. What the National Controller and key directors required by way of information and intelligence does not appear to have been stated and this led to an uncoordinated information collection approach and a lack of intelligence product.

Situation reports - The lack of good situation awareness also led to many situational reports, particularly after the first 24 hours, being repetitive and unhelpful. In part this may have been because of the changing workforce every eight hours in the CRC.

USAR Information - Information from USAR was not always forthcoming, perhaps in part because of the physical separation from the CRC, being at Latimer Square some distance from the Art Gallery building. In the initial stages, having a liaison officer from the CRC at the OSOCC would have assisted in the transfer of information.

Much more use of information displays within the CRC could have provided staff and visitors with greater detail and more strident efforts could have been made to develop and maintain situational awareness of events on the ground.

Multiple briefings - There appeared to be daily briefings for Police and emergency services and a subsequent briefing for elements of the CRC. This meant that information had to be relayed between the two briefs and this does not appear to have been done systematically so that this information was not totally available to the CRC.

An overall impression gained by the Review was that there was a great deal of information activity generated by committed and hardworking staff but too little targeted timely messages that directly assisted businesses and communities most in need.

Evaluation of the Response

The Review considers that the following features of information management in the Response worked well:

- The CRC focussed on information collection and gathered much, although not systematically enough.

The following aspects of information management in the Response could have been better:

- A strategic plan for information collection and intelligence analysis would have directed information collection and intelligence analysis.
- Internal information sharing was problematic for the CRC and there did not appear to be one area within it which was considered the most reliable source of information. Information was not generally well displayed.
- There appears to be a lack of understanding regarding information and intelligence. Many CRC staff referred to both interchangeably. A strategic plan for information collection and intelligence analysis seemed to be lacking.

- The Review was advised that the situational awareness between functions and individuals varied considerably and there was little development of a Common Operating Picture.
- The CRC being geographically spread across the Art Gallery building impeded the rapid transfer of information.
- Lack of CRC liaison officers with Police, Fire and USAR.

Conclusions and recommendations

The Review concluded that:

- The CRC focussed on information collection and this was largely successful. What was challenging was sharing this information to create situational awareness across the CRC and response agencies; analysing that information into intelligence to better inform decision makers.

The Review recommends that:

- CDEM planning and exercising include provision of clear directions regarding information collection and intelligence analysis, together with the installation of operations knowledge boards, or electronic intelligence summaries at EOCs for all significant incidents.
- Information gathering follow a collection plan targeting sources that will provide decision makers with their priorities.
- All EOC staff work on developing good 'situational awareness' so they are aware what is occurring around them and the implication of changes and decisions. Eight hour shift changes appear too short to gain and maintain effective situational awareness.
- An EOC should aim to maintain a single am and pm briefing to inform and update all IMT functions and key personnel at the same time.

Privacy

On 24 February the Privacy Commissioner issued a Code of Practice called the Christchurch Earthquake (Information Sharing) Code 2011 (Temporary). Such prompt action was made possible because of work done over several years, including international consultations, on privacy issues arising from emergencies.

The purpose was to remove any concerns that emergency services and government agencies might have about sharing personal information as needed in the response to the Christchurch earthquake emergency. The code supplemented the existing law and provided wide authority to share personal information. It did not change the way information is given to the news media. A code of practice under the Privacy Act becomes part of the law of the land as “subsidiary legislation” with a similar status to that of statutory regulations.

We were told that agencies operating in Christchurch found the Code helpful in enabling them to share information to provide assistance to people affected by the disaster. One issue was the extent to which the existence of the code was made known within all organisations, and how it can be better publicised.

The code expired eventually on 30 June 2011. The Privacy Commissioner has however drafted a new Code, based on what was done for Christchurch, to become a permanent part of the law. This draft code is subject to widespread public consultation. Once promulgated, it will come into effect upon the declaration of a state of national emergency.

In our view this is a most sensible innovation, since it provides certainty in advance as to the law regarding privacy, and will enable agencies to share that information so as to better assist people after a disaster. We consider that the Privacy Commissioner and her office are to be strongly commended on being prepared in advance of the earthquake and thus being able to respond promptly.

7.3 Management and Coordination of Information to the Public

1,269 journalists were accredited in the response. 177 staff in the CRC provided 24/7 liaison.*

That is about as many in total as USAR teams rescuing people from buildings.

The resources required to support such numbers were considerable, in a stricken disaster zone.

We asked the media managers and journalists whether such a large number was good, bad or inevitable.

The universal response was: 'inevitable'.

*** Presentation by Lee Cowan to Christchurch City Council**

Public information management (PIM) during an emergency involves collecting, analysing, and disseminating information to the public. CDEM doctrine states:

It promotes effective leadership and decision-making and enables the people affected by the emergency to understand what is happening and take the appropriate actions to protect themselves. The goal of the PIM is:

- *to create strong public confidence in the emergency management response*
- *to support public safety with public information*
- *to positively influence public behaviour with public information*
- *to manage public expectations*¹⁷⁸

The media did an excellent job in informing the country and the world about the tragic disaster that had befallen Christchurch. Within the limitations of their technical capacity and reach into the community, the media also make considerable efforts to tell the people of Christchurch what they needed to know about the Response to the earthquake. Technical limitations and loss of services (such as electricity) made this effort insufficient.

Communication from the Response organisation to the media was also good.

178 MCDDEM www.civildefence.gov.nz/pim accessed 27 March 2012

Situation at February

After the September earthquake, the Mayor of Christchurch had fronted the media, leading most presentations. His strong television background enabled him to communicate well and give confidence to the people of Christchurch.

By February central government was involved much more, especially through the appointment of a Minister for Earthquake Recovery. Nevertheless when the initial declaration of emergency was by the CCC, and the effective EOC was that of the city, the Mayor still occupied the central role in communications in the first few days.

Structure after 24 February

After 24 February, when the Christchurch Response Centre (CRC) was set up under the National Controller, there were two media sections within the EOC. One was the CCC team led by their public information manager. The other was the 'all-of-government' group led by senior communications managers from Wellington. Both groups were involved in developing the communications messages and dealing with the media. Having two different teams from different organisations with different cultures and different primary responsibilities was a recipe for tension, which did occur at times.

After the first few days relationships between the media and those involved in the Response were very strictly managed. Media were excluded from the CRC and staff in the Response work ordered not to talk to the media. Full briefings were given twice a day.

Despite these limitations, the amount of time required of the National Controller and others in preparation for media briefings, in briefings themselves, and in the relatively few public meetings amounted to about 3 ½ hours a day. The pressure on controllers' time of media work, and concern over it, is not untypical in disasters.¹⁷⁹

In Wellington relations with the media were coordinated by senior communications managers from government departments. They dealt with ministerial offices, departments, ODESC, and the NCMC.

Other major departments maintained relationships with the media, some of them from teams in Christchurch, on a semi-independent basis.

¹⁷⁹ For example: ' Many emergency managers have been frustrated when they have had to divert much needed time and resources to address the demands of the media, while at the same time trying to mount a multi-organisational disaster response under conditions of extreme urgency and uncertainty. Well-planned inter-actions with the media, though, can be of critical importance in decreasing the loss of life and property.' Wenger 1985

What the Media Did

The media contingent from overseas was large, partly because of the number of foreign nationals missing or killed in the earthquake.

Local media news editors told the Review that their main focus was on providing information for the people of Christchurch, rather than chasing news stories for a national or international audience. Radio stations abandoned their music programs and read news continuously during the day. The Press resumed deliveries to nearly all its subscribers within a few days.

The media initially focused on the tragedy in the CBD with rescue and then recovery of bodies and identification of victims. Then access to the CBD by businesses to retrieve computers and equipment became a major story. Demolition of heritage buildings also received a lot of media attention. These topics dominated early press conferences and the weight of media interest was such that it put pressure on the operations in the CRC. Issues in the Eastern Suburbs such as the distribution of portaloos were not initially a story, but once public interest in them was aroused, they became the story.

Social media were monitored but little effort was made in using them to distribute messages.¹⁸⁰ There was a challenge meeting the responsiveness that social media demands while not being able to verify all information. The other limitation was that those without electricity could not use the internet or receive messages on mobile devices once batteries were flat, so while social media could reach many, until power was restored it could not meet those especially in need of information.¹⁸¹

Talkback radio was of considerable significance, especially at night, for lonely and distressed people. It was also a source of information as to what was happening in particular localities. Occasionally people in need called in, and the talkback hosts sought to obtain help for them.

Sign language translators at press briefings were a great success, and one of them, Jeremy, attracted a cult following on Facebook.

Servicing the Media

The media appeared to be generally satisfied with the information given them and the way it was managed. While they did not like the restrictions on access, most accepted the need for limitations, at least in retrospect.

A major issue was the physical arrangements for the media. Press conferences were held outside the CRC, but inside the cordon. This meant that media had to enter the cordon which they found

¹⁸⁰ See Australian experience in #qldfloods and @qpsMedia, 2012.

¹⁸¹ After 10 days 10% of households still did not have power.

to be a difficult process, especially before an efficient pass system was organised. A marquee to house the media was provided, and indeed was essential.

Communicating with the Community

The media communicated well the scale of the tragedy and the plight of the people of Christchurch. Also well communicated was the work of the Response day by day. Little cheap sensationalism was apparent. Most of the stories that ran were based on important aspects of the disaster as it affected people.

Some stories dominated at different stages of the Response, such as search and recovery in the early stages, access for property in buildings within the cordon, and later portaloos. While these perhaps affected the presentation of a balanced picture, that did draw the attention of the CRC to aspects of the Response that needed to be improved.

The media complied with regret, but hardly any resistance, to the quite stringent restrictions imposed on CDEM staff in talking to the media. In this great responsibility was shown since stories based on interviews with staff who had limited knowledge of what was happening would have been misleading and even dangerous where health and safety were involved.

Within Christchurch it appears that the people in less affected suburbs, particularly in the west, who had electricity available with little delay, were kept well informed. The major weakness in communications was conveying up-to-date information to badly affected suburbs, particularly before electricity was restored.

Without electricity people had no access to television or the Internet and in some suburbs relatively few people subscribed to the daily newspaper. What is more, lack of electricity also meant that when mobile batteries went flat, the devices were unusable. Even when services were restored, the information that people needed was very local: for example, restoration of water or sewerage in particular localities, the state of individual streets, and the location of services such as welfare centers, food centres or tankers with fresh water.

Community Meetings - The CRC commenced community meetings mid-way through the second week after the earthquake. They were conducted in communities that were directly affected and were initially well received and attended, although by Week 3 frustration was apparent as to why problems were not being resolved and by Week 6 they were less supported or effective.

Almost all the media people spoken to by the Review felt that a good job was done in communicating to the community. Nearly every community group spoken to by the Review considered that information provided was inadequate. But in the self-examination carried out by the government communications team this issue received a one line mention in a 26 page document.

An example of the lack of understanding of community needs was the pictorial publication distributed late in March. It was prepared with information from the CRC and published using CCC processes. The brochure took nearly two weeks from initiation to distribution. Much of the information in it was thus not current. The first two pages of the brochure appear as Appendix 6.

In contrast, after the September earthquake the Waimakariri District Council hand-delivered daily newsletters to affected streets in Kaiapoi. The information was current as of the morning of the distribution and was specific as to individual localities. An example appears as Appendix 5.

The task facing the CRC in distribution was very much larger than that faced by the Waimakariri District Council, but on the other hand Christchurch had far larger resources of staff and volunteers to distribute such information.

In areas where it was not possible to deliver a newsletter to every house, posting information sheets on bus shelters, shop-fronts, at sports grounds and at community centres and welfare centres would have been very welcome.

Similarly the Review did not learn of any concerted effort to inform the business community of the action being taken regarding the issues of concern to them, such as access to buildings and within the cordon and demolition policy. At least some of the heat generated by these issues would have been dissipated by a better understanding of the reasons for decisions being taken.

On the one hand the staff operating the PIM and all-of-government functions within the CRC are to be commended for managing a large number of media and providing advice to communities. They embraced social media and committed large numbers of staff to the public information function. On the other hand, it appears that much of the more sophisticated effort was lost on those who had no electricity to receive it. Interviews with the Mayor reassuring local communities were not viewed on television or heard on radios, and twitter was not accessible.

The coordination of communications between ministers, departments, ODESC and the NCMC was done well. Messages were well worked through so that a consistent and complete picture of the emergency was given. The success was in large part due to the good relationship in the existing government communication managers' Forum.

What did not work quite as well was the desire of some departments to use their own media managers to tell the story of their activities in Christchurch. Another issue was the practice of departments or ministerial offices contacting the CRC in Christchurch directly seeking information which would be used for the media. Such contacts were considerably filtered by the all-of-government team in the CRC, but even so, took up valuable time of the Controller and senior managers. It would be helpful for the NCMC in future to provide more 'top cover' for an EOC.

Public Information distribution needs to be multi-channelled, embracing social media but also using community meetings, daily briefing sheet and door knocking. No one method can be relied upon to reach all who require the information.

Evaluation of the Response

The Review considers that the following features of information to the public worked well:

- The media did an excellent job in informing the country and the world about the tragic disaster that had befallen Christchurch. Within the limitations of their technical capacity and reach into the community, the media made considerable efforts to tell the people of Christchurch what they needed to know about the Response to the earthquake.
- Restrictions on access to the Controller and senior staff to two press conferences a day worked well, and the strict rules forbidding staff to talk to the media at will was surprisingly well accepted.
- Social media worked brilliantly for the student army, and was monitored in the official response but not used greatly to get messages out.
- Talkback radio filled a need, especially for the elderly and lonely, and late at night.

The following aspects of the Response could have been better:

- The major weakness in communications was conveying up-to-date local information to badly affected suburbs, particularly before electricity was restored. (This was done much better in Kaiapoi after 4 September).
- The Review did not learn of any concerted effort to inform the business community of the action being taken regarding the issues of concern to them, such as access to buildings and within the cordon and demolition policy.
- The appointment of a spokesperson to provide information on occasion at other times would be valuable and take some pressure off the Controller.
- Press conferences should be held outside any cordon if it all possible and reasonable facilities provided for the media.
- The greater use of pooled coverage should be encouraged as much as possible to reduce the weight of media presence.
- All the staff in the CRC working with the media should have been in a single team.

- Departments sometimes used their own media managers to independently tell the story of Christchurch, and occasionally departments or ministerial offices contacted the CRC in Christchurch directly seeking information for media stories.
- Initially physical arrangements for the media, including shelter from the weather, were inadequate (but were improved).

Conclusions and recommendations

The Review concluded that:

- The media got the story of the earthquake out competently and sensitively. The staff assisting the media in the CRC and the NCMC operated effectively in managing a large number of media and providing advice to communities through the media.
- The provision of very timely and localised information to badly impacted communities not contactable through traditional media such as when electricity supply is disrupted needed significant improvement.

The Review recommends that:

- Plans and templates be prepared for communications with communities that the traditional media cannot reach after a disaster.
- The public information management and all-of-government functions be merged within EOCs.
- A competent and high-profile spokesperson be appointed for the controller in major emergencies.
- That reasonable facilities for shelter and catering of media be provided where these are not available otherwise.

7.4 Science Advice

Science advice for the Response was provided by a small team in the CRC. Geotechnical advice was in high demand as well as seismology, but a wide range of fields was covered including social science. A GNS scientist was stationed in the NCMC and advice was received from other scientists from time to time. Quite separately, engineering advice was provided mostly in relation to inspection and demolition of buildings. Sitreps ('Status Reports') were issued daily for the first month, but important advice was also supplied through frequent discussions with the controller and with the planning team in the CRC.

The Review analysed the Sitreps for the first month after the earthquake. Major topics dealt with most days included:

- Liquefaction
- Landslides and rock falls
- After-shocks
- Mapping of impact.

Also dealt with were the activities and needs of researchers, both official and unofficial, and social science aspects. One sitrep gave a formal estimate of the probabilities of after-shocks of different magnitudes.¹⁸² The information provided appeared to have several purposes:

- Monitoring hazards, especially rockfalls and landslides, and assessing the risk to individual localities and houses to determine whether evacuation was required.
- Obtaining information needed for planning the Response and recovery: especially regarding liquefaction.
- Gathering important scientific data before it was lost: for example recording liquefaction before clean-up
- Liaising regarding mapping and satellite imagery
- Learning as much as possible about the earthquake as part of basic scientific research

The sitreps do not record much policy or advice to the National Controller regarding public information, and presumably this was done through briefing sessions and personal discussions. An instruction was given by the Minister for Earthquake Recovery to 'tell it as it is'. Social scientists also advised that in giving information to the populace, many of whom had suffered considerable trauma, sensitivity was required.

