



National Lifelines Forum – Key Points

The 2011 Forum, held in Christchurch on 1 and 2 November, focused on the impacts to lifeline utilities from the Canterbury earthquakes, and the recovery currently underway. The objective was to identify learnings for infrastructure resilience planning for New Zealand. Eighty-six registrations were accepted.

Thanks are due to the Earthquake Commission for financial support for the Forum. Thanks also to the Canterbury Lifeline Utilities Group, and in particular Joanne Golden and John Mackenzie, for assistance with Forum arrangements.

Main points are summarised in the following table. The second column lists ideas for Lifelines Groups and national utilities, and other relevant matters.

PRESENTATION	COMMENT
DAY ONE, 1 NOVEMBER 2011	
Welcome and Forum Opening John O'Donnell, Chair of the Canterbury Lifeline Utilities Group, welcomed participants	
Energy Sector	
<p>Transpower noted that ground accelerations were right up to maximum design levels – these anticipate moderate but recoverable damage in 2,500 year events. Some damage occurred but supply was restored quickly following the earthquakes (albeit at reduced security levels at Bromley, following the February earthquake). Delays of 4 to 5 hours arose from the need for physical inspection rather than breakage.</p> <p>Orion noted extensive damage in February, drawing attention to importance of supply route diversity especially given difficulty of mitigating cable damage in liquefaction zones. Also noted the value of seismic mitigation – relatively straight-forward strengthening of unreinforced masonry substations is a particular example. Examples given of quick access to additional spares, and learnings available relating to engagement of manpower from other parts of New Zealand.</p> <p>Contact Energy (LPG reticulation) suffered little damage. Supply was shut down as precaution, then relivened taking into account customer priorities (full relivening took 10 days excluding CBD). MDPE pipe and installations performed well – no leaks found on mains.</p>	<p>Benefits from mitigation over many years noted, learning from Edgecumbe earthquake in 1987. Transpower engaged in and using international standards. Resilience enhancements are ongoing.</p> <p>The value of “planning to plan” noted, i.e. promoting culture, facilities and other arrangements likely to help a range of responses rather than detailed planning. Also note very rapid construction of new line and substation to serve eastern suburbs, made possible by “can do” attitude and temporary easing of planning restrictions.</p> <p>Ringed network promotes security. Careful relieving process given safety concerns.</p>

Telecommunications Sector	
<p>Chorus noted that, while the main Christchurch exchange, Telecom House (CBD, Hereford St) was operating throughout (using generators and alternative water supply), access restrictions interrupted many of the functions normally undertaken there. Cooling was also a problem without mains water, but they were fortunate in having an artesian bore on site. Minor damage occurred at other sites. Fibre performed well, but damage occurred to other (access) cables. Extensive use of generators at cell sites etc. Battery tests underway (some excessive discharges noted).</p> <p>Kordia noted benefits of sector coordination via the Telecommunications Emergency Planning Forum (TEPF) – many examples of equipment / facilities / information support between 7 telcos. Kordia’s broadcasting assets performed well.</p> <p>Vodafone commented on experience and learnings. Further generator investment is underway.</p>	<p>Much of the damage was due to ground failure rather than shaking.</p> <p>Telecom is amongst the companies with pre-established arrangements with engineers to enable early post-earthquake building inspections.</p> <p>Good example of “interdependencies in practice” – needed electricity via generators, these required much fuel, in turn requiring local road access for refuelling and state highways for wholesale fuel supplies.</p> <p>The Telco Sector coordination model should be adapted / adopted in other sectors?</p> <p>Other telcos are also examining preparedness and making changes.</p>
Transport Sector	
<p>NZTA noted that the February earthquake caused far greater damage than September. Retrofitting of bridges, following earlier work in Thorndon (Wellington), saved much repair cost and delay – this work is ongoing. Lessons available on post-disaster traffic management.</p> <p>Lyttelton Port noted the nature of ground subsurface on which much of the wharves had been built. Quite extensive damage occurred but important port operations resumed quickly. Further good examples of retrofitting.</p>	<p>As in other sectors, contractors undertook much of the immediate and ongoing response – these arrangements proved effective in NZTA’s and other cases.</p> <p>Use of tunnel for dangerous goods (petrol) a good example of inter-sector emergency cooperation.</p> <p>Recovery plans need to allow for aftershocks.</p> <p>Main office building very recently vacated as a precaution.</p>
Water and Waste Sectors	
<p>Christchurch City noted the imperative that household water and wastewater supplies resume quickly. Extensive contamination of waterways from sewerage spills. 45,000 repair jobs logged since February. Material suppliers were a good source of advice and ideas.</p>	<p>Importance of access to records including maps noted.</p> <p>University of Canterbury noted distinction between different waste types and that sites needed for huge volumes. Participant support for inclusion of waste within lifelines noted.</p>
Lifeline Utility Co-ordination	
<p>Lisa Roberts and George JasonSmith, who were directly involved in LUC roles in the Christchurch Response Centre, compared the arrangements in the Centre with those envisaged in the Guide to the National Civil Defence Emergency Management Plan 2006. Things that worked well included the ability to draw on co-ordinators from elsewhere in NZ, and the level of support and goodwill shown by lifeline utilities</p>	<p>A need arises for an increase in size of the pool of trained persons able to fill LUC roles in emergencies.</p> <p>A brief review of the LUC arrangements in February and March is nearing completion (comments can be sent to Tony Fenwick at tony.fenwick@ihug.co.nz).</p>

