RMA, Emergency Management & Infrastructure Resilience

RMLA (Nelson) 22 October 2014

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National Infrastructure Unit Content

- National Infrastructure
  - The Plan
  - Direction of travel
  - Evidence base
  - 2014/15

- Resilience

- Resilience in practice

- Lifelines
Established 2009 – Infrastructure identified as one of six key drivers of economic growth

Works across specialist sector policy agencies eg. Ministry of Transport, Ministry for the Environment etc

We are about:

“High performing infrastructure supporting higher living standards”

Involving a lot of: Oversight – Facilitation - Coordination

National Infrastructure Advisory Board
A diverse business ...
Vision
By 2030 New Zealand’s infrastructure is resilient, coordinated and contributes to economic growth and increased quality of life

Outcomes
Better use of existing infrastructure
Better allocation of new investment

Principles
Investment analysis
Resilience
Funding mechanisms
Accountability / Performance
Regulation
Coordination
The journey …
## Evidence Base: Priority Issues

### Transport:
- Understanding/measurement of network performance
- Optimisation of freight networks/distribution
- Urban congestion – productivity impact
- **Resiliency/redundancy on key routes**
- **Land use planning and integration with transport networks**
  - Auckland investment – timing/phasing

### Telecommunications:
- Understanding/measurement of network performance
- Optimisation of investment being made to drive productivity gains
- Improving connection speeds
- **Inconsistencies in planning legislation**
- **Building constraints, e.g. tower heights**

### Energy:
- Consider opportunities of demand side management and efficiency to improve utilisation of assets
- EDBs management of aging assets, changing technology and customer expectations
- **Liquid fuel storage**
- Flat demand and changing distribution mix

### Urban Water:
- Data quality, consistency and transparency
- Demand forecasting
- Asset management and planning
- Affordability and Renewals
- Regulatory Framework

### Productive Water:
- Data quality, consistency and transparency
- Consideration of processes relating to business case management
- Asset management and planning
- Affordability and Investment certainty
- Climate change and future security of supply, inc. storage

### Social Sectors:
- Continuing improvement in asset management
- Capital Planning and co-ordination across the social sectors
- Demand management and asset optimisation
Priority Themes & Issues

**Vision:**
- Changing patterns of demand.
- Technology impact.
- Relationship to economic growth.
- Community expectations and levels of service.

**Economy:**
- Relationship to economic growth.
- Drivers and opportunities of regional growth.
- Links and impact on other economic priorities and policies.

**Data and asset management:**
- Data quality, consistency and transparency.
- Asset management maturity.
- Understanding and measuring network performance.
- Informed decision making.

**Decision making:**
- Data/informed decision making.
- Optimisation of networks.
- Cross sector coordination/prioritisation.
- Auckland investment.
- Governance and management.
- Useful “tools” to drive conversations.

**Funding:**
- Affordability and investment certainty.
- Alternative sources of funding.
- Cross-sector prioritisation.
- Pipeline and visibility.

**Regional integration and collaboration:**
- Regional collaboration – vision, planning, investment.
- Integration of land use planning and infrastructure – especially transport.

**Regulations/standards:**
- Consideration of cost implications.
- Clarity on roles and responsibilities.
- Future proofing.
- Inconsistencies across planning legislation.
- Levels of service.

**Demand Management:**
- Improving asset utilisation.
- Understanding of decisions makers and communities.
- Levels of service.

**Resilience:**
- Understanding of criticality and key pinchpoints/bottlenecks.
- Climate change and adaptation.
- Supply chains and security.
- Levels of service.
Vision
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Regulation
Coordination
NZ features ...

- Isolated – long way from markets
- Heavily dependent on primary products
- More urbanised than France and Germany
- Challenging geography
- Hazardous
In the face of:

- rapid changes
- hazards

Hazards to infrastructure:
- natural,
- socio-natural, or
- technological

Viewed against:
- short term change (shock, unexpected events),
  and
- long term, more gradual change or stresses.

Source: Jackson, Natalie, The demographic forces shaping New Zealand’s future. What population ageing [really] means
Home Truths ….

- Infrastructure fails

- Resilience:
  - something you are not something you do
  - not necessarily more expensive
  - emergent as well as shock events
  - natural hazards and beyond
  - not always about making things stronger
  - includes decommissioning infrastructure
  - often achieved by operational changes

- Equilibrium is never constant

- Our diverse regional economies are valuable
New Zealand's regional economies

GDP by region for the year ended March 2010, $billion

- Northland 5.3
- Auckland 66.3
- Waikato 16.2
- Bay of Plenty 9.9
- Taranaki 8.0
- Manawatu-Wanganui 8.0
- Wellington 26.9
- Nelson and Tasman 3.4
- Marlborough 1.9
- West Coast 1.4
- Canterbury 23.2
- Otago 8.3
- Southland 4.3