The scientists in the EOC were overwhelmed with visitors. The earthquake was an attraction for scientists from all around the world and managing them was an on-going task.

¹⁸² 'Earthquake Activity:

...A table of forecast events for the next year is shown below. The average forecast number of events is given, with the possible range shown in parentheses.

Forecast	In One Week	In 30 Days	In One Year
M4-4.9	5.1 (1-10)	13 (6-21)	44.5 (32-58)
M≥5	0.5 (0-2)	1.2 (0-4)	4.2 (1-9)

A possibility remains for the occurrence of another aftershock >M6. However it is more likely that such an event will not occur. As with smaller aftershocks, the chance of a larger aftershock decreases as we get farther away in time from the magnitude 7.1 earthquake.'

Source: Science team Status Report to the Intelligence Team in the CRC: 1 March at 12:00 hrs.

During the response, social science researchers were banned from interviewing people affected by the earthquake. This was done in a desire to avoid extra stress for people suffering ongoing trauma caused by living in damaged homes without sanitation, and with their normal activities, social contacts and communications disrupted. In addition, some extra stress was being imposed by the multiplicity of agencies, official and unofficial, calling and offering help to families in a largely uncoordinated manner. Such a ban was a highly unusual occurrence, and may have meant that some important information available shortly after the disaster was lost. In the case of physical sciences, efforts were made to gather such time sensitive information (such as on liquefaction). With adequate planning before an event it should be possible to gather important social data in a strictly controlled manner as happened with research into physical science and engineering.

Science does not have a formal place in the CIMS structure even although most emergencies will require scientific advice of one kind or another. The focus of much of the information sought from within the EOC related to day-to-day activities rather than medium-term strategies.

After the 4 September earthquake GNS had considerable contact with several utilities including Orion and CCC Water and Wastewater. They also had provided information to Selwyn and Waimakariri District Councils but had not had requests from the CCC itself. Advice was sought by many organisations after the 22 February earthquake.

The Review considered whether the advice given was sufficient to keep the public well informed about the risk of further large after-shocks. For the people of Christchurch and the surrounding areas the September earthquake had come as a huge shock even though scientists knew that such local events could occur infrequently. Then the Boxing Day earthquake occurred, further shaking confidence. The surprise about the 22 February earthquake was not that it had a Richter magnitude of 6.2, but that it produced such unexpectedly strong accelerations, and by bad luck was a direct hit on the city. After the 22 February event small to medium after-shocks were daily events. Against this background it was hardly news to the people of Christchurch that after-shocks were likely to continue, and indeed were likely to be of sufficient magnitude to be damaging.

The key prediction by GNS was that an after-shock of magnitude greater than 5 could be expected in the next month. At this probability level it was prudent for great care to be taken in accessing or repairing damaged buildings. It also meant that further landslides or rockfalls could be expected. The Response took precautions accordingly. The largest after-shocks were magnitude 6.0 on 13 June and 23 December. GNS had said: 'a possibility remains for the occurrence of another after-shock greater than M6, however it is more likely that such an event will not occur.'¹⁸³

It is possible that some people would take the phrase, 'it is more likely that such an event will not occur' to mean, 'it will not occur'. Hence there is a continued need for caution in making public

¹⁸³ See previous footnote.

predictions about the probability of earthquakes occurring. GNS is well aware of this and in its business as usual of informing the public about earthquakes week to week practices considerable caution. In the middle of the response to a major emergency, even greater caution is required, and perhaps it would have been helpful to have concluded the advice with the phrase, 'but it still could happen'.

Evaluation of the Response

The Review considers that the following features of the science role worked well:

- Sound scientific advice was provided to meet the day-to-day needs of the CRC and in particular to help mitigate immediate risks.
- At the same time scientists carried out basic research on the earthquake and its impact.

The following aspects of the science role could have been better:

- Insufficient advice was sought within the CRC on medium-term strategic issues

Conclusions and recommendations

The Review considers that:

- The scientific advice provided was sound and timely.
- For nearly all emergencies some scientific knowledge is needed in order to respond effectively. This applies not only to natural disasters such as earthquakes and floods, but also events such as shipwrecks and mine explosions.

The Review recommends that:

- Explicit provision be made within the National emergency plan for science input and strategic engineering advice to be embedded within the EOC.
- Planning be undertaken to enable important social data to be gathered in a strictly controlled manner (as happened with research into physical science and engineering) so as to better assist communities impacted in future by earthquakes.

Chapter 8 - The Community

8.1 CDEM Arrangements at the Community Level

In the aftermath of the 22 February earthquake, it was demonstrated that the ability of a community to survive and recover depends on more than just the 'official' CDEM arrangements. The resilience of the Christchurch community was demonstrated by the way so many households were able to care for themselves and also by the way in which community organisations stepped up and looked after their neighbourhoods.

Households

Overall, the resilience of the community was remarkable. The total number of people needing care in welfare centres was in the thousands but not tens of thousands.¹⁸⁴ Most people moved quite quickly from welfare centre to accommodation in the community. Community organisations with little prior involvement in civil defence, apart from the 4 September event, effectively provided the total response in some suburbs. People in damaged houses, some of which were very severely damaged, survived with little outside help and relatively little temporary housing was required. There were no outbreaks of disease, and despite the conditions, no civil unrest.

People spoke of being helped by neighbours, or temporarily living with friends or neighbours. Households were resilient. The Review was not in a position to determine to what extent this resilience was inherent and to what extent it had been enhanced as a result of education over the years by civil defence.

Within the overall high level of resilience, some communities were much less able to cope than others. The Ministry of Civil Defence and Emergency Management gives sound advice on its website and inside telephone directories. This advice includes (amongst other things) storing food and water for at least three days, Primus or gas barbecue to cook on and the torch and radio with spare batteries. Lower income families struggling to survive from day to day do not have the ability to store food in advance. Many households do not have a battery radio even although they

¹⁸⁴ The Review had difficulty in obtaining data on the number of people who passed through welfare centres. We have no doubt that the figures are available somewhere. The estimate of the magnitude of the numbers comes from interviews with Christchurch welfare centre supervisors and data from the Waimakariri District Council.

are likely to have TV. Thus the preparedness advice cannot be expected to be followed by that part of the population which in any case is more vulnerable to natural disasters.¹⁸⁵

Formal CDEM Community Structures

The Christchurch City CDEM organisation had several part-time staff engaged in developing and leading community civil defence activities. Before the earthquakes their task was recruiting training and leading volunteers to work in welfare and recovery centres and civil defence posts. In addition they identified and prepared the use of facilities to be used as such centres.

After the 22 February earthquake the prime task of this staff was to manage the welfare centres. This work is described in the Welfare Section of this Review. The very limited expenditure on paid staff was leveraged greatly by the volunteers who they had recruited and they led.

The New Zealand Response Teams trained for 'light rescue' are also part of the community CDEM structure.¹⁸⁶ This organisation mobilised and preformed a multitude of tasks, for example, relating to access to damaged buildings, but could have done more with better liaison with USAR.

In Waimakariri the community civil defence organisation appeared to be stronger in relation to the size of its community than was that of Christchurch. The difference seemed in part to be due to the level of resourcing. After 22 September the Waimakariri organisation acted almost entirely as support for Christchurch, rather than having to deal with a major impact on its own population.

It appeared to the Review that the organisation of civil defence structures in the community was most effective in planning the welfare centres and in managing them but did not otherwise play other large part in the response apart from the work of the New Zealand response teams. Official civil defence posts and official community hubs were significantly lacking in the Eastern Suburbs. The CCC service centres in the Eastern Suburbs were closed after the earthquake because of damage to their buildings and did not reopen in temporary premises during the critical period of the Response.

Officially Recognised Community Organisations

Across the city existing community organisations played a significant role. Two of them were contracted by the Civil Defence organisation (the Red Cross and the Salvation Army) and their work is described elsewhere in this Review. Although these organisations are worldwide it is important to recognise that much of their work was done by Christchurch community members.

Neighbourhood Watch was another officially recognised organisation. Within the Neighbourhood Watch groups a huge amount of assistance was provided neighbour to neighbour but this of

¹⁸⁵ The relatively greater vulnerability of lower income groups is well documented in the literature: e.g. Mileti, 1999.

¹⁸⁶ These are mentioned in Section 3.3.

course is unmeasured and unrecorded. Because Neighbourhood Watch was organised into areas and groups it was able to quickly check on the situation of households right across the city. This information was timely and was conveyed to the CRC but unfortunately did not appear to reach decision-makers. The Review did not learn of significant activities by CDEM organised groups across the city apart from the welfare centres and the New Zealand Rescue teams.

In Sumner, New Brighton and Lyttelton, existing community groups either led or played a major part in the Response. They were linked and assisted by local Police or volunteer Fire Brigades but had practically no direct contact with the CRC. Marae played a significant part in the Response but again were not linked into the formal CDEM structure in Christchurch. They were linked through Te Puni Kokiri who passed information obtained from the CRC and obtained resources as required. The Tuahiwi Marae was linked into the Waimakariri District response.

All the community groups spoken with advocated a much stronger relationship with the CDEM organisation before events occur, as well as strong links during the Response.^{187,188}

Migrant Communities

When the preparation of its report was in its final stages the Review became aware of a report prepared by the Christchurch Migrant Inter-Agency Group. The report raises a number of issues which need to be taken into account by agencies when responding to future emergencies. In particular it addresses problems around effective communications for groups with cultural or linguistic diversity. It also highlights the need for all local CDEM organisations to establish and maintain strong links with the leadership of migrant communities.

An extract of the report with a summary of key learning and recommendations is attached as Appendix 8.

The full report will be available in due course on www.migrantheb.org.nz.

187 A RAND study reports: 'Participants noted that sharing information was the single hardest point to surmount in coordinating efforts between NGOs and with other private and government agencies. Differing formats, data elements, and the lack of sharing agreements beforehand were significant impediments to sharing information that was needed to provide effective and speedy aid to individuals.' Acosta et al.

188 Katrina experience also shows the need: Partnerships essential to community-based resilience that usually 'emerge from households, friends, family, neighbourhoods, non-governmental and voluntary organisations, businesses, and industry' were repeatedly ignored. When the disaster struck, these 'shadow responders', who provided 'most of the initial evacuation capacity, sheltering, feeding, health care and rebuilding much of the search and rescue, clean-up, and post-Katrina funding' were 'refused or poorly used by government officials'. Revkin, AC. blog in NYT; 13 8 2010

Future Community Arrangements

An issue for the future is whether or not Civil Defence Emergency Management in the community should be based primarily on special purpose organisations dedicated to their civil defence role. The arrangements which proved successful in the use of volunteers for welfare centres (and light rescue) should of course be continued. But beyond these roles, the experience in Christchurch after 22 February was that existing community organisations such as churches, Coast Guard, marae leadership and as well as others can play a huge role.

It was put to the Review that prior arrangements should be in place to use such organisations more effectively in the Response. The suggestions included identification of community leaders in advance, mandating them to form community led response teams and setting up mobilisation arrangements in advance of emergencies. If emergencies were a regular occurrence in any community such arrangements would be desirable. But emergencies arise infrequently across New Zealand and in any particular locality decades usually pass between major emergencies. It would clearly be difficult to maintain enough enthusiasm within organisations that exist for quite different purposes to make a formal structure emergency management structure effective.¹⁸⁹

A good solution may be found by examining just what the Christchurch experience showed: community groups did know what to do. For example, marae organisations do not need advice on how to cater for and safely house many hundreds of people. The other community organisations did not need to be told what to do or how to do it. For the most part they needed some resources and information from the EOC as well as a strong link through which to interact with the EOC. For effective liaison, leaders in the organisations also needed to know the key people with whom they would be dealing in the EOC.

A minimal structure could be set up within which leaders from participating community organisations or informal groups¹⁹⁰ could exercise, say annually, with CDEM Groups, together planning formal arrangements for liaison post emergency.¹⁹¹ Such organisations would provide staffed community hubs with such facilities and functions as were needed in the particular locality and particular emergency. Some community organisations in Christchurch have expressed an interest in holding a store of emergency equipment or supplies. Christchurch is the ideal place to develop a template for such arrangements for the whole of New Zealand since leaders of a significant number of community groups have learnt through hard experience what works and what needs to be improved.

189 New Zealand differs markedly from other countries where major disasters or threat of disaster occur almost annually. Examples are bushfires in Australia, hurricanes on the East Coast of the USA, and tornados in central USA. Hence the patterns of community involvement in those countries are unlikely to translate directly to New Zealand where any specific local community group is unlikely to be called into action more frequently than perhaps once every generation.

190 Such as ethnic communities.

191 The link between community organisations and an EOC is discussed more fully in Section 1.3 Volunteers.

Evaluation of the Response

The Review considers that the following features of the CDEM community arrangements worked well:

- CDEM volunteers and the New Zealand response teams played a useful role in specific areas of the Response.
- Red Cross and Salvation Army contributed significantly even though the scale of the emergency was much greater than planning contracts had envisaged.
- Overall, the resilience of the community was remarkable, with surprisingly few people needing care. Community organisations with little prior involvement in civil defence, apart from the 4 September event, effectively provided the total response in some suburbs.
- Several local MPs from across all parties played a most significant role in leading community efforts and linking with the Response

The following aspects of the CDEM community arrangements could have been better:

- More official attention could have been given to those communities less able to cope. Lower income families struggling to survive from day to day do not have the ability to store food in advance. Many households do not have a battery radio even although they have TV. Thus the preparedness advice cannot be expected to be followed by that part of the population and specific arrangements need to be made following an emergency.
- The CCC service centres in the Eastern Suburbs were closed after the earthquake because of damage to their buildings, but no alternative arrangements were made for their services in their locations.

Conclusions and recommendations

The Review concluded that:

- The role of CDEM community organisations was primarily through the volunteers involved with welfare centres, and the New Zealand Response Teams, who all performed well.
- Neighbourhood Watch played a significant but understated role and could undertake significantly more responsibilities such as checking systematically on neighbourhoods and doing formal surveys during a response.
- The major work done by community organisations, particularly in severely impacted or isolated suburbs, was of immense value in the Response. Such work would be enhanced by

minimal prior arrangements, by better resourcing and better information flows in the response period.

The Review recommends that:

- The existing arrangements for volunteers from the community to train for and assist in managing welfare centres et cetera should continue, and with more emphasis placed on Neighbourhood Support.
- A template should be developed in Christchurch for a simple structure to link community organisations to the official Response. It would involve training or exercising (perhaps annually), plans for resourcing and a strong arrangement for liaison with the EOC post-event. The development of the template should be led by the groups who so successfully contributed to the Response, and should draw on overseas experience.¹⁹²
- MCDEM analyse the findings of the report prepared by the Canterbury Migrant Inter-Agency Group and where appropriate incorporate the findings into CDEM planning.

8.2 Volunteers

In the immediate aftermath of the earthquake individuals rushed to assist people trapped under debris, in vehicles or inside damaged buildings whether they were friends or strangers, relatives or workmates. They would not have considered themselves as volunteers but they performed a vital role in assisting those injured or trapped through that period until standard emergency services could formally respond. Their actions followed well-documented experiences of other natural disasters wherein most rescues are achieved very shortly after the disaster. The actions of many were captured on camera and many have been able to be put in contact with those they helped to rescue. In the many cases where that has not been possible the individuals concerned can rest assured that their actions contributed in a significant way in the immediate response phase and are highly valued as such.

The Red Cross and Salvation Army are organisations which are contracted to supply services in the event of a civil emergency through supporting the Welfare component of a response. Their activities during the repose to the February event are dealt with in the Welfare section of this report

¹⁹² For example the National VOAD in the USA: 'National Voluntary Organisations Active in Disaster (National VOAD) is the forum where organisations share knowledge and resources throughout the disaster cycle—preparation, response and recovery—to help disaster survivors and their communities. Members of National VOAD form a coalition of non-profit organisations that respond to disasters as part of their overall mission. http://www.nvoad.org/index.php?option=com_content&view=article&id=53&Itemid=188

Also within the standard CDEM formal structure are activities which rely heavily on trained volunteers. These volunteers undertake regular training and exercises. There are more formal units such as volunteer fire crews, New Zealand Response Teams, etc., which are dealt with in other Sections of this Review.