generally. Matters for improvement included better integration of the role within the overall Centre response system and better desk procedures (e.g. end-of-shift handovers).	NELC will be having specific discussions with MCDEM over the development of a consistent national approach to the training and engagement of Lifeline Utility Coordinators.
Field Trip	
Participants visited a Telecom exchange (Shirley), Orion substations at Brighton, Pages Road and Keyes Road, Transpower's Bromley substation and the Wastewater Treatment Plant.	
DAY TWO, 2 NOVEMBER 2011	
Status Reports from Lifeline Groups and National Utilities¹	
Southland: Activities resuming. Using Bay of Plenty as a model for Southland vulnerability project. Also using ECAN's "GIS Viewer" as platform to hold utility and hazard data	
Canterbury: Has developed resource folder. Research and related activities underway. Projects on hold due to earthquake pressures. New Project Manager to be appointed.	
West Coast: Work on Alpine Fault rupture avoidance and landslide susceptibility completed. New Chairperson to be appointed.	
Marlborough: Working on hospital electricity issues with Marlborough Lines. Recovery exercise planned – will involve lifeline utilities.	
Wellington: Critical area management projects and assistance with NZTA pre-plans for SH 1 are advancing. Protocols for post-earthquake reconnection of electricity have been finalised. Power outage utility communications plan to be prepared.	
Manawatu-Wanganui: Business plan nearing completion. Report on Palmerston North infrastructure vulnerability in preparation. Relationship developed with Foodstuffs.	
Hawke's Bay: Reconnaissance planning and strategic work programme in preparation.	
Taranaki: Training material developed for LUCs (now have 5 coordinators). Reconnaissance plan developed. Attention being given to lifeline utilities' BCPs.	
Gisborne: Work underway on bridges to be strengthened.	
Bay of Plenty: Vulnerability study finalised. LUCs trained, and were active in relation to Rena incident. Fuel contingency plan nearing finalisation.	
Waikato: Vulnerability study progressing and tool available for use. Service stations not needing mains power identified. Documents saved on memory stick and always at hand.	
Auckland: Vulnerability study (AELP-2) underway. Fuel and electricity contingency plans done. Seminar on Christchurch earthquake to be held 23 Nov. Transport group to be set up to consider mass evacuation issues.	
Northland: Fuel contingency plan done. Work under way on lifeline resilience, focussing on tsunami (including evacuation issues).	
The NELC Chairman noted that LUC training is a common theme but more needs to be done in this area – national-level leadership is required. NELC wishes to keep abreast of lifeline group projects to ensure that high-value opportunities are identified and shared.	

¹ Further information is in separate document *List of Lifelines Group Projects and Activities*.

<p>Mobil noted cooperation from other lifeline utilities in enabling resumption of bulk fuel supplies from Woolston. Mobil is reviewing their earthquake experience with a view to applying lessons elsewhere. Improvements in risk assessments are ongoing.</p>	
<p>Solid Energy noted that their emergency plans had been tested twice in the last year (Pike River and earthquakes). Solid Energy has resources available to assist recovery in West Coast if required. Rail and Port are key lifelines for the company (and for the nation).</p>	
<p>TelstraClear noted that business continuity plans had been reviewed following September and that this review had been completed by February. Point of interest: Local residents commissioned to “look after” generators in their neighbourhoods (in return, cell phone recharging made available to residents).</p>	
<p>Active Management of Critical Areas</p>	
<p>Richard Mowll from the Wellington Lifelines Group, described recent work on identification and mitigation of risks at vulnerable sites (including active fault crossings) where infrastructure is concentrated. Ongoing problem-ownership is a key issue – while responsibility remains with the individual lifeline utilities, there are distinct merits in collaborative hazard management.</p>	<p>Meetings with lifeline utilities had identified new risks, and a learning is that (when developing response plans) assumptions about other infrastructure availability need to be tested.</p> <p>The likelihood of lengthy restoration delays following a major Wellington earthquake (i.e. potentially much longer than Christchurch) was noted.</p>
<p>National Infrastructure Plan and Resilience</p>	
<p>Richard Ward and Roger Fairclough from the Treasury noted that resilience is one of six “principles” in the 2011 National Infrastructure Plan. The Plan aims to improve use of existing infrastructure and allocation of new investment. A work programme is underway including development of resilience principles and indicators.</p>	<p>The draft resilience principles appear to line up well with the three themes NELC has suggested to guide Treasury work, i.e. the need for robust assets, collaboration and realistic user expectations.</p> <p>NELC is involved in the extensive industry engagement now underway. Further thoughts from Lifeline Groups and others are welcome.</p>
<p>MCDEM’s EMIS and Monitoring & Evaluation Programmes</p>	
<p>Jo Horrocks commented on</p> <ul style="list-style-type: none"> • progress with the new Emergency Management Information System (EMIS) – this has been slowed by earthquakes and other events but testing etc are now underway • the monitoring and evaluation programme – this aims to contribute to nationwide assessment of CDEM capability and capacity against CDEM Strategy goals. The initial focus has been on CDEM Groups – in general, planning and exercising appear to be well-managed and lifelines coordination is rated as satisfactory. Further work needed on business continuity. 	<p>EMIS aims to facilitate emergency responses by responders including lifeline utilities. Training and further work on lifeline utility interfaces are planned.</p> <p>MCDEM intends to extend the programme to cover the CDEM capability of lifeline utilities and government departments. The lifeline framework is available at: http://www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-CDEM-Monitoring-and-Evaluation-CDEM-Capability-Assessment-Tool?OpenDocument – the relevant tab is: G3-llu.</p>

