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Wellington Metropolitan Emergency Water Supply Planning Group

1. Introduction

A project was established in February 2002 to improve existing response and recovery strategies for the delivery of water to end users following a major earthquake. The planning group involves the water supply managers and emergency managers from each of the councils of the Wellington metropolitan area (Hutt, Porirua, Upper Hutt and Wellington) and Greater Wellington Regional Council along with representation from public health agencies, the New Zealand Fire Service and the Institute of Geological and Nuclear Sciences.

The Emergency Water Supply Planning Group is co-ordinated by Greater Wellington Water and funded from the water supply levy. This group operates on the collaborative interagency Lifelines Group model and is considered to be a good example of sector-based projects to be encouraged by the Wellington Civil Defence Emergency Management (CDEM) Group. The water supply agencies, as Lifeline Utilities, are actively participating in CDEM planning as required under section 60 of the Civil Defence Emergency Management Act 2002. The involvement of the respective emergency managers and emergency services' representatives ensures a direct linkage with community response and recovery planning.

2. Background

During the 1990s, considerable "toughening" of the Wellington metropolitan area's wholesale and urban water supply infrastructure was undertaken. Impetus for this work came from firsthand observations made by Wellington Lifelines Group study teams following the 1994 Los Angeles and 1995 Kobe earthquakes.

On the urban water supply systems, seismic upgrading of key reservoirs and the associated installation of automatic shut-off valves was commenced, with the focus of this work being on holding stored water within the reservoirs in the likely event of breakages of water mains at lower levels. On the wholesale water system, enhancing the seismic resistance of critical water treatment and distribution assets was the main priority.

3. Improved Understanding of the Impacts

Over the past few years there has been continuing work to understand the implications of a major earthquake involving a rupture of the Wellington Fault. With a probability of occurrence of approximately 10 percent over the next 50 years, this event requires specific planning and preparation. The planning undertaken for Exercise Phoenix last year enhanced the understanding of both the direct physical impacts and the specific difficulties associated with the repair and restoration of utility services.

The bulk water mains operated by Greater Wellington Water cross the Wellington Fault in no fewer than five locations. One of the bulk mains also runs along the liquefaction-susceptible Petone foreshore. The extensive damage likely at these and other locations remains a key physical vulnerability of the system. As well as the potential damage, the logistical challenges in gaining access and suitable contract resources to carry out repairs after a major earthquake are considered to significantly extend the previously anticipated repair periods.

As Upper Hutt is close to one of the major water treatment facilities, at Te Marua, it is anticipated that bulk supplies could be restored to their local reservoirs within a week of a major fault movement. By contrast, it could be several weeks before basic repairs to the considerably longer bulk water mains leading through Porirua to Wellington City could be carried out.

While physical mitigation and response planning to reduce the repair time for the bulk water system continues, emphasis is also required to be placed on enhancing local emergency water supplies.

Local water supplies include both the emergency water held by key community facilities, households and businesses, and the water able to be retained in local reservoirs. Reasonable levels of emergency water can currently be expected to be retained in key reservoirs in Lower Hutt, Upper Hutt and Porirua Cities because of the progressive installation of automatic shut-off valves and associated seismic upgrading. A similar programme for this mitigation work is currently under way in Wellington City.

4. Greater On-site Storage of Water Required

The work of this planning group has highlighted that key community facilities and households need to store a greater quantity of water for emergency purposes. The Public Health Service and District Health Boards view this as an important health issue in terms of the potential impact on the wider community, as well as from the operational perspective of hospitals and medical centres.

Traditional Civil Defence messages have referred to the need to store 3 litres per person per day for 3 days at household level. This amount however only covers direct drinking water needs. Each person requires an additional 10 to 20 litres of water per day for personal hygiene requirements and food preparation. Understanding and communicating the implications of this requirement is fundamental to being able to meet the CDEM objective of maximising the continued habitation of people in their homes following a major earthquake.

Every household and residential facility should have an independent supply of stored water to last at least 3 days. Realistically it will take 2 to 3 days for each council to launch a full emergency water distribution operation utilising the water held in local reservoirs and available from local sources. This distribution operation may need to continue for several weeks for the cities and suburbs that are furthest away from the bulk water sources at Te Marua, Wainuiomata and the Hutt Aquifer at Waterloo. During this time, residents would have to travel to collect water from community supply points at various places around each city. Clearly, residents would be better

off if they held personal supplies for more than the minimum recommended time of 3 days.

It is currently estimated that only 15 percent to 20 percent of households across the Wellington Region have even the basic survival (drinking water) requirement of 3 litres per person per day in their homes.

Key medical facilities such as hospitals, local medical centres and rest homes need to make specific provision for levels of on-site water storage appropriate to their post-earthquake functions. Similarly, places of emergency assembly such as schools and community centres and emergency operations centres need to have significant volumes of water stored on-site in order for them to be able to function as intended.

5. Emergency Water Supply Planning Group Activity Programme

The Wellington Metropolitan Emergency Water Supply Planning Group has developed a programme of preparedness activities to be undertaken over the next 2 to 5 years in order to improve the level of emergency water supplies available to key sectors of the community following a major earthquake.

Specific subgroups have been established to address public communications issues and to work to enhance the emergency response plans of each authority.

The programme supports the mitigation measures being undertaken by the councils as part of their asset management programmes. The planning group notes the importance of maintaining expenditure on specific major earthquake mitigation and preparedness measures at appropriate levels.

This programme includes short-term priorities and medium-term strategies. The short-term priorities include ensuring key community facilities such as hospitals, local medical facilities and rest homes, schools and emergency operations centres have appropriate quantities of on-site stored water, and the establishment of new public education messages to emphasise "more stored water for longer" for households and workplaces. The corresponding medium-term strategy is to investigate the possibility of making household storage tanks a building code requirement.

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On behalf of the Wellington Metropolitan Emergency Water Supply Planning Group