This Section concentrates on other groups that are usually described as spontaneous volunteers. In a New Zealand setting these are normally associated with local churches, marae, and other local/community based groups. They are well organised and led, and exist for another purpose and they do not usually have contact with CDEM apart from in emergencies. In addition organisations like the Farmy Army and the Student Army spring up under strong leaders, and are able to play a significant role. CDEM culture appears to lump such valuable organised resources into the category of 'spontaneous volunteers' along with the quite different class of well-meaning individuals with limited skills who walk in off the street and have less to offer the Response.

Neighbourhood Support, which is part funded by the CCC and the Ministry of Justice, had a recognised spot in the EOC/CRC. It was able, through its web-based network of 2,000 plus neighbourhood contact points, to gather information across those parts of the city where it was represented, but did not have the facility to readily use this network to send out information for distribution amongst each group. The Review has been advised that such a facility is now being developed. There had been no success as yet in persuading TLA staff that a common web based approach would be of great value in emergencies, noting it is reliant on the provision of electricity.

In both the September and February earthquakes in Christchurch there were two particular groups that were so organised that they were able to make very significant contributions. The first was the Farmy Army organised through the local province of Federated Farmers. In February it set up its headquarters, well outside the cordon, at the Addington Show Grounds. A liaison officer from the CRC relocated himself out to Addington and was able to coordinate the tasking of the Farmy Army resources to meet the priorities set by Operations. The Student Army in February also relocated to Addington at the Farmy Army headquarters and benefited from the same close liaison with the CRC.

The Farmy Army, because of its organisational structure, was able to absorb other individuals and groups that came into the city to assist in the clean-up. The Student Army was recruited and organised almost entirely by the use of social media.¹⁹³ Apart from assisting in the clean-up and silt removal etc., it was tasked to distribute information sheets around the affected suburbs and also specifically tasked to assemble 960 portaloos which were, in early March, brought in as flat packs from the USA.

¹⁹³ The use of social media by volunteers in time of disaster is discussed in Starbird, 2011.

Both the Farmy Army and the Student Army and the people who joined them provided significant assistance and support to communities in clearing the surrounds of houses and driveways of liquefaction silt. The silt was removed from individual properties and footpaths and piled on the road for the collection by City Council contractors. Hundreds of thousands of cubic metres were shifted.

The key learning from a CDEM perspective was that in the case of large self-organised groups, their management must be left with the group and the role of the EOC is to ensure that there is explicit tasking allocated to each group and that the reporting back of completion of tasks is recorded and fed into the EOC operations and planning sections.

Within specific suburbs there were church organisations, marae and community leaders, who took up the challenge to provide leadership, support and assistance in their immediate communities. Few of the organisations that took up important roles had previously been perceived as a component of any emergency response. This is possibly because an emergency on the scale of the February quake in Christchurch had simply not been factored into the planning or into CDEM exercises. The Review heard from people representing a wide range of different organisations who described the extent to which valuable contributions to the Response had been made. The number of different types of organisations that were able to step up points to the need for CDEM organisations to widen their thinking about the range of organisations which should be brought into any discussions, aimed at enhancing community resilience.

The Sumner/Redcliffs suburbs were almost completely isolated because of rockfalls and roading upheavals. The Response in the area was self-organised within the community by utilizing the Sumner Coastguard volunteers in concert with the Volunteer Fire Brigade and the overall support of the local police. This grouping carried out all the activities of the Response; assisting those in need, going door to door to check on welfare, providing communication outside the area, and preparing/distributing a local information bulletin. They organised briefings on geotechnical hazards that had been, and were still, a significant problem for the area. The group representatives stated it had had practically no contact with the CRC until some weeks after the event.

Lyttelton is a suburb that suffered considerable damage to buildings and road access and was almost completely isolated after the event. While the presence in the port at the time of HMNZS Canterbury and the military personnel on board underpinned it, the Response was substantially by local community organisations. The Review was told of similar community led responses in other suburbs, for example Mt Pleasant, Heathcote Valley, Raupaki and Diamond Harbour.

In the New Brighton/Aranui area, where electricity was cut off for a long period, a major community based response was led by the Police. Church and other community organisations united to arrange the supply of food and other essentials, to check on residents and to provide support as required. Hot meals were prepared at Rangiora by volunteers under the supervision of

a volunteer professional chef whose restaurant in the city was inoperable. For the first few days, until roading conditions improved, the delivery of these meals to the New Brighton emergency centre was by helicopter. The whole operation became known as the Rangiora Earthquake Express and was organised and staffed by volunteers in Rangiora.

It was suggested to the Review that the whole Rangiora Earthquake Express was unnecessary. That is certainly not the view held by the people leading the community response in those Eastern Suburbs. However, it is perhaps symptomatic of the lack of understanding as to just how bad the conditions in the Eastern and Port Hill Suburbs were in those first few days. The Review was told that it was not the responsibility of CCC but of Civil Defence to establish the conditions prevailing in those suburbs. The point is that some parts of the CRC found it difficult to support spontaneous volunteering.¹⁹⁴ This attitude is perhaps not surprising since the CIMS structure needs modification to relate well to community voluntary groups.

A particularly interesting example of an individual spontaneous volunteer is the General Manager of Toll Logistics who spent several weeks in the CRC and with access to his firm's resources, both national and international, made a vital contribution to the overall logistics activity of the CRC. This is discussed in Section 7.1.

Professional engineers were another large group who voluntarily carried out activities assessing the structural safety of buildings, etc. There are issues relating to the status and protections that should be accorded such individuals.

Evaluation of the Response

The Review considers that the following features of the volunteer response worked well:

- Spontaneous volunteers carried out many rescues and provided much of the assistance in the first few hours. Volunteers, by supporting their neighbours, helped many families right through the period of the Response.
- The FARMY Army and the Student Army, although new organisations in September 2010, played an immense part in the Response.
- Existing community organisations with a voluntary base, but no official recognition by CDEM, provided almost all the response in some suburbs (as discussed in Section 8.1).

¹⁹⁴ The same attitude was exhibited initially with respect to clean-up of beaches polluted by oil from the wreck of the Rena (October, 2011). For some days volunteers were discouraged on the grounds that the clean-up was a professional task involving skills and risk, and was unsuitable for volunteers. Very soon the official position changed, and the beaches were cleaned mostly by a force of thousands of volunteers.

The following aspect of the volunteer response could have been better:

- Linkages between volunteer groups of all kinds and the CRC could have been much more effective.

Conclusions and recommendations

The Review concluded that:

- The potential for volunteer participation in the Response to emergencies has been vastly under-estimated, but based on the experience of such groups in Christchurch could be developed as an integral part of the CDEM structure.

The Review recommends that:

- The Neighbourhood Support organisation with its web-based network be recognized as a significant resource for information gathering and dissemination in times of emergencies and its information handling capacity enhanced.
- An EOC should include in its organisational structure a single liaison point through which semi-spontaneous volunteer groups which have strong self-management capability can be tasked. The steps taken by CRC to place the liaison person out with the 'volunteer' headquarters is best practice.

Chapter 9 - Findings of the Review

9.1 Issues Specifically Arising

(not dealt with elsewhere in this report)

This section deals with several unrelated issues which are not specifically mentioned in the Terms of Reference but which logically arise from them.

The late Dr Cvetanov and the CTV building

The Review was formally approached by the legal representatives of Mr Srecko (Alec) Cvetanov to investigate matters relating to the tragic death of his wife in the CTV building. Dr Cvetanov survived for many hours after the collapse of the building and communicated by cellphone with her husband, with the police ComCen through 111 and with police on the site. The Review was advised that calls ceased early on the morning of 23 February, some 12 hours after the quake.

Members of the Review team met with Mr Cvetanov and his legal representatives as the coordination of the response fell within the Terms of Reference. Mr Cvetanov's affidavit setting out the issues he sought to have investigated was supplied.

The issues raised fell into several categories:

- The apparent slow response in searching the part of the building where Dr Cvetanov was trapped and apparent failure to utilise information available through her phone calls and Mr Cvetanov's knowledge of her location.
- Technical aspects of the search and rescue effort.
- An apparent lack of management and coordination at the CTV site in the 12 hours or so that Dr Cvetanov was known to be alive.
- Whether Dr Cvetanov's death was caused by the fire or by rescue attempts.

Several of Mr Cvetanov's concerns are outside the Terms of Reference of the Review. They are the technical aspects of the search and rescue and the precise cause of Dr Cvetanov's death.¹⁹⁵

¹⁹⁵ The Review understands that the latter is to be considered in a coronial enquiry.

The issues that do fall within the Terms of Reference of the Review are the management and coordination of the various services (clause 10, a) and d), including those involved with search and rescue. Hence the overall management and coordination of the rescue work at the site has been considered by the Review.

The Review team interviewed enough people who saw the work of the Police and Fire Service on the site, and the command and communication structures of both services, to reach a view on the management and coordination at the site.

The condition of the CTV building was beyond the experience of all present. The building had pancaked and there was a deep-seated fire. The bodies of those who had died were being removed from the rear of the building as the injured who were rescued were brought out the front. Relatives of those trapped had gathered nearby at Latimer Square. Scores of people were initially assisting in the rescue: both from the Police, Emergency Services and spontaneous volunteers. Some had brought heavy equipment. Much activity appeared to be taking place around different areas of the building concurrently but there is doubt as to how much of this was well coordinated.

The technical difficulty of rescue at the CTV site required the 'heavy rescue' skills of USAR. However until the middle of the night on February 22 only one - the Christchurch USAR Task Force - was in action and that team was working at PGG, CTV and assisted in rescue at the Grand Chancellor.¹⁹⁶

All of those we interviewed considered that the Senior Station Officer and the Police Sgt on the site were highly capable and well qualified for their tasks.¹⁹⁷ It was also abundantly clear that acts of bravery took place with firemen, police and volunteers risking their lives in the unstable wreck of the building, with after-shocks continually occurring. That bravery continued as USAR formally took over and continued the rescue from the early hours of 23 February. The Review commends all those who contributed on site to the rescue.

Both the Police and Fire Service indicated to the Review that their service was in charge at the site. As there was a fire at the CTV building, the Review would have expected a NZFS Officer would have been the Incident Controller. But it appears that there was no single officer in charge and acting as Incident Controller for the whole site, even though it is possible that both officers considered they were in charge. Eye witnesses also indicated that there was no clear Incident Controller or Incident Management Team established.

¹⁹⁶ This illustrates the importance of rapid mobilisation of USAR teams from across the country and Australia. Because of the distance of New Zealand from the rest of the world, no time should be wasted on bureaucratic procedures.

¹⁹⁷ The Review did not have the opportunity to speak to those two officers directly.

Such an Incident Controller should have been able to stand back and take a strategic view of the site. In particular he or she would:¹⁹⁸

- establish command and control including clearly identifying themselves as the Incident Controller for the site
- establish the Incident Control Point
- protect life and property
- control personnel and equipment
- maintain accountability for responder and public safety
- establish and maintain effective liaison with outside organisations.

An incident controller who is free from hands-on tasks is able to support and supervise the whole effort on site and can take a holistic approach. In particular he or she can provide good liaison with all agencies involved and centralise resource requests through their command structures.

The police did have an officer in their EOC adjacent to the ComCen, who was in command of all Police operations, supporting and providing strategic oversight to the Police ComCen tasking. He may have been able to reallocate existing resources and potentially seek extra resources if requested. On the other hand the Fire Service relied on the Fire ComCen getting requests from officers on site if further resources were required, rather than resourcing being strategically directed by the Fire Service command. The Review doubts whether the Fire Service senior station officers on the major sites (CTV and PGG) would have been in a position to ask for extra resources, knowing that Fire Service assets were fully tasked, but not knowing that their sites deserved priority because of the number of lives still at risk at their sites.

The rescue was extraordinarily difficult because of the nature of the collapse of the building with the added presence of fire. In the end however it is neither within the competence nor the Terms of Reference of the Review to determine whether or not Dr Cvetanov could have survived had the rescue efforts been better coordinated on site.

In summary, the Review considers that the management and coordination of the Response at the CTV site on February 22 was inadequate at an incident control level; and considers that one or more of the NZFS executives who visited the site should have either assumed the role of incident controller or ensured an officer on site clearly adopted that function in order to ensure there was effective incident management.

The Chief Coroner has confirmed that any remaining questions surrounding the deaths of those killed in the Christchurch earthquake will be addressed when the Coronial Inquest resumes.

¹⁹⁸ New Zealand Fire Service Commission 1998: CIMS Manual: p16

Cost of Proposals

The Terms of Reference for the Review did not require that cost be considered in making the proposals needed to improve emergency management. Nor did the Terms of Reference require an estimate of the costs of any proposals.

The Review did however seek the most effective and efficient ways of achieving a safe level of emergency management. As a result, most of the recommendations do not have significant cost implications. They require better planning and organisation rather than spending more money.

The change in responsibility for management of emergencies involves some shift in expenditure rather than extra expenditure. With TLAs playing a lesser role and CDEM groups a larger role there will be some switching of cost from TLAs to regions but overall savings rather than increases because of the reduction in duplication. The enhanced roles recommended for the Defence Force and MSD are integrally linked with their existing activities and the costs should be absorbable within their existing funding. Most of the cost of the cadre of professional emergency managers would be borne by the organisations by which they are employed in peace time.

The development of a greater role by community organisations in emergency management would involve some cost, e.g. to fund a greater role for Neighbourhood Support.

A change in name away from 'Civil Defence' would involve significant rebranding costs if undertaken in one stage. It would be possible however to rename the management of emergencies simply as 'Emergency Management' and gradually over time leave the phrase 'Civil Defence' to refer to the community participation in preparing for and responding to emergencies.

Transfer of the Ministry of Civil Defence and Emergency Management away from the Department of Internal Affairs would involve administrative costs and hence could well be delayed until other reorganisations were taking place.

Counter Disaster – Civil Defence

The Review is satisfied that the thinking of Civil Defence in New Zealand is not 'old school', but the term certainly is. While it is still used in Singapore, it is not a term readily used elsewhere. Civil defence is usually seen as efforts to protect the citizens of a state (generally non-combatants) from military attack. Programmes were initially discussed at least as early as the 1920s and were implemented in many countries during World War II and subsequently during the Cold War. While the suggestion that infers that citizens need to take measures to protect themselves still applies, community resilience is generally used now to encompass these actions.

Many countries refer to community resilience as an element of emergency management (EM), or national preparation for emergencies. While some consider that CD is community based and EM is agency based, few countries currently use that distinction. While not critical of the advancement

of CDEM over the years, and while acknowledging the apparent wide recognition of CD, the name should be reviewed so it has the opportunity to better connect with younger New Zealanders. Counter Disaster, still using the initials CD could be one option.

High Impact Emergencies

The emergency management structure in New Zealand is inherently built around small to medium impact emergencies, such as occur every few years or every decade at the most. The 22 February earthquake showed how difficult it is to step up such arrangements for the very high impact emergencies, which have occurred in the past far less often.

Examples of the difficulties experienced (and discussed elsewhere) are:

- Inadequate planning for a national input into forward control of high impact emergencies.
- Inadequate arrangements to incorporate large numbers of ‘semi-spontaneous’¹⁹⁹ volunteers from the community into the Response.
- An EOC structure devised in the ‘heat of battle’ because of the exigencies of the Response, and without prior planning, to merge disparate groups into a cohesive whole had only partial success.

The cost of planning for high impact emergencies should not be much different to that of planning only for smaller events and has the advantage that if such plans are in place and well exercised, the management of lesser impact emergencies becomes much easier.

The CIMS structure seeks to achieve control and cooperation between the emergency services at an incident level, for events such as major fires, floods and other multi-agency events. It is not designed to deal with an event of national significance. Desirable changes in the CIMS structure for high impact emergencies are discussed elsewhere. They include provision of a professionally trained chief of staff, enhancement of the well-being (welfare) function, and provision of an all-of-government function reporting directly to the controller. Greater planning at a national level needs to occur to prepare for the major events of national significance that cannot be managed at regional level.