GeoNet Update	
<p>Sara Page noted the range of contemporary natural hazard information available on GeoNet.</p> <p>Brad Scott drew attention to ongoing volcanic hazards, monitoring and alerting arrangements.</p>	<p>Further information, including subscription information, is available at http://www.geonet.org.nz/index.html.</p> <p>Ash is a main volcanic hazard. The Volcanic Impacts Study Group (VISG) is active in this area. Information resources have been prepared.</p>
Infrastructure Research under the Natural Hazards Research Programme	
<p>Roger Fairclough, working for NELC, outlined upcoming research funding possibilities and recent work to identify earthquake-related research needs.</p> <p>Sonia Giovinazzi described research activities with Christchurch lifeline utilities since the earthquakes, drawing on Natural Hazards Research Platform (NHRP) funding.</p>	<p>Increased NELC involvement in research is planned. Further thoughts from lifeline groups and others are welcome. Funding opportunities are expected to open soon.</p> <p>An objective of the NHRP work has been to tap into existing research knowledge for lifeline utilities' benefit.</p>
<p>Liam Wotherspoon described work getting underway on port resilience, recognising the importance of ports to the national economy.</p> <p>Rob Buxton described his research on interdependencies.</p>	<p>Cooperation from all ports is a noteworthy achievement. Focussing on a "virtual port" with representative characteristics may offer a generic methodology for approaching resilience-related work in this and other competitive sectors.</p> <p>The interdependency work is at a "proof of concept" stage.</p>
Assessing the Value of Lifelines Engineering Work in Canterbury	
<p>Tony Fenwick gave a progress report on a review of the value of seismic mitigation following <i>Risks and Realities</i>. Much asset-related and organisational preparedness work had been undertaken. Orion, for example, had invested \$6 million in seismic strengthening, estimated to have saved \$60 million to \$65 million in direct asset replacement and repairs. Large-scale overseas studies have found very significant mitigation net benefits.</p>	<p>Establishing counterfactuals (i.e. what outcomes would have been expected had mitigation not been done) raises difficult issues for most lifeline utilities.</p> <p>Thanks are due to many parties for information provided, and to EQC for funding.</p>
Key Learnings to Inform Infrastructure Resilience Planning for New Zealand	
<p>Three commentators noted:</p> <ul style="list-style-type: none"> • The need to recognise and plan for a range of earthquake hazards (e.g. shaking, ground failure such as liquefaction, landslides / rock falls) • The need for continuing long-term effort in mitigation and response (it's a marathon, not a sprint) • The importance of collaboration including mutual aid (but aid needs to be well organised / integrated) • The need for pre-arranged contracts with engineers to enable early post-earthquake building inspections • The need for an increased pool of trained Lifeline Utility Coordinators (the lifeline utilities themselves might be a source of personnel) • The importance of simple tools (e.g. posters) to communicate research and other messages 	

- The need to ensure that mitigation steps are both taken and function well (e.g. water shut-off valves)
- The value in diversity (e.g. ringed systems that offer alternative supply routes)
- The merits of “planning to plan” as distinct from detailed response documents
- The importance of access to plans and maps in emergency conditions, and the value in GIS-based information systems
- The importance of customer education, emphasising that outages will occur from time to time despite efforts to increase supply resilience
- The pitfalls in assuming that response experience in one location is applicable in another (e.g. Wellington’s response challenges would be greater than Christchurch’s in sectors such as transport, water, petroleum)

In concluding comments, others noted:

- The value of quick post-disaster reconnaissance
- The need for a focus on quick service restoration (e.g. over-ground water pipes are likely to be acceptable as a temporary fix)
- The need for effective communication (e.g. simple letter-box drops were well received in Kaiapoi)
- The need to recognise the very large expenditure requirements building up in water asset renewals
- The importance of secure storage (e.g. in food supply chains) and the differing seismic characteristics of alternative storage / racking products

National Engineering Lifelines Committee
WELLINGTON

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