¹⁹⁹ The term ‘semi-spontaneous’ is used to describe volunteers who contribute through well-established organisations that are not normally associated with Civil Defence, such as churches, Coast Guard, or marae; or through well-structured new organisations such as the Farmy Army and the Student Army; or who belong to professional groups that regularly assist in emergencies but without a formal structure such as engineers.

Debrief and Counselling of Staff

Although most major organisations have provided counselling for staff who had suffered varying degrees of trauma arising from their work in the Response, not all had done so. Some of the people we interviewed by the Review were clearly relieved to get their experiences 'off their chests'.

Some had to respond to tragic situations and some had been thrust into positions of responsibility for which they had never been trained. Others had dealt with personal and family trauma while still going to work in doing their job. The need for counselling of people involved in a response is well established, for example, ICAT Report on Chile.²⁰⁰

Society owes a debt to these people, and even at this late stage it is important that senior managers in every organisation are conscious of their staff (including managers) who may still need counselling.

For future emergencies organisations would do well to follow the good practice established by those such as MSD.

Related to the matter of post response counselling is the debriefing of staff. The Review was surprised to find that some very significant elements of the Response had not as yet been debriefed.

A Review such as this must cover the whole breadth of the Response and it is not possible to examine in detail every aspect. Organisations themselves have the responsibility to debrief and record the results.

9.2 Key Actions Required

Simplify Emergency Management Response Structure

The Review found that the inherent duplication of control between the regional CDEM Group and CCC hampered the Response to the earthquake. The division between these two entities persisted in the CRC after it was formed. It is clear that the potential for duplication across the country needs to be reduced. This would concentrate resources, training and expertise on a smaller number of incident management teams and EOCs while still ensuring that emergency management is decentralised.

²⁰⁰ http://emergency.lacity.org/stellent/groups/departments/@emd_contributor/documents/contributor_web_content/lacityp_015617.pdf

The Review recommends placing the responsibility for control of the response to local emergencies wholly with regional CDEM Groups, rather than being in practice delegated to Territorial Local Authorities (TLAs) as well. It is proposed that Groups would not delegate to TLAs the authority to appoint controllers under the CDEM Act. Groups would provide controllers and senior staff in EOCs, and some of these might well be appropriately qualified TLA staff – but not automatic appointments of TLA managers. Groups would also make arrangements for dealing with small events like limited local flooding, and would arrange to ‘sectorise’ a response as necessary.

Mayors and designated elected members would still have the authority to declare emergencies, and the Review does propose any change in current law whereby the declaration of a state of local emergency is not linked to the question of which authority manages it. TLAs would remain responsible for the restoration of their own infrastructure, providing local community knowledge and supporting the Group when requested.

This recommendation arises directly from an assessment of the efficiency and effectiveness of the several EOCs that operated during the Response:

- Initially both CCC and the Group operated separate EOCs in the same city, initially some few hundred metres apart. This involved duplication, confusion as to roles and uncertainty with supporting agencies as to with whom they should be dealing.
- After the declaration of National Emergency the two EOCs were merged but within the new CRC the two groups never melded into a cohesive organisation. This was despite the efforts by individuals on both sides to make the new structure work.
- It is quite clear the CCC EOC on its own could never have handled an emergency of this severity satisfactorily nor would the Group ECC have been able to cope, especially without the active support of the CCC.

These conclusions are reinforced by the experience after the September event when three TLAs each declared a state of local emergency and appointed their own EOC. The emergency was thus managed in three separate parts, despite considerable commonality in issues faced and resources required. With that event, partner agencies like the Police, MSD, the DHB and NGO's needed to appoint representatives in three EOCs rather than in one.

Even before the 4 September event, ongoing disputes between CCC and the Group had led to what the review considers to be dysfunctionality. The 2002 CDEM Act is based on the premise that TLAs will cooperate smoothly with each other and regional councils. A lack of clarity as to roles and responsibilities contributed to the disharmony.

We are convinced that both levels of local government should exercise powers under the CDEM Act together through Groups. While it would be theoretically possible to leave the power with TLAs, it would be costly and inefficient for 67 TLAs throughout the country to develop capacity to

manage significant emergencies. The alternative is for control of local emergencies to rest entirely with Groups, and for TLAs to only have the responsibility of restoring their own infrastructure and providing support for the Group response. This recommendation also reduces the occasions in which natural disasters inconveniently overlap administrative boundaries.

The Review is conscious that such a change runs counter to the long tradition of Civil Defence in New Zealand where the central role has been played by TLAs. The arguments are that TLAs are more closely linked to local communities than are regional councils and know their community much better than most central government agencies. Also many of the emergencies in New Zealand arise from perils such as flooding or earthquake and result in communications being disrupted. Thus the management of the Response needs to be local.

This argument does carry some weight. However communication links in New Zealand have improved greatly in the last few decades and isolation of a single TLA for more than a short period is now less likely. The cost of planning and exercising a full response within all TLAs, as well as regional councils, is exorbitant for a small country like New Zealand. With respect to the argument for local linkages, much better means of linking to communities during response are needed than are provided by TLAs' BAU arrangements.

TLAs would still be required to manage the restoration of their own services and facilities, with direction of this centrally from Group EOC but managing restoration locally,²⁰¹ and to assisting in staffing the EOC. In order to ensure that both regional and territorial authorities meet their responsibilities in planning and preparedness, this would be assessed annually as at present. However central government support after emergencies would be reduced for local authorities which failed to plan and prepare adequately as deemed by the annual assessment. The safeguard against a failure of communications or the inability of a Group to act immediately are the powers of the Police (and to a lesser extent the Fire Service) who in any case initially manage most small emergencies.

The Review is also conscious some TLAs have prepared themselves to manage emergencies very well. An example of this is the Waimakariri District which by all accounts performed very well in both major earthquakes. A Group would incorporate the skills and resources of such TLAs into the Response.

Had this recommended regime been in place in Christchurch prior to 22 February, the Mayor would still have been able to declare a state of emergency. However the CDEM Group would have had the sole responsibility for control of the emergency, rather than having a legal but ineffectual power to direct the CCC controller. The CCC would not have had the option of planning and operating its response separate from that of the Group, but would of necessity have had to contribute its considerable resources to the Group effort. In planning for emergencies, the Group

201 What this means is that restoration of sewerage, for example, would be managed by the TLA team responsible during BAU, but their ultimate responsibility would be to the Group EOC rather than their own CEO.

would have made plans for an EOC in Christchurch, as it would have done for events in other parts of Canterbury, and would only set up a regional EOC if coordination between several local EOCs were necessary. Snow emergencies in particular would call for local EOCs, contributed to by TLAs, but under the control of the Group. Mitigation, especially through zoning and building code enforcement, would remain the responsibility of TLAs.

The detail of this change should be developed in conjunction with the Local Government Association.

Recommendation 1:

That territorial local authorities no longer have power to control the response to emergencies, but that they still retain the power to declare them.

Enhance Professionalism in Emergency Management

The Review recommends that across New Zealand far fewer managers be designated as controllers. We propose the establishment of a small cadre of highly skilled emergency managers from amongst local and central government, major companies across the country and perhaps NGOs, to lead all emergencies of any significance. Those from central government could come from Public Service Departments, the Police, and the NZDF. They would be chosen for personal competence and capability, and their skills would be kept fresh by participation in emergencies across New Zealand and by regular exercises.

During the Response, some people from CCC with the most limited experience or training in emergency management were required to act as controllers, directors of operations, or manage other functions within the EOC. This is neither fair to them nor to the community that they are protecting. Earlier in this Review there was discussion of the myth that any competent manager can effectively manage a major emergency without extra skills and experience. If this myth is rejected, the need for a small cadre of well-trained emergency managers is apparent. New Zealand has relatively few declarations of emergency of any significant size and, in order to maintain professional skills,²⁰² every emergency should be used to give experience to controllers. This cadre could also be used to manage major regional or national events, thereby maintaining their currency.

Under this recommendation, councils, departments, other government agencies, companies and perhaps NGOs would nominate managers to be accredited as controllers and for key IMT positions when declarations of emergency are made. The accredited controllers would be drawn

²⁰² This is comparable to the requirement for surgeons to carry out a certain number of procedures each year in order to maintain accreditation for that procedure.

from organisations across the country, so that in any emergency some with local knowledge would be available. Such controllers would have a regular job in their own organisation, perhaps as emergency manager or business continuity manager or even a more senior position. The extra training and skills developed would be of value to their parent organisation. The cost of maintaining such a Group should be comparable with the total cost to regional councils and their member TLAs of giving limited but incomplete training to a larger group of managers.

The Review also recommends that a much more competency based approach be taken to the appointment of key staff within EOCs. This specifically could be the use of NZDF and MSD staff to manage logistics, intelligence and 'well-being'²⁰³ functions in the EOC and the use of these organisations' skills to a greater extent in Response.

NZDF trains officers to manage intelligence, planning and logistics for military purposes as a part of its ongoing work. Limited further training in emergency management would quickly equip such officers to take senior roles in an EOC.²⁰⁴ The manager of specific function in the EOC should if possible have background and experience as part of their normal job. The extra training required by the military to participate effectively in an EOC is far less than is required to train a manager from a local authority without experience in key fields to safely do the job during an emergency. For NZDF there would be the benefit of developing their officers' skills under the pressure of operational situations, as well as helping to protect the population from natural disasters. The successful integration of a skilled commercial company logistics manager into the CRC demonstrates the potential for integrating managers from the private sector. Lifelines companies are already engaged, but there is scope for drawing on a wider pool of talent.²⁰⁵

The well-being function within EOCs similarly needs to be staffed professionally. At present MSD chairs Welfare Advisory Groups, but once an emergency is declared the management of welfare passes to the local authority staff in the EOC. Few local authorities have senior and well-trained managers operating in the field of community well-being. MSD has trained professionals working with community groups. While the focus of the Ministry itself relates considerably to benefits and to dysfunctional families, it appears to have a better professional base to which to add emergency management and broader well-being skills than any other organisation in the public sector. In addition, MSD contracts with a broad range of NGOs to deliver social services and hence has a good knowledge of the sector.

203 As noted elsewhere, this is currently called 'welfare'.

204 The military skills do not always exactly match the requirements of an EOC: for example, purchase, transport and payment for goods purchased abroad is less a military skill than the expertise of commercial logistics companies. Similarly surveying the community is not part of military intelligence. Hence further training is needed, and people with complementary skills would need to be blended in to the organisation.

205 It is noteworthy that CERA has adopted just this approach in recruitment to manage the recovery.

These particular functions of logistics, intelligence and well-being require expertise in execution as well as in management and should be carried out by organisations or agencies with competence and experience in the field. The NZDF should be much more heavily involved with responsibility for specific defined functions related to its strengths as was MSD. As discussed, the procurement aspect of logistics could well lie outside NZDF. On-the-ground surveys of impacted communities would similarly be usually carried out by agencies other than MSD or NZDF, but both would be involved in organisation and analysis.²⁰⁶

The Review also recommends that within an EOC, the Chief of Staff be a person professionally trained and experienced in that role. In Christchurch the role was not clearly defined and, in particular, did not appear to include the responsibility for making sure that all parts of the EOC effectively worked together.

Within military organisations the role of Chief of Staff is well defined, and considerable training is given for the role as it applies in larger headquarters. The skills required for military purposes translate readily to much of what is required in an emergency management EOC. Again, it appears to the Review that less additional training is required to add to the skills of a well-trained NZDF officer than would be required to give a local authority officer the skills required to effectively be Chief of Staff in an operational emergency centre.

Finally the professionalism of NZFS and the Police at command levels and related to emergencies needs to be maintained and further developed. We recommend that adequate ongoing training be provided at staff college level in operational command, as opposed to business management aspects.

Recommendation 2:

That a cadre of highly trained emergency managers from organisations across the country be established to lead and control emergency responses.

Link the Response more closely to the Community

The Review recommends that new structures be developed to modify CIMS so as to better link the Response to the community. In the Response to 22 February some links with the community were excellent and others needed major improvement.

As an input to the response spontaneous volunteers made a significant contribution through the Farmy Army and the Student Army. In places like New Brighton, Sumner and Lyttelton great work was done by what might be called 'semi-spontaneous' volunteers (i.e. existing community

²⁰⁶ Surveys are discussed in Section 5.1 of this Review.

organisations mobilising to assist in the Response). So too did volunteer professionals such as engineers.

Information about the needs of individuals in each part of the impact zone was also required as input. After 22 February such information was not gathered in a systematic coherent manner, nor does it seem to have been analysed and presented as coherent and timely intelligence to manage the Response. Little systematic on-the-ground reconnaissance seems to have been done for the Response as a whole (as opposed to specific elements such as repair of infrastructure), with the partial exception of Operation Eastern Suburbs.

From the response effort the community requires the necessities of life. Whenever and wherever lifelines, facilities, houses or supply chains have been damaged or disrupted, alternatives are required. Requirements are especially food, water, sanitation, shelter and medical services. Meeting these needs is traditionally described as the 'welfare' function but as discussed earlier we propose the term 'well-being' instead. Apart from sanitation, these needs appear to have been very well met by the Response to 22 February.

Finally, the community needs accurate, relevant and up-to-date local information about the response and how their own needs are being met. This could have been supplied much better after 22 February. Considering all these community needs together, what are required are much stronger links between an EOC and the community. The formal CIMS structure is deficient in providing for such links.

With volunteers, there needs to be a way to plug into the EOC so that volunteer organisations have a structure within which they can be readily identified and tasked, but at the same time be left with their own internal self-management. In other words no attempt should be made to bureaucratise the volunteer organisations. Very considerable experience was gained after 22 February, as well as after the other significant earthquakes. Solutions were found to a lot of problems. We recommend that a formal project be undertaken to develop templates to optimise the use of such volunteers, based on the experience of Christchurch organisations.

The gathering of information about the situation of individual households - whether they are safe, whether they have basic necessities and whether they have particular requirements for assistance - need not be difficult. The main issue is the development of a simple short questionnaire limited to information that is essential, and that does not try to meet multiple demands of different agencies. The Review recommends that the template for such a questionnaire be developed and tested. Patterns for a structure within which voluntary organisations can be tasked should again be based on the lessons learnt by the Student Army and the FARMY Army and their liaison officers from CRC.

Gathering information in other ways and assembling intelligence from it is an ongoing function which could well be developed with the assistance of NZDF. Sources include reconnaissance, social media, talkback radio, 111 calls and phone calls to the call centre amongst others. Equally

important as the gathering of data is its analysis, and the provision of intelligence summaries that give the controller (and the whole EOC) good situational awareness and supports their decision making.

Information to the whole community should use those methods used after 22 February including radio and newspapers. But the prime method of conveying information to heavily impacted areas should be that developed for Kaiapoi after 4 September: hand delivered, single page, double-sided information sheets placed in each letterbox of the badly impacted areas. In addition such newsletters should be distributed at any centres that the community uses, such as dairies, supermarkets, sports fields, welfare centres, etc. The focus should be on relevance and timeliness, with less concern on appearance and presentation. Information needs to be up-to date. It should be as accurate as the intelligence available to the EOC on the morning of the day that it is delivered.²⁰⁷

The Review's proposals for the enhancement of links with the community form part of a package with the recommendation that a more professional approach be taken to leadership within EOCs. This package is an alternative to the present arrangement whereby both skilled leadership and community links are expected from TLAs - despite few TLAs having the specialised emergency management expertise or sufficient deep community links as part of their business as usual.

Recommendation 3:

That new structures be developed to modify CIMS so as to better link the response to emergencies with the community and community organisations.

Give higher priority to business and jobs

I need my fishing boat before I need my house. I can sleep anywhere but without my boat I cannot feed my family.

An unknown Sri Lankan fisherman after the Boxing Day tsunami in 2004

The Review considers that protection and restoration of business and jobs should be an integral part of the Response rather than something that can be safely left for a later recovery process. In Christchurch several response activities had a major effect on business, particularly because they related to the devastated CBD.

Building evaluations and consequential demolitions determined the fate not only of buildings but sometimes of the businesses they contained as well. Contents of buildings which were vital to the survival of the business were inaccessible for weeks or months and the processes for access to retrieve this took considerable time to become satisfactory. Access into the cordon was difficult to obtain, particularly in the early days and weeks after the earthquake, and with varying levels of understanding by business of the dangers of access. The effect on some businesses of these

²⁰⁷ This was achieved in Kaiapoi.

activities was severe and could have been ameliorated had the structure of the EOC provided a good link with business. In fact as time passed relationships developed and cooperation improved significantly. On the other hand (as already noted) the innovative Earthquake Support Subsidy (ESS) had a very positive effect on business.

Time is of the essence for many businesses. In the modern just-in-time manufacturing sector, component manufacturers simply cannot stop for any significant time or the business is lost, together with the income for all employees. Therefore business recovery must commence immediately after the disaster during the Response phase.

Business is, by its very nature, often self-reliant and motivated to action but it does need assistance in an emergency and a share of the recovery resources to bridge the inevitable gap between the event and resumption of operations. The review was told by several observers that businesses which depended on turnover and profit for survival seemed to recover more quickly than those dependent on the public purse but none the less some assistance is often needed to aid private business recovery. This was demonstrated in the aftermath of the February earthquakes.

The relative neglect of business in the Response did not arise from a failure by the CRC to recognise the importance of business. Rather it arose because of an absence of concern for business and jobs (indeed economic issues generally) in the formal CIMS structure and in CDEM doctrine.

There are therefore two major areas for development with respect to business and the Response. The first and most difficult is to increase the preparedness of businesses for a major disaster. This has no doubt been given impetus by the recent events but as time passes it will be more difficult to maintain focus and momentum on this aspect.

The second area, that of improved communication and connection between business and emergency planning and EOC operations, can be addressed in a more structured way to effect long term improvements.

Recommendation 4:

That the preservation of business and jobs be made a higher priority during response to emergencies, and links between the Response and businesses improved.

Location of MCDEM

The Review recommends strengthening MCDEM so as to provide a better platform from which to launch responses.

A feature of the Christchurch Response was the manner in which major government departments, especially MSD and the Police, responded according to their own plans without involving the CRC. Both are large organisations, both are well organised to deal with crises, and both got on with the job. When tasked by the National Controller they did what was asked of them and both

performed well overall. However their relative independence did not assist when dealing with issues such as assisting people heavily impacted in the Eastern Suburbs.

The Review considers that the situation could be improved by much closer liaison in peace time between MCDEM, MSD and the Police and by giving MCDEM more mana from which to lead other departments. Hence we recommend that Police and MSD each provide a seconded officer to MCDEM, about the level of Police inspector or equivalent. Their task would be more than just liaison. It would be to lead within MCDEM in the aspects of response management for which the Police and MSD would have responsibility during an emergency. Similarly, because of the enhanced role that we recommend that NZDF play in EOCs during emergency, we recommend that NZDF also nominate an officer of appropriate rank to MCDEM with a similar responsibility.

As we carried out the Review, it became clear that MCDEM's position as a tiny Department, nestling within the ambit of DIA's broad portfolio hampered its relationships with major departments in preparation for and during emergencies. In addition, it has become traditional in New Zealand for the Minister of Civil Defence to be a junior minister often outside the Cabinet. This clearly places MCDEM at a disadvantage in dealing with departments with great influence. The point is that the whole government system has limited need for MCDEM most of the time, but when it does need MCDEM, it needs it badly. The location of MCDEM has in the past been determined by what is administratively convenient in 'peacetime' rather than what is operationally efficient during emergencies.

The location in DIA presents a real risk of absorption by a departmental culture quite alien to the need of emergency management. That this risk is real is shown by the pages in DIA Annual Report for 2011 which says:

'The Canterbury earthquakes required us to reprioritise resources...to effectively lead the response and support the people of Canterbury to manage at a difficult time.'²⁰⁸

In fact the Response was not led by DIA, but by a separate entity with its own Act, Minister and responsibilities. Yet both the Auditor Office and a Parliamentary Committee have congratulated DIA on leading the Response. The risk is that DIA seeks to further absorb MCDEM in a department whose culture is essentially policy and administrative.

Several people interviewed urged us to recommend that a more senior Minister be Minister of Civil Defence, but this is well beyond our Terms of Reference, as is consideration of the whole-of-government response. We respect those limits. The issue considered here is what shape MCDEM needs have in order to effectively operate the NCMC and to respond to major emergencies.

208 The Department of Internal Affairs Annual Report, 2010–11: p13

The Review considers that, while placement of MCDEM within DIA has some administrative advantages, the operational disadvantages outweigh these. The Director of Civil Defence needs assistance from outside for much of his operational base. It has also been the practice for DIA to contribute to the work of NCMC by providing staff. Unfortunately many of these staff have little or no training or experience in emergency management and may or may not have the personal capacity to do this work. More use should be made of staff trained in emergency management and drawn from MSD, the Police and NZDF, and other departments.

The Review gave some consideration as to what, in an ideal world, would be the best location for MCDEM. It is not substantial enough to be a department in its own right carrying its own administrative services. With any host there is a danger of 'cultural capture' by the parent agency, particularly if the parent has a well-defined and somewhat different culture itself. This argues against either the Police or NZDF being the parent department for MCDEM.²⁰⁹

The best platform from which MCDEM could launch responses would seem to be the Department of Prime Minister and Cabinet. That department already has significant responsibilities in leading ODESC and is the natural place for a department managing major emergencies. A junior Minister could of course continue to be appointed as Minister of Emergency Management to oversee the function during peacetime and minor emergencies.

Recommendation 5:

That consideration be given to locating the Ministry of Civil Defence and Emergency Management (MCDEM) within the Department of Prime Minister and Cabinet so as to provide a better platform for launching responses.

Better Preparedness

In examining the Response one feature was strikingly apparent: organisations that were well prepared in advance responded much better than those who were not. This was seen both at the highest level and with almost all supporting and peripheral agencies. It is a natural human reaction to any emergency to use those contacts and communication channels that apply in normal life. It was strikingly obvious that those organisations that responded most effectively had emergency responses that closely mirrored normal operations where possible and in which emergency responses had been predetermined and embedded in normal operations

The Canterbury CDEM Group and the CCC did not work together cohesively, major participants seem to have had their own agendas, and preparations to manage an event with the impact of 22 February were generally weak. As a result it proved very difficult to establish a seamless and effective EOC. On the other hand, for example, Canterbury DHB had good planning and well

²⁰⁹ The Review has however argued above for much closer links and a greater contribution from Police and NZDF for emergency management.

exercised procedures in place for its response. Consequently the DHB found it much easier to achieve a strong response. Even an agency like the Office of Privacy Commissioner, with marginal involvement, was able to respond very quickly and effectively because good planning had been done well in advance. Orion was not only prepared in the sense of having plans through a culture of preparedness but had taken significant action to remove vulnerabilities in its network. These mitigation efforts paid off and enabled faster restoration of electricity than would otherwise have been the case.

The elements of preparedness included a culture of readiness, good planning, exercising those plans and taking action to lessen the potential impact of a disaster. Most of these elements lie outside the Terms of Reference of the Review and are not dealt with in detail. Preparedness involves the creation in advance of structures that can effectively manage a major emergency. It requires the identification of people with the capability of managing an EOC and the key functions within it, training such people and keeping their skills fresh. The best way to maintain skill levels is of course experience in managing or observing actual disasters, either in New Zealand or abroad. Because such disasters (thankfully) occur infrequently in New Zealand regular exercises are necessary. The extent to which the potential effects of disasters are mitigated in advance also effects the level of response required. For example, the buildings of all kinds in Christchurch that protected their occupants during the earthquakes contributed far more to safety than any extra efforts made during the Response.

It is also clear that the classical elements in emergency management of Planning, Preparation Response and Recovery do need to be managed together. The structures required to manage a response should not be divorced from the other elements of emergency management.

Recommendation 6:

That MCDEM continue to promote a culture of preparedness for major disasters amongst all sectors and be resourced appropriately to do so.

9.3 Summary of Recommendations

Major recommendations

The major recommendations are described in Section 9.2 Key Actions required:

1. **That territorial local authorities no longer have power to control the response to emergencies, but that they still retain the power to declare them.**
2. **That a cadre of highly trained emergency managers from organisations across the country be established to lead and control emergency responses.**
3. **That new structures be developed to modify CIMS so as to better link the response to emergencies with the community and community organisations.**
4. **That the preservation of business and jobs be made a higher priority during response to emergencies, and links between response and businesses improved.**
5. **That consideration be given to locating the Ministry of Civil Defence and Emergency Management (MCDEM) within the Department of Prime Minister and Cabinet so as to provide a better platform for launching responses.**
6. **That MCDEM continue to promote a culture of preparedness for major disasters amongst all sectors and be resourced appropriately to do so.**

Other Recommendations

Section 2.2

7. ----National emergencies should be managed with control forward , appointing a nationally recognised and competent figure as Controller.
8. ----Plans be made and exercised in advance so that the Director of CDEM can remain in Wellington.
9. ----The position of National Controller be separated from that of the Director of CDEM and enhanced to allow for this eventuality.
10. ---The National Emergency Plan provide for potential deployment of the National Controller forward and how the NCMC and ODESC can best support this arrangement.
11. ---There be built up a cadre of highly trained men and women competent to control and lead in emergency operations centres (EOCs) in moderate and large emergencies.

Section 2.3

12. ---Particularly during the response phase, only those with CIMS training and acknowledged as effective operational leaders be appointed to senior positions in a CIMS structure.
13. ---EOCs of whatever size have the capability to become operational with minimal infrastructure in the first instance and not be location dependant.

14. ---The Police and Fire ComCens continue to be co-located and the Ambulance ComCen be added to the one facility.
15. ---A single EOC facility be developed for the Canterbury Region that could be used by single or all agencies to improve coordination and operational effectiveness.
16. ---A single incident controller be appointed at each incident site of significance in accordance with CIMS doctrine, and, depending on the size and complexity, an incident management team (IMT) be set up to assist in controlling the incident.
17. ---Responsibility for the management of all emergencies and hazards be more clearly identified well in advance between police, emergency services and government agencies and 'default' positions better defined.

Section 2.4

18. ---In major emergencies, controllers use a CIMS structure with slight modifications as proposed in this report, and where EOCs are established on other structures, they move as rapidly as possible to structures reflecting CIMS.
19. ---Staffing of large EOCs include a senior and experienced Chief of Staff.
20. ---Communication within large EOCs for major emergencies be improved.

Section 2.5

21. ---CIMS include a functional role titled 'Community Wellbeing' in response and recovery operations.
22. ---Authorities ensure that only people who have completed the required training and are suitable for the role are placed in CIMS functional positions.
23. ---Greater use of collaborative planning tools to prioritise.
24. ---Controllers ensure that liaison officers are exchanged with other major partner agency EOCs to best gain and maintain situational awareness.
25. ---Controllers appoint individuals to key functional leadership positions and have them supported by others in a shift relief arrangement.
26. ---MCDEM develop a shift handover template and include it in a future edition of CIMS.
27. ---Consideration be given to producing a national CDEM identity card (or badge) available to mandated agencies.

Section 2.6

28. ---Staff to assist in the NCMC should be drawn from those with skills and capability from across all government departments and agencies.
29. ---The responsibility for logistics as between NCMC and other departments should be clarified and the respective roles planned and exercised.

Section 2.7

30. ---Phone contact and registration systems be reviewed in the light of experience after 22 February.
31. ---More integrated planning and exchange of personnel take place with emergency management agencies in Australia.
32. ---Assistance that will contribute little to the response, or will cost more to put in place than it is worth or will even hamper the response, should be politely declined.

Section 3.1

33. ---The Police EOC ensure that its situational awareness and intelligence products are fully shared with other EOCs operating in support of the same incidents.
34. ---Greater emergency management training be conducted by the Police (and other agencies) to ensure all levels of command are familiar with arrangement and requirements.
35. ---Police and Fire consider the merits of an alternative Police ComCen being identified in Christchurch.
36. ---Incident control responsibilities using CIMS be clear for all emergencies.

Section 3.2

37. ---Greater priority be placed on quickly establishing incident control at major rescue sites prior to establishing Regional level arrangements.
38. ---Agency responsibility for controlling designated incidents be maintained where ever possible.
39. ---Emergency Services aim for a single, combined, resilient EOC capable of managing large Regional emergencies.

Section 3.3

40. ---Statutory responsibilities regarding the role of NZFS USAR in conducting structural assessment and deconstruction advice be clarified.
41. ---NZFS consider flexible 'operational control' and tasking arrangements for domestic USAR deployments depending on the operational requirement, National or Incident Controller expectations and overseas contributions.
42. ---NZ USAR gain a better understanding as to the capabilities of the New Zealand Response Teams and better integrate them into domestic training and operations where appropriate.

Section 3.4

43. ---Ambulance ComCens be co-located with Police and NZFS ComCens and become part of the same communications network.
44. ---Regular exercises, including senior managers, need to be conducted to maintain operational readiness.

Section 3.5

45. ---The priority of support and the potential capabilities expected of the NZDF during emergencies be clarified.
46. ---Closer links be established between NZDF and MCDEM with the appointment of an NZDF officer as liaison **within** MCDEM.
47. ---NZDF take part more fully in CDEM planning and exercises.
48. ---The following potential NZDF roles within an emergency be developed:
 - a. Provision of a Chief of Staff for EOCs
 - b. Assisting with the intelligence function
 - c. Explicit support where the military have specific expertise such as mapping and reconnaissance
 - d. Specific operational tasks such as cordon management
 - e. Assisting with the planning function
 - f. Physical planning and management of an EOC

Section 4.1

49. ---More emphasis be given by the water network managers to business continuity planning, and to exercising in emergency management.
50. ---When systems of wastewater are disrupted, the management of the response should provide adequate advice on alternative sanitation while portaloos or chemical toilets are being obtained.
51. ---Consideration be given to establishing reconnaissance teams with their own communications to gather data for multiple lifelines in the same reconnaissance, for example, road, water and waste water.

Section 4.2

52. ---All aspects of solid waste disposal be given attention in the development of lifeline plans.

Section 4.3

53. ---Emergency protocols and procedures be worked out between the electricity distributors and telecommunication companies.
54. ---Protocols regarding power disconnection and transformer facilities in buildings to be demolished be improved by the development of demolition protocols.
55. ---The mutual support arrangements between power companies be further developed.

Section 4.4

56. ---As protocols are developed for building demolition, provision be made for buildings with sensitive equipment or cables on or under them.

57. ---The need to service and restore telecommunications equipment be taken into account in cordon access arrangements.

Section 4.6

58. ---National CDEM planning include provision for priority transport of ATC staff from Christchurch to Auckland to service the alternative centre.

59. ---In airport emergency planning consideration be given to rapid evaluation of runway status to enable early emergency operation of military aircraft.²¹⁰

Section 4.7

60. ---Communication protocols between NCMC, EOC and LUC be reviewed.

61. ---An emergency standby rail control strategy be investigated and implemented to lessen the current control system vulnerability in the event of the main control centre being unavailable.

62. ---KiwiRail be urged to take part in local CDEM exercises as well as those at national level, and through lifelines links.

Section 4.8

63. ---LPC join in local CDEM planning and exercises.

Section 4.9

64. ---The issue of fuel distribution and management and the procedures to be used during any restrictions should be addressed at national level.

65. ---Fuel supply companies develop links with utilities to minimise and mitigate outages of essential supporting services.

66. ---That lifelines planning identify the location of priority fuel stations.

Section 4.10

67. ---The principles and practices surrounding lifeline relationships with EOCs be reviewed and publicised with a view to clarifying the roles of LUC and individual lifelines.

68. ---Nationally based (or at least nationally consistent) training of LUCs be undertaken.

69. ---LUCs exercise regularly both nationally and locally in a meaningful way.

70. ---The role of MED in the LUC be reviewed and if necessary formalised.

71. ---National policies be developed and promulgated in respect of fuel allocation and distribution in an emergency.

210 Such as C130 aircraft.

72. ---Disposal of solid waste, in particular liquefaction silt and demolition debris be incorporated in lifelines plans.
73. ---The resilience of infrastructure providers in the main centres in New Zealand s be evaluated to provide a national picture of vulnerabilities and a basis for improvement.

Section 5.1

74. ---The successful experience of the health sector be used as a template for the response in other regions.
75. ---Protocols be developed to facilitate the continued safe operation of welfare and other centres even where running water is not available and sanitation is of a lower standard than would normally be acceptable.

Section 5.2

76. ---A structure be developed within CIMS by which Community and voluntary organisations can 'plug into' the official Response.
77. ---MSD needs to 'rebrand' its effort in an emergency and develop new services.

Section 6.1

78. ---Consideration be given to the development of a high level national team to manage building safety evaluations in major emergencies.
79. ---Local and Regional authorities develop local organisational structures and appropriate information and data management systems.
80. ---A national system be developed for the selection, training, warranting and mobilisation of building professionals for building safety evaluation in an emergency.
81. ---Guidelines for Building Evaluation be revised in the light of the experience in Christchurch with particular attention to revision of the placarding system.
82. ---Improvements to the building safety evaluation arrangements already commenced, with MCDEM, and DBH supported by NZSEE, be carried through.
83. ---Building evaluation during an emergency be given a legal mandate.
84. ---DBH accelerate the development and maintenance of a common approach, organisation and training for building evaluation in local authorities.

Section 6.2

85. ---National protocols, procedures and plans be developed for the demolition of buildings and structures under a state of emergency and be incorporated in CDEM plans.
86. ---The demolition protocols be developed in conjunction with representatives from building owners, local authorities, MCDEM, USAR, engineers, the insurance industry and business groups.

Section 6.3

87. ---MCDEM set up a working group to design CDEM guidelines for the setting up, management, contraction and demobilising of cordons in an emergency.

Section 6.4

88. ---CDEM plans include early restoration of business (including preservation of jobs) as an objective of the Response.

89. ---A senior business liaison person be included in the organisation of EOCs.

Section 6.5

90. ---MCDEM encourage businesses to prepare emergency response plans, including templates, for those areas considered important by business, such as post-disaster human resource management.

Section 7.1

91. ---The Guide to the National Civil Defence Emergency Management Plan include a section dealing with logistics.

92. ---For significant emergencies, the expertise available in commercial logistics companies be incorporated into EOCs at an operational level.

93. ---MCDEM establish a national resource database of providers of essential goods and services complete with at least three emergency contact points in each organisation.

94. ---Protocols be developed to deal with abnormal payments needing urgent decisions in an emergency situation.

Section 7.2

95. ---CDEM planning and exercising include provision of clear directions regarding information collection and intelligence analysis, together with the installation of operations knowledge boards, or electronic intelligence summaries at EOCs for all significant incidents.

96. ---Information gathering to follow a collection plan targeting sources that will provide decision makers with their priorities.

97. ---All EOC staff work on developing good 'situational awareness' so they are aware what is occurring around them and the implication of changes and decisions.

98. ---An EOC should aim to maintain only two briefings a day – morning and afternoon -- to inform and update all IMT functions and key personnel at the same time.

Section 7.3

99. ---Plans and templates be prepared for communications with communities that the traditional media cannot reach after a disaster.

100.--The public information management and all-of-government functions be merged within EOCs.

101.--A competent and high-profile spokesperson be appointed for the controller in major emergencies.

102.--Reasonable facilities for shelter and catering of media be provided where these are not available otherwise.

Section 7.4

103.--Explicit provision be made within the National Emergency Plan for science input and strategic engineering advice to be embedded within the EOC.

104.--Planning be undertaken to enable important social data to be gathered in a strictly controlled manner (as happened with research into physical science and engineering).

Section 8.1

105.--The existing arrangements for volunteers from the community to train for and assist in managing welfare centres et cetera continue, and with more emphasis placed on Neighbourhood Support.

106.--A template be developed in Christchurch for a simple structure to link community organisations to the official Response.

Section 8.2

107.--The Neighbourhood Support organisation with its web-based network be recognized as a significant resource for information gathering and dissemination in times of emergencies and its information handling capacity enhanced.

108.--An EOC should include in its organisational structure a single liaison point through which semi-spontaneous volunteer groups that have strong self-management capability can be tasked.

9.4 Conclusion

This is the report of an independent review of the Response to the Christchurch earthquake of 22 February 2011 from an emergency management perspective. It identified what went well and what could be done better, reaches clear conclusions, and makes firm recommendations. The Review team considered the management of the Response across the range of the many agencies and organisations that were involved.

Despite ongoing difficulties of historical origin within the local CDEM structure it was reassuring to discover the way in which those managing the emergency and in the Christchurch community

dealt with challenges unprecedented in New Zealand. Overall the Response went well, but some aspects could be done better in future. What the Review learnt of the strengths and weaknesses of the Response can be applied to help cities in New Zealand even more vulnerable to major disasters than is Christchurch.

The Review recommends significant but not revolutionary change in the CDEM structure in New Zealand. The main themes are:²¹¹

- Clarifying responsibility for controlling emergencies by placing it fully with regions or CDEM groups
- Raising the level of professional emergency management skills to lead and control emergencies by creating a small cadre of highly trained emergency managers available across the country
- Recognising the significant role that community and community organisations play in responding to emergencies and linking that closely to emergency management
- Giving preservation of businesses and jobs a higher priority in the response to emergencies and better linking the response and businesses
- Giving consideration to relocating MCDEM²¹² to DPMC²¹³ to provide a better platform from which to respond to emergencies
- Encouraging preparedness for emergencies which showed its value in Christchurch.

The management of emergencies in New Zealand can be markedly improved without great cost or disruption. The Review commends to Government for consideration of the recommendations on these key themes as well as other recommendations also listed in Section 9.3.

The Review records its appreciation to all those people of Christchurch who told us what had happened after the earthquake, to those from other centres, and to government officials for the frank manner in which they provided information.

The lessons learnt in Christchurch can be applied throughout New Zealand without large cost or disruption. The Review is hopeful that these lessons will not have been learnt in vain.

211 See section 9.2 Major Recommendation

212 Ministry of Civil Defence and Emergency Management

213 Department of Prime Minister and Cabinet

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REVIEW OF THE RESPONSE TO THE 22 FEBRUARY 2011 CHRISTCHURCH EARTHQUAKE

TERMS OF REFERENCE

Background

1. A magnitude 6.3 earthquake occurred at 1251hrs on 22 February 2011 in the vicinity of Christchurch at a depth of 10 kilometres. The earthquake caused widespread and significant damage to Christchurch. A total of 181 people lost their lives and there were numerous casualties. The earthquake caused damage to buildings and residential houses, extensive liquefaction, significant rock falls in areas of the Port Hills as well as considerable disruptions to road and rail networks, airports and port, electricity supplies and water and wastewater systems.
2. Christchurch City declared a state of local emergency on 22 February 2011 and an Emergency Operations Centre was activated in the City's Art Gallery to manage the response. The Group Emergency Coordination Centre (ECC) was established at the University of Canterbury's Ilam campus. The National Crisis Management Centre (NCMC) was activated in the basement of the Executive Wing of Parliament.
3. Given the severity of the consequences of the earthquake, the Government declared a state of national emergency for Christchurch City at 1030 hrs on 23 February 2011. The state of national emergency remained in force until 30 April 2011 and the establishment of the Canterbury Earthquake Recovery Authority.
4. A process of organisational de-briefings and workshops within agencies and with those who participated in the response at local, regional and national levels has commenced to catalogue strengths and weaknesses and issues in the response that could inform enhancements. There is a need for a formal independent review to report on the management of the response during the period of the declaration of the state of national emergency to inform the continuing development of New Zealand's Civil Defence Emergency Management (CDEM) arrangements. The review will invite submissions from interested parties and those involved in the response.

Objective

5. The objective is to undertake an independent review of the response to the 22 February 2011 Christchurch earthquake from an emergency management perspective, to identify the practices that should be reinforced, and identify the processes and policies that warrant improvements.
6. This is not a whole of government review, but focuses on the Civil Defence Emergency Management response and how well the National Civil Defence Emergency Management plan worked. The outcomes of the review will be used to identify any changes that need to be made to Civil Defence Emergency Management arrangements.
7. The review is to address the period from the time of the initial earthquake on 22 February 2011 through to 30 April 2011 when the state of national emergency was terminated and the responsibility for recovery activities was transferred to the Canterbury Earthquake Recovery Authority.

8. The review will consider the management of the overall response across the range of agencies and organisations that were involved. It will focus on Civil Defence Emergency Management aspects of the response, coordinated by local level Civil Defence Emergency Management, the Christchurch Response Centre, and the National Crisis Management Centre. Other agencies and organisations will be part of the review only to the extent that their activities contributed to the Civil Defence Emergency Management led response.

9. The review is not to duplicate or interfere with the Royal Commission established to investigate the collapse and loss of life in the Pyne Gould Corporation (PGC) building and the Canterbury Television (CTV) building, or with any other official reviews in relation to the 22 February 2011 Christchurch earthquake. The review is also not to address recovery issues, including the establishment and activities of the Canterbury Earthquake Recovery Commission. Although not part of the response, the review team will consult with the Canterbury Earthquake Recovery Authority, particularly with respect to item 10(m) below.

Terms of Reference

10. The review will deal with the following:

- a. The mobilisation and management of the initial response in Christchurch during the period from the onset of the earthquake until the establishment of the CRC.
- b. The declaration of the state of national emergency.
- c. Roles and responsibilities in the response under a state of national emergency.
- d. The co-ordination of response activities in Christchurch, via the Canterbury Response Centre or otherwise, of:
 - The emergency services, including Urban Search and Rescue;
 - Welfare agencies and services;
 - Medical and health services;
 - Lifeline utilities and restoration of services;
 - The New Zealand Defence Force; and,
 - Managing spontaneous volunteers.
- e. The co-ordination of national support by the NCMC in Wellington.
- f. Management of the international dimension and offers of support.
- g. Management of logistics, in terms of procurement and distribution as well as co-ordination between the Christchurch Response Centre and the National Crisis Management Centre.
- h. Management of building safety evaluations. This will include the effectiveness of the colour based building classification system, public understanding of these classifications, the collection of assessment data and how this data was used for the purpose of needs assessment and welfare support. It will not include how this data related to the recovery process, nor any aspects related to land zone classifications or re-building in any areas.

- i. Management of building demolitions and cordoned areas. This will include the process for the deconstruction and demolition of buildings, the establishment and management of cordons, including public safety issues. It will not include the longer term planning for the recovery of the red zone.
- j. Information management.
- k. Management of information to the public and businesses during the response.
- l. Co-ordination of public messages between the National Controller, NCMC, departments and their Ministers.
- m. The restoration of commercial activity as part of the response, including managing the impact from closure of the Red Zone and damaged buildings, and managing support and reestablishment to affected businesses.
- n. CDEM arrangements at the community level including preparedness and business continuity.
- o. Provision and co-ordination of science advice.

Review Team Membership

- 11. The review is to be conducted under a Ministry of Civil Defence and Emergency Management (MCDEM) contract. Secretarial support and accommodation for the review team will be arranged by MCDEM. The cost of conducting the review will be met by MCDEM.
- 12. The final report is to be provided to the Director MCDEM no later than 30 June 2012.

Appendix 2

Review team

Ian McLean

Ian McLean has broad experience in NZ and abroad. After an earlier career in the public sector, most of his work for 25 years has related to natural disasters, in managing the consequences and in insuring against them. He assisted in managing the response to and recovery from the Edgecumbe earthquake, and has paid multiple visits to assess and report on the Northridge, Kobe and Izmit earthquakes.

He initiated and chaired the international conference *'Wellington after the Quake'*. He reviewed the National Recovery Plan as part of the formation of MCDEM. He led sessions at MCDEM courses, and reviewed the response to the H1N1 flu epidemic. He played a major part in the design of the Turkish and Romanian Catastrophe insurance schemes, and has been involved with those in Taiwan and California.

Ian McLean has been a leader in various spheres: in the public sector in a UN project in Tanzania, as Chair of the Public Expenditure Committee of the NZ Parliament, and as Chair of EQC. In the community he revived the LakesWater Quality Society which initiated restoration of the Rotorua lakes; and as Executive Chair reorganised and strengthened the Mahi Tahi Trust which works with Maori inmates in prison.

David Oughton

David Oughton had a distinguished 41 year career as a public servant ending in 1994 after a nine year stint as Secretary for Justice.

Because of his judgment and quiet but incisive approach, after his retirement as Secretary of Justice, he has been engaged by the Chief Executives of nearly a score of government departments and local authorities to conduct a wide range of investigations and reviews.

In 2004 he was appointed as Recovery Support Facilitator for the Lower North Island Floods Event to resolve problems in the recovery and to get the region working again. He then served as a member of the MCDEM review team for the Response for that event.

His experience both operational and at Head Office level, gave him a detailed understanding of machinery of government issues.

He is active in community affairs including being a trustee of the He Huarahi Tamariki Trust operating a school for teenage parents, and the Porirua Foundation.

He was born in Christchurch and grew up there.

Stuart Ellis

Stuart Ellis was an Army Officer for over 22 years serving with the Special Air Service (SAS) Regiment. He was the Australian Contingent Commander in Somalia in 1994 and the Commanding Officer at the Royal Military College, Duntroon in 1995-6.

Stuart changed careers to become the Chief Executive Officer/Chief Officer of the South Australian Country Fire Service in 1996. In 2002 he established Leading Emergency Services providing strategic advice to Emergency Services across all Australian States and New Zealand. He has participated in a range of inquiries including the Defence Force Black Hawk Inquiry in 1996, the ACT Bushfires in 2003, he chaired the Council of Australian Governments (COAG) National Inquiry on Bushfire Mitigation and Management.

Government's National Bushfire Review in 2004. He has completed numerous agency and incident reviews and in 2009 he was appointed to assist the Victorian Bushfire Royal Commission as their sole operational consultant. He conducts annual study tours of fire services for the Australian Fire and Emergency Services Authorities Council (AFAC).

Basil Wakelin

Basil Wakelin is a leader in the engineering profession, not only in NZ, but also internationally. He has held management positions in a large international engineering consultancy firm, and has run his own practice. In addition he has been a leader on accreditation and professional competence systems for engineers across the world.

For much of his career he was involved in industrial engineering with a substantial project management component. In this work he led or was part of multi-disciplinary teams of engineers. He has worked widely internationally with success.

For his work with the profession he has been acknowledged by his peers.

Basil Wakelin's active role in the community includes leadership in Prison Fellowship New Zealand, a Christian organisation providing services in prison and in prisoner reintegration; and being acting National Director for a time.

Claire B Rubin

Claire B. Rubin is a social scientist and a leading US authority in the field of emergency management. She has 34 years of experience as a researcher, practitioner, and academic in the field of emergency management, and more than 10 years of experience in homeland security. She is the President of Claire B. Rubin & Associates, LLC (www.clairerubin.com), specializing in disaster research and consulting, and located in Arlington, VA. Ms Rubin has worked extensively with FEMA and has reported on or reviewed emergency management in many US disasters.

She is a Visiting Research Scholar at the George Washington University's Institute for Crisis, Disaster, and Risk Management, in Washington, D.C. She is a co-founder and the former Managing Editor of the **Journal of Homeland Security and Emergency Management (JHSEM)**. She is the editor of the textbook titled *Emergency Management: The American Experience, 1900-2010. Second edition, published by Taylor and Francis, 2012.*

Ms Rubin has written more than 85 publications on hazards and disasters and has delivered numerous lectures and presentations on emergency management and homeland security topics.

Some of her local volunteer activities include Community Emergency Response Team and Citizen Corps programs in Arlington County, VA. In October, 2009 she was appointed to the Emergency Preparedness Advisory Commission by the Arlington County Board.

She presented a paper at the conference 'Wellington after the Quake' in 1995 and had informal contact with people involved in emergency management in NZ since that time.

Key metrics and impact data

21 March 2012

The CDEM Response Review Team asked for, alongside a response timeline, a data summary as available in the form of:

- *An authoritative summary of the impact of the event and the key metrics of the impact and response to it.*

The key impact and response data and metrics relating to the period 22 February to 30 April are set out below. At the time of your request a definitive summary had not been prepared, and the data provided is drawn from a mix of sources being:

- SITREPS and Key Statistics compiled during that period.
- Different agencies' information aggregated later, though directly relating to what they were dealing with in that period, and not including ongoing impacts.

It is therefore authoritative in that it represents the Common Operating Picture (COP) that the national CDEM response was working to at the time.

The metrics provided are those that give a sense of scale and duration in the response timeframe. For example, utility services outages and school closures occurred early in the time period and were subsequently restored. By comparison, impacts to buildings mostly occurred immediately though a picture of their extent continued to grow to 30 April, and beyond.

Furthermore, details are continuing to evolve now in terms of both the form and scale of impacts of the event in that:

- Some impacts occurred but were unknown at the time e.g. co-morbidity and heightened psycho-social stresses among the population not immediately recorded as deaths and welfare needs
- Some secondary impacts are now occurring and escalating e.g. financial costs and economic losses.

These are matters to be identified, monitored and addressed as part of the recovery process.

Also, the review team may wish to consider that while its focus is for a period of approximately six weeks following the 22 February event, this was one, albeit the most significant, of a series of aftershocks following from an initial earthquake event on 4 September 2010. Some data concerning the initial earthquake and a significant aftershock prior to 22 February are provided below (source: Canterbury regional EMO, 09/09/2011). This may be relevant to the team's review in two opposite ways:

- Some impacts occurred on already impacted communities, buildings, services and infrastructure, and thereby adding to vulnerability in ways that may not have been fully understood and factored into response planning at the time
- In contrast, the prior events did, in a sense, provide a 'dry run' for the more significant event of 22 February that may have enabled some aspects of the response (and recovery efforts already underway) to manage this subsequent event more effectively.

4 September 2010 Magnitude 7.1 Darfield – 40 km South West of Christchurch

Significant liquefaction and ground movement

- Christchurch, Waimakariri and Selwyn districts
- Significant surface rupture (Selwyn district) on unknown fault

Damage to 10s of thousands of homes:

- Christchurch eastern suburbs
- Kaiapoi area of Waimakariri district

Unreinforced masonry buildings and some newer reinforced concrete structures

Total recorded injuries = 90 2 seriously Direct fatalities = 1

Level 4 Response – Regionally coordinated, locally managed

Significant community-based response and recovery, within:

- Neighbourhoods – particularly in Eastern suburbs of Christchurch
- Social groups – Student Army (social media), Farmy Army

Largest multi-agency emergency response mounted in New Zealand

- USAR, response coordination, security, emergency welfare, building assessment, infrastructure
- Christchurch City Council EOC (within Civic Building) damaged

26 December 2011 Numerous aftershocks - Largest Magnitude 4.9 under Christchurch city

At least 20 buildings damaged in central city and suburban centres

Level 2 – Locally managed

Key data and metrics for period 22 February to 30 April during the State of National Emergency in response to the Christchurch Earthquake

Deaths and Injuries:

The official earthquake toll is 185 victims (at 09/02/2012).

- 115 people died in the Canterbury Television (CTV) building
- 18 people died in the Pyne Gould Corporation (PGC) building
- 8 people died on buses in the central city
- 28 people died in other areas of the central city
- 12 people died in suburban locations
- 4 additional people whose deaths were identified by the Chief Coroner as being directly associated with the earthquake

Source NZ Police website 15/03/2012

A peak number of approximately 600 local and international USAR personnel were deployed. USAR and Emergency services, with assistance from the public, rescued 70 trapped people in the first 24 hours.

Many people with minor injuries thought to be in the thousands were treated in the field and at local medical centres, as well as local hospitals. Severe injuries tested local hospital resources that suffered some, though no critical damage, to the extreme. Some severely injured, as well as some existing patients at hospitals, were shifted by air and road ambulance to hospitals in other cities. Similarly aged persons from damaged care homes were also evacuated.

Too date ACC has received 7171 claims as a result of the 22 February event of which:

- 3,129 (46%) were immediate and unavoidable (e.g. due object falling)
- 574 (18%) due subsequent injury in the event (e.g. tripping over debris)
- 1,881 (25.6) as secondary consequence of the event (e.g. during clean-up).

Welfare centres and services:

Metrics tracked by Welfare Desk in by NCMC during response period:

<i>Metric:</i>	<i>Value:</i>	<i>Time/date</i>
Calls to the government helpline	109,772	1900 hours (13/3)
MSD civil defence payments	\$11,611,866	2000 hours (13/3)
Number of Civil Defence payments	69,422	2000 hours (13/3)
Total employer support subsidy applications	8,220	1600 hours (13/3)
Total number of employees supported by applications	52,014	1600 hours (13/3)
<i>(sole traders and contractors included in this figure)</i>		
Cumulative amount paid for earthquake support subsidy	\$71,470,160	1400 hours (13/3)
Total of affected people registered with the Red Cross	39,134	1200 hours (10/3)

Population movements:

Total migration (from NZ Post data) indicates that approximately 8,632 households and 24,892 people (including 2,268 children) from within the Canterbury region re-located their place of residence (if only temporarily) during the 6 weeks from 23rd February.

Source: *Preliminary report on Household Relocation from and within the Canterbury Region 22 February 2011 – 6 April 2011* Opus International Consultants

Building and property damage:

A total of 447, 943 residential properties in Canterbury have been assessed by EQC for damage as a result of the earthquake series, consisting of:

- 81,775 full inspections before 22 February 2011
- 182,838 rapid assessments post 22 February 2011
- 196,468 full assessments post 22 February
- A total of 461,081 inspections

Source EQC website 15/03/2012

In the days following the 22 February event the Christchurch City Council organised up to 220 building teams to visit houses in the suburban areas to do a preliminary assessment of property damage, and provide information to households.

As of 23 June 2011:

- 5,000 residential properties were in the red zone, where it is not feasible to rebuild on the land at the present time
- 10,000 properties were in the orange zone, where engineers need to undertake further investigations
- 100,000 properties were in the green zone, where homes can be repaired and rebuilt, and
- a further white zone had a combination of areas that were still being mapped or are non-residential.

Approximately 26000 houses are now vacant with 2% considered unsafe *[for reoccupation. The remainder are in areas where soil instability has made it imprudent to repair and re-establish services.]*

Impacts on Education services:

Initially all schools were closed for safety inspections. By 14 March 104 of 164 schools had re-opened, and 168 of 339 early childhood education centres reopened in Christchurch.

According to Ministry of Education data, Canterbury students had an average 10.5 days of disruption after the 22 February earthquake.

There were 12,069 students from Canterbury region who re-enrolled in other schools around the country, this being 15.9 percent of total enrolments for the region from prior year. Re-enrolments were greatest in the week following the earthquake (3,567 students) and peaked at 7,581 on 17 March.

As at 13 September 2011 5,442 students were still away from their original school (7.1 percent of the students enrolled in these areas in July 2010) with 2,196 (40.4 percent) re-enrolling elsewhere in Christchurch and neighbouring districts and 3,246 (59.6 percent) are re-enrolled outside of these areas.

Source: Statistics New Zealand

Lifeline utilities:

- ***Electricity***

The Transpower national grid services survived largely intact with some initial close-downs for safety and inspection needs only. There was extensive damage to the local network with around 75% outage in Christchurch initially, though restored to over 50% in first 24 hours. It took 10 days to restore to 90% supply with remaining 10% primarily being the CBD red zone. A total of 629 million customer minutes lost during the event. This was 7 times larger than 4th September 2010 earthquake.

- ***LPG***

LPG reticulation suffered little damage. Supply was shut down as a precaution, and then re-livened taking into account customer priorities (full re-livening took 10 days excluding CBD).

- ***Roads***

Most highways were open quickly, except for Lyttelton Tunnel, and parts of State Highway 74 and Anzac Avenue Bridge for which a detour was set-up. Major damage occurred to local roads within the city due to liquefaction and surface flooding. This caused major traffic congestion issues, not only for the public but also those involved in managing aspects of response and restoration of services. Of the city's roads 895 km (46%) needed repairing.

- ***Water supply/waste water***

Mains water supply is impacted to over 40% of Christchurch residents, and only approximately 50% of households could still use their toilets in the initial period following the event, although this waste is mainly discharged into watercourses due to pumping stations being out of action and the Bromley treatment works being severely damaged.

Over forty water tankers were deployed in key locations around the city, and a desalination unit was set – up at Brighton Beach. Approximately 2,800 portaloos and 500 disposal tanks were placed in streets, and over 31,000 chemical toilets distributed to households.

Over 45,000 network repair jobs were logged by the City Council as a consequence of the event. Of the networks, 124 km of water mains and 300 km of sewer mains are needing to be replaced and 8 of 97 pumping stations to be rebuilt.

- ***Fuel Supplies***

The event occurred when fuel stocks were high. Following an initial need to inspect infrastructure and have power restored services resumed fairly quickly from the supply depot. Many retail outlets were able to open quickly also. With public demand high, while sufficient petroleum supply was available, a CDEM Critical Fuel Customer list was developed for priority access to ensure response efforts were not compromised..

- ***Telecoms***

Telecoms suffered some physical damage to assets, however in general were able to maintain a reasonable level of service. A key issue for telecoms was the loss of main power requiring sites to be powered by back-up diesel generators. Maintaining fuel to generators, and gaining access to and replacing some sites (due to unsafe buildings) became secondary issues.

- **Port**

Suffered extensive damage though important port operations resumed quickly.

- **Airport**

After initial closure for inspection, the airport was able to resume normal operations including international flights within 24 hours.

- **Rail**

Rail services north and south of the city opened quickly following inspections. All rail within the city and to Lyttelton port re-opened after approximately one week.

- **Waste management**

Daily waste load to Kate Valley more than doubled. Liquefaction silt disposal site required (collection managed by road network utilities). Storage site needed for material associated with fatalities and required for Royal Commission and other investigations. Food wastes rotting in 'Red Zone' exclusion area of the city centre resulted in additional issues. Ongoing volumes of demolition waste (from search and rescue & 'make safe' activities and beyond) is estimated to be 4 million tonnes. Infrastructure waste (e.g. silt from liquefaction) is estimated to be 4 million tonnes.

Appendix 4

Review contributors

The Review met or spoke with more than 200 people, some as individuals but the majority were associated with one or more of the organisations or community groups listed below.

ACTIS	Jane Bowron - Columnist
AECOM	Kestrel Group
Airways Corporation	Kiwi Rail
Aranui Resident Community Board	Lyttelton Port Company
Auckland City Council	Mark Proctor
BECA	MDS Law
Business NZ	Media Works
Canterbury District Health Board	Ministry of Civil Defence & Emergency Management
Canterbury Earthquakes Royal Commission	Ministry of Economic Development
Canterbury Employers' Chamber of Commerce	Ministry of Education
CCBA Business Association	Ministry of Foreign Affairs and Trade
CERA	Ministry of Health
Chief Coroner	Ministry of Social Development
Chorus	Mobil NZ Ltd
Christchurch Business Leaders Group	MPs and Ministers of the Crown
Christchurch City Council	Neighbourhood Support
Christchurch International Airport	Neo Leaf Global
Christchurch Migrant Inter-Agency Group	New Zealand Customs
Christchurch Worship Centre	New Zealand Defence Force
Communities Earthquake Recovery Network	New Zealand Police
Community and Welfare Volunteer Coordinators	New Zealand Privacy Commissioner
David Hopkins Consulting	New Zealand Red Cross
Department of Building and Housing	New Zealand Transport Agency
Department of Internal Affairs	NewstalkZB
Department of the Prime Minister and Cabinet	NZ Fire Service
Duncan Cotterill	NZ Response Teams
Education NZ	Orion
Emergency Management Training and Advisory Services	Parklands Baptist Community Centre
Environment Canterbury	Pegasus PHO
EQC	Positive Directions Trust
Farmy Army	Radio New Zealand News
GNS	Rangiora Earthquake Express
Grace Vineyard	Seaview Resilience Centre
Ian Connor Consulting Engineer	Selwyn District Council
Inland Revenue	St John Ambulance
IPENZ	Student Army
	Sumner Community group

Te Puni Kokiri
Te Runanga o Nga Maata Waka
Te Rūnanga o Ngāi Tahu
Telecom New Zealand
The Innovative Travel Company
The Press
The Salvation Army
The State Services Commission

Toll Logistics
TV3
University of Canterbury
USAR (NZFS)
Waimakariri District Council
USAR (NZFS)
Waimakariri District Council



KAIAPOI & PINES KAIRAKI UPDATE AS AT 10 AM MONDAY 6 SEPTEMBER 2010 ISSUED BY WDC CIVIL DEFENCE CONTROLLER

Council Priorities

- Public Health and Safety, restoring Water, then Sewer, Building Checks then Drainage and Roding

Water - Kaiapoi

- Up to 85% of Kaiapoi has water restored, but in some areas where water has gone back on we are finding further breaks that require the Council to shut off the water again to fix those breaks.
Areas where major issues still exist, and where our priority is directed, are:
 - Feldwick, Cass, Sewell and Charles Streets, Grey Crescent, Palmer Place and surrounding areas
 - Raven Quay, Fuller and Hilton Streets and CBD area
- Water has returned to the Courtney Drive area, but further leaks mean the supply is unreliable – these are being repaired.
- We have more than 15 gangs of contractors supported by Council staff working on the problem areas.
- Potable Water tanker is at North Kaiapoi School – bring your water containers – we have a limited amount of bottled water available
- Please conserve water and boil it prior to drinking

Water – Pines and Kairaki

- Pines Beach water has been restored, but further breaks make the supply unreliable – we hope to have increased reliability by Monday afternoon
- Working towards Kairaki Beach – we hope to have water on maybe Monday afternoon or Tuesday. Significant camp ground damage means, initially, we may connect to just one point for water to be collected from.
- Potable water is available at the Pines Beach Hall.
- Please conserve water and boil it prior to drinking

Sewer – Kaiapoi

- About 50% of sewerage operating - North Kaiapoi feeding to Beach Rd pump station is operational.
- Charles Street pump station has major damage and sewage is being spilled to Kaiapoi River
- Raven Quay pump station damaged but is being manually pumped by sucker trucks.
- Treat all surface water including Kaiapoi River, streams and water ponding on streets and properties as contaminated. All silt and sand should also be considered contaminated.
- Ok to flush toilets and have a short shower but make limited use please

Sewer – Pines and Kairaki

- No sewer pump stations are working and will take some time to return
- Temporary pumps and Sucker Trucks will pump from sewer mains where possible
- Treat all surface water including Kaiapoi River, streams and water ponding on streets and properties as contaminated. All silt and sand should also be considered contaminated.
- Ok to flush toilets and have a short shower but make limited use please

Building Safety

- Council has help from other Councils and consultants to assess building damage

- In the worse affected areas Council officers will move door-to-door checking whether houses are safe and sanitary - officers will say your home is either OK to live in: is unsafe and something needs fixing to make it safe before entry/occupation is allowed (eg chimney must be removed); or the building is unsafe and should not be entered/inhabited
- Owners need to check with their insurance company and lodge a claim with the Earthquake Commission –they have their own assessors. You can call the Earthquake Commission on 0800 326243 or 0800 652333 and have your insurance company policy number to discuss making a claim. You can also get information on the web side get thru website - www.getthru.govt.nz
- If you have no power, water and sewer connections on your property you may want to think of staying with friends or family.
- If you have to leave your house please turn off power, gas and water.

Kaiapoi Central Business District Area

- Cordoned off
- With a building expert advice, we will start allowing business owners back into the area to assess the damage and how they will recover – access to others/public will be prohibited.
- Countdown is operating, otherwise please stay away from CBD

Drains

- There are blockages in Courtney Stream – water levels in these areas are rising. The Council is working on clearing these drains and allowing limited water to pass.
- Many other open drains and road-side drainage sumps are blocked and will need to be cleared progressively, when resources allow.

Roading

- Williams Street between Charles and Ohoka Road is closed and will be until at least Tuesday
- Major
- Other roads are open – please limit travel in Kaiapoi and Pines Kairaki to that which is essential. All others should staff away.

Welfare

- If you need welfare support in the first instance please go to North Kaiapoi School in Williams Street.

Updated Information is on Council's website –www.waimakariri.govt.nz

Or

Call Waimakariri District Council on 03 311-8900

Your guide

to recovery from the earthquake



Christchurch

EARTHQUAKE RESPONSE

Contents

3-4 Services Update



This section contains information about the status of services such as water, public transportation and rubbish collection.

5 Your Health



This section is about how you can take care of you and your family's health.

6 Your Property



This section is about your property, how you can make insurance claims, what to expect and where to go for more information.

7 - 8 Support Services



This section is about what support services are available to you and your family such as counselling, financial support and finding accommodation.

9 Your Safety



This section is about what actions you can take to protect your family, home and property.

10 Schools



This section is about schools in your area and what you need to know about sending your child to schools in Christchurch.

11 Understanding the Earthquake



This section is about what you need to know about the recent earthquakes in Canterbury, as well as other hazards such as landslides, rockfalls and floods.

12 Earthquake Resource Guide



This section includes a list of phone numbers and websites you can go to for more information.

The information contained in this publication was correct at the time of distribution (26 March). Given the nature of the situation, it is recommended that you check for updated information through the various phone numbers and websites listed.



Message from the Mayor

Tuesday 22 February will be forever etched in the minds of Christchurch people, and the rest of the country, as the day our city changed forever.

In the weeks that have followed, a remarkable community spirit has been evident and we can all be very proud of the way we looked after each other during this time.

A huge number of agencies were involved in the emergency and recovery response and this publication is a collaboration by many of them to provide an up-to-date guide on the recovery process after the earthquake.

In this tabloid, you'll find an update on essential services such as rubbish collection and toilet facilities; education services; information for ratepayers and where to go if you need financial assistance or other welfare information. There is also important advice on looking after your property and your family's health and wellbeing. On the back page, you'll find a list of key contact details and websites for a raft of organisations who can assist in a variety of ways.

Now, more than ever, it is important you continue to look after yourself and your loved ones. If you can, help your neighbours and others in your community. Keep informed by listening to radio and television updates or by visiting www.canterburyearthquake.org.nz. Encourage others to do the same. Most importantly, please ask for help if you need it.

We have a long road ahead of us but by supporting each other and making sure we all get the help we need, we can look forward to a better future.

Bob Parker
Mayor of Christchurch



New Zealand Government



Christchurch Earthquake Response

Timeline 22 February 2011 - 6 March 2011

22 February 2011

- 1251: Mw 6.3 earthquake in Christchurch
- 1255: Telephone reports of earthquake & significant damage
- 1300: MCDEM consults with GNS Science - confirmation of significance
 - Christchurch CC activates at Art Gallery
 - Other TA's activated: Hurunui, Waimakariri, Selwyn. Ashburton monitoring
- 1305: Minister of Civil Defence and DPMC informed
- 1315: NCMC activates at Mode 3 (Assist), support agencies requested to send representatives
 - Arrange for Christchurch staff to get back from Wellington
 - First media interviews from NCMC
- 1400: NCMC fully activated
- 1445: Christchurch City Council declares a State of Local Emergency
- 1500: ODESC meets
 - Cabinet meets
- 1600: USAR reconnaissance in Christchurch
 - Government Helpline activated by MSD (24/7)
- 1630: Prime Minister arrives in Christchurch
- 1700: USAR Task Force 2 (Christchurch) deploys
 - NWCG convenes
- 1730: Police Commissioner arrives in Christchurch
- 1800: Welfare centres established at Hagley Park and Burnside High School
 - MFAT International Emergency Line activates
 - RNZAF transports US/NZ MFAT Delegation from Christchurch to Wellington
- 1815: ODESC meets
- 1900: Cabinet meets
- 2000: 2x RNZAF Iroquois helicopters arrive in Christchurch
- Night:
 - Cordon around 4 avenues - Police imposing tight access restrictions.
 - NZFS deploys 200 additional personnel, incident management team mobilised.
 - NZ Police deploys 60 additional personnel.
 - USAR Task Force 1 (Palmerston North) and 3 (Auckland) deploys.
 - USAR in Australia, USA, Singapore, UK, Taiwan & Japan mobilised.
 - NZ Response Teams mobilised to support USAR.
 - Triage centres established at Latimer Square, central city, Spotlight Plaza & Sanitarium (Papanui).
 - Missing Person enquiry line established by Red Cross.
 - Air Bridge established by NZDF between Christchurch & Auckland, stopping at Wellington & Ohakea to start operating 23/3.
 - HMNZS CANTERBURY (located at Lyttelton Port) mobilised in support

23 February 2011

- 0700: Schools in Christchurch, Selwyn, Waimakariri closed until further notice
- 0800: ODESC meets
 - Christchurch Airport (Domestic) re-opens
- 0830: Work & Income sites established to focus on emergency assistance only: Ashburton, Hornby, Rangiora
- 0930: Cabinet meets
- 1030: Minister of Civil Defence declares a State of National Emergency
- 1045: NCMC steps up to Mode 4 (Manage)
- AM: 3 x RNZAF Kingair on VIP and civil specialist tpt duties
 - Army assistance to Police cordon enforcement
 - Singaporean Armed Forces (SAF) contingent operating alongside NZ Army and NZ Police
 - NZ Army Medical Support teams operating ambulance stations Latimer Square
- 1200: ODESC meets, establish of All of Government media capacity
 - Christchurch Airport (International) re-opens
 - Air NZ joins RNZAF air bridge
- 1400: All of Government media coordination established – to operate from Christchurch
 - DVI operational
- 1700: National Controller and Team arrive in Christchurch
 - Welfare centres established at Burnside, Rangiora, Pioneer stadium, Cowel's Stadium.
 - Centres at Lincoln & Rolleston on standby
- 2000: National Controller meets with CDEM Group Controller in Christchurch to establish response structure
- Night: RNZN Littoral Warfare Support Team (LWSG) arrive CHCH
 - HMNZ Ships OTAGO and PUKAKI anchored in Lyttelton harbour
 - HMNZS CANTERBURY provides 700 meals for Lyttelton CD

24 February 2011

- 0700: National Controller meets with Christchurch Mayor Bob Parker and CE Tony Marrayatt to communicate the response structure and agree formation of a joint Christchurch Response Centre (CRC) in the Art Gallery
- 0700: Now a total of 738 NZ Army, 150 RNZAF, 116 SAF, and 226 RNZN personnel deployed in CHCH
- 0800: ODESC meets
- 0830: Additional Work & Income sites open at Kaiapoi and Riccarton
- 1000: Special financial delegations arranged by CE of DIA for National and NCMC Controllers
 - Army Engineering support arrive in CHCH with 2 water production units.
 - Tent City at Burnham Camp increasing from 350 beds to 500 beds.
- 1400: Joint CRC established
- 1500: Operations 'Suburb', 'Shop', 'CBD' & 'Sweep' commence
 - CBD Cordon expanded
 - Australian field hospital arrives
- 1800: ODESC Meets
 - 2 x RSAF C-130's with 22 x DART Equipment

25 February 2011

US USAR arrives. USAR now comprises 150 NZ and 500 internationals, conducting grid search. USAR operations continue at main sites CTV, PGC, Cathedral.
Canterbury DHB plan to move elderly out of city
Ministry of Education completes visual inspection of schools in Waimakariri and Selwyn
Temporary morgue established at Christchurch Central Police Station
Cowles Stadium welfare centre close. Pioneer stadium, Burnside and Rangiora remain open.
Police now 3366 personnel deployed
NZFS now 1812 personnel deployed
Ambulance now 949 personnel deployed
ODESC meets

26 February 2011

Key stats: 50% of city without water (62,000 homes), 100,000 homes without sewerage, 329 people in welfare centres.
NZDF catering support now providing over 6000 hot meals per day, HMNZS CANTERBURY continues to provide over 500 hot meals per day to Lyttelton.
Completed evaluations of 964 buildings in CBD 59% green, 17% yellow, 24% red.
National Controller's priorities: USAR, eastern suburbs, restore water and power, planning including options for housing
Health plan for relocated pharmacies; primary care satisfactory, elective surgery cancelled.
USAR: plan to shore Hotel Grand Chancellor.
Australian police support arrives to assist with assurance patrols in suburbs.

27 February 2011

Restricted Air Space established over Christchurch
Four welfare centres open but low uptake
Ministry of Education completes visual inspection of Christchurch schools
ODESC meets

28 February 2011

USAR moves from rescue focus to search and recovery of deceased
Cabinet meets

01 March 2011

Total of 1792 NZDF personnel now deployed
National Controller sets delegations for CRC
Debris Waste Management Plan commence
Minister extends State of National Emergency
ODESC meets

02 March 2011

03 March 2011

Total of 1697 NZDF personnel now deployed

NZDF uplifts Orion transformer in Townsville.
ODESC meets
Taiwan USAR team stood down

06 March 2011

Community briefings commence
USAR Australian team rotated, US and Singapore teams downsized, China and Japanese team remain.

07 March 2011

NZDF completes phase 1 of reduction of forces from CBD cordon
Australian desalination plant arrives
Cabinet meets
Minister extends State of National Emergency
Employers' assistance package introduced by government
ODESC meets
UK USAR team departs

08 March 2011

Education status: of 167 state schools, 7 open, 27 unable to open, 59 green and to open in 7 days, 79 still need checks and arrangements to be put in place. 30% of early childhood centres reported open.

09 March 2011

US USAR team departs

14 March 2011

National Controller orders moratorium on demolition to revisit approvals process

17 March 2011

Only NZ USAR teams remains

30 March 2011

ODESC meets. National Controller's priorities briefed: Community well being, infrastructure restoration, business recovery, planning for transition to recovery.

D. SUMMARY & RECOMMENDATIONS

Lessons learned from the Christchurch Earthquake in relation to supporting culturally and linguistically diverse residents

Key learnings:

1. Loss of Buildings and Equipment

- In a major disaster social agencies almost certainly will not be able to find individual replacement offices. Be prepared to share and be prepared to locate a back-up venue, in the event that the first location becomes unavailable after a period of time.⁴
- A 'cloud based' computer system regional website hub, with all (relevant) agencies linked in is the ideal electronic support system. Data bases and communication systems are thus completely transportable no matter how much conventional infrastructure is damaged. For individual agencies and community organisations a strict system of backup and off-site storage of computer data is a self evident need.
- The plight of many ethnic businesses has shown the need for a national education programme about insurance for NESB citizens and migrant organisations. The insurance industry has a major challenge here but it seems to be very much in the interests of both the industry and also the migrant communities, individuals and organisations.

Recommendations:

Include and emphasise the need for 'cloud based' / shared (hub) information systems in any Future Disaster Planning strategy to ensure access to vital information

Work with the Insurance industry to provide targeted information about this issue to migrant communities, businesses and others

2. Strong Leadership

- Leadership choice is crucial and will ultimately affect the outcomes for refugee and migrant families and communities
- Strong leadership in Christchurch was a direct result of prior interagency collaboration and working relationships; and capacity building with migrant communities themselves.

⁴ Whilst the 'caregivers' of the city's migrants were hosted at a very suitable city marae and given priority by Te Runanga O Ngai Tahu the intricacies of the politics of government bureaucracies, and marae management, saw the Migrant Inter-Agency group eventually displaced from their residence there by Te Puni Kokiri.

- A regional ethnic leaders' forum/council/assembly was critical in Christchurch to inform, and support local CALD communities. Ethnic Leaders groups should be encouraged to form in other centres, with an initial focus on planning for disaster relief situations. Empowering the individuals in such groups needs to be a national and local government led initiative. The Christchurch group is worthy of further training and is potentially a very valuable national resource.

Recommendations:

Develop strategies to:

- **share the Christchurch learnings with migrant organisations in other centres – in particular the benefits of effective collaborative working relationships, investment in capability building with migrant leaders and associations and the need for strong, clear leadership;**
- **enable and encourage ethnic leaders groups to form in other centres (with support and guidance) and modeled on the Christchurch Ethnic Leaders Group.**

Develop a further paper for discussion which considers the more general issue of migrant community leadership through an inter-agency group (such as the Christchurch group) including management of the process from the initial set-up stages and going forward on a sustainable basis.

3. Effective Communication

- Very few New Zealand government (national and local, health authorities, etc) service agencies are equipped to communicate with CALD residents. They will need the help of experienced migrant agency staff to: (a) set up systems, and; (b) distribute the information. Many will also need to be convinced, sadly, that this is an issue worthy of immediate attention. The nearly 40,000 NESB Christchurch residents deserved better. Very few staff employed in these agencies as media or communication managers are conscious of: (a) the need to consider the reading age of their releases, or; (b) the sentence structures which are most suitable for translators to work with.
- The inadequacy of the "It's on our website" message in times of power outages needs to be highlighted and addressed. A range of message distribution channels are required in times of crisis.
- Civil Defence plans need to be modified to prioritise the need to maintain local Access Radio following disasters. Their experienced communicators are a precious asset.

Recommendations:

The overarching responsibility for overseeing effective official communications at times of crisis needs to be identified nationally and given sufficient 'teeth' to impact when needed. Sufficient consideration of the needs of CALD communities needs to be a key part of this.

Develop national guidelines for use by key government and disaster relief agencies around communicating with CALD communities to ensure that vital public information messages reach them in times of disaster (note CLING has developed some guidelines for Christchurch which could have broader use).

This should include work with Civil Defence and others to emphasise the importance of maintaining the functioning of local Access radio – a key means of communicating with NESB residents.

4. Engagement with Disaster Relief Agencies

- It is clear that Civil Defence and others were not fully cognisant of the diverse language and cultural needs of many of Christchurch's residents, and the barriers that they faced accessing the support that they needed. This is a policy area that migrant agencies have a responsibility to influence.

Recommendations:

- **Migrant agencies need to work closely with Civil Defence and others at the national level to advocate for change in priorities and policy affecting refugee and migrant groups at times of crisis, and also more generally.**

5. Learning from the Experience and Future Planning

- As soon as immediate danger has passed in a disaster a "Lessons Learned" group should be operating; collecting data. The feelings of frustration that result from experiencing barriers to efficiency are very demoralising for 'workers' at the forefront of recovery efforts.
- The Christchurch experience provides invaluable learning opportunities for migrant organisations and associations in every region in New Zealand. Each region should develop a Disaster Response Plan as soon as possible using this document as a starting point. It needs to cover leadership, emergency administration systems, communication needs, multi-lingual needs, and strategic plans for dealing with the 'official' disaster response bodies. It must reflect the needs for experienced agency staff to influence and/or manage culturally appropriate responses to crises. The Christchurch Migrant Inter-Agency Group has begun preparing their contingency plan for future disaster responses.

- A component of the migrant Disaster/Crisis Plan needs to be the pre-training of a pool of disaster management centre volunteers for reception and communication management.

Recommendations:

Develop strategies to share the learnings from this report with other regions of New Zealand and to provide a model Disaster Relief Plan for broader use throughout the country.

6. Efficient funding, resource allocation and collaboration

- A nationwide initiative is needed to get major relief organisations to change their focus from enacting their "hand out" practices. New Zealand is fortunate to have many highly effective, credible NGOs that can be trusted to efficiently manage relief support. Almost all relevant Christchurch NGO staff turned up to work with the Inter-Agency group in the first few days even although the majority had huge problems in their own homes, and lives, as a result of the 22 February earthquake. That is professionalism.
- The use of volunteers may be part of the philosophy of the major organisations but the resulting, costly, inefficiencies (as with the moon man evacuations) show that it is time for these major institutions to build partnerships rather than create duplications. The major institutions come for weeks or perhaps months. The 'resident' professionals are there for the full rebuild of the social infrastructures. They also have the institutional knowledge on which sound judgments about "real need" can be made. Faith in their abilities in New Zealand is historically well justified.

Recommendations:

Urgent work is required at the national level to discuss and address the concerns outlined in this report with respect to the most efficient funding distribution model (for disaster relief funds), particularly at times of severe crisis, such as the February earthquake; including the judicious use of volunteers.

7. Essential Support

- While the ethnic liaison officers within the N.Z. Police were universally seen as the 'unsung heroes' the demands on them were unreasonable. New Zealand needs more such officers. No other group was more valuable to the Migrant Inter-Agency Group, than this team, in the immediate post quake period. Migrant agencies need to actively assist the Police with ongoing recruitment in this area.

Recommendations:

Ensure that the vital work carried out by the NZ Police Ethnic Liaison Officers is given the acknowledgement and recognition that it is due.

Strengthen links between the NZ Police and ethnic leaders groups, migrant organisations and others to support the work of the Ethnic Liaison Officers.

This paper was compiled from submissions to the Lessons Learned sub-group, from the 'Lessons Learned' meetings minutes and notes, and feedback from various Inter-Agency Group members. It was edited by the Chairperson of that sub-group, the Christchurch Migrant Centre Manager, Rex Gibson. George Clark (Settling In) accepted responsibility for bringing the different strands of the document together and final oversight of the completed report.

This report is a collection of submissions, many anecdotal, and does not purport to be an academic research exercise. Such a study is beyond the scope of an organization such as the Inter Agency network. This report is thus the experiences of the submitters as they saw it.

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