New Zealand total gross domestic product (GDP) $189.7 billion

Change in size of regional economies, over the period 2007–10 (%)

-- N

Main Industries

- Agriculture
- Forestry, fishing, mining, electricity, gas, water, and waste services
- Manufacturing
- Construction
- Financial and insurance services
- Professional, scientific, technical, administrative, and support services
- Public administration, defence, and safety
- Health care and social assistance
- Information, media, telecommunications, arts, recreation, and other services

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National Risk Matrix – Summary for NZ

NZ’s National Security System perspective

Relative Likelihood
- At least once a Year
- At least once a Decade
- At least once a Century
- At least once a Millennia

Relative Consequences
- Minor
- Moderate
- Major
- Catastrophic

Categories:
- Geophysical
- Meteorological
- Biological
- Technological
- Social
- Conflict
- Other

- Very Large eruption
- Auckland Eruption
- Very large tsunami
- Sovereignty Threat To NZ
- Global Conflict
- Large urban earthquake
- Major Pest/Disease outbreak
- Major Infrastructure failure
- Financial Crisis
- Major Transport Accident
- Major Infrastructure failure
- Severe Weather
- Failed Pacific State
- Cyber Attacks infrastructure
- Cyber Attacks Data Confidentiality
- Human Pandemic
- Major Interstate Conflict
- Terrorism
- Large rural flood
- Large urban flood
- NZ's National Security System perspective
LIVING STANDARDS: THE HEART OF OUR POLICY ADVICE

Assess the impact of policy across key living standards dimensions

Economic Growth
- Does this improve the opportunities or incentives for higher incomes or greater economic growth?
- Does this remove obstacles that hinder resources moving to their most efficient use, or enhance the ability of people to take up new opportunities?

Sustainability for the Future
- Does this impact on the capital stocks for future use (e.g. physical capital, human capital, or the sustainability of the environment)?

Increasing Equity
- Does this impact on the distribution across society (both intra and intergenerational)?
- Does this improve opportunities for people to improve their position?

Social Infrastructure
- Does this impact on core institutions that underpin our society (e.g. trust in the rule of law, democracy, Crown-Māori relationship, cultural identity)?
- Does this impact on the trust and connections between people?

Reducing Risks
- Does this impact on NZ’s ability to withstand unexpected shocks?
- In particular, does this impact on our macro-economic position (debt, deficits, inflation etc.)?

Considering these five key aspects when developing your policy advice will ensure that Treasury consistently embeds Living Standards in our advice. It is an adjunct to, not a replacement for, a good evidenced-based process for developing free and frank advice. Need help or more information? See Girol Karacaoglu.
Risk, Resilience and Sustainability …..

(Linking to Treasury’s Living Standards Framework)

Risk Management

Resilience (Adaptability)

Sustainability (Future Generations)

Known Knowns
- Variability can be readily described

Known Unknowns
- Limitations, assumptions

Unknown Unknowns
- Black swan
- Threats where you have an adversary
- Complex system risks with dynamic interdependencies
Planned and adaptive capacities ….

Regular hazards or threats that have well-understood impacts

Greater Resilience

Complex or unusual hazards and threats where pre-planned mitigation and responses are less feasible

Adaptive
The Quest for Resilience ….

• “Strategic resilience is not about responding to a onetime crisis. It’s not about rebounding from a setback.

• It’s about continuously anticipating and adjusting to deep, secular trends that can permanently impair the earning power of a core business.

• It’s about having the capacity to change before the case for change becomes desperately obvious.”

(Hamel & Välikangas, 2003)
Resilience Attributes …

- **Service Delivery**
  - Focus on national, business and community needs in the immediate and longer term

- **Adaptation**
  - National infrastructure has capacity to withstand disruption, absorb disturbance, act effectively in a crisis, and recognises changing conditions over time

- **Community Preparedness**
  - Infrastructure providers and users understand the infrastructure outage risks they face and take steps to mitigate these. Aspects of timing, duration, regularity, intensity, and impact tolerance differ over time and between communities

- **Responsibility**
  - Individual and collaborative responsibilities are clear between owners, operators, users, policy-makers and regulators. Responsibility gaps are addressed

- **Interdependencies**
  - A systems approach applies to identification and management of risk (including consideration of interdependencies, supply chain and weakest link vulnerabilities)

- **Financial Strength**
  - Financial capacity to deal with investment, significant disruption and changing circumstances

- **Continuous**
  - On-going resilience activities provide assurance and draws attention to emerging issues, recognising that infrastructure resilience will always be a work in progress

- **Organisational Performance**
  - Leadership and culture are conducive to resilience, including: Leadership & Culture, Networks & Change Ready. Future skills requirements are being addressed
Resilience …..

Not all elements of infrastructure require high resilience

All infrastructure sectors have vulnerabilities

Infrastructure systems can not guarantee supply of services at all times

Indicators, Pinchpoints and Hotspots
<table>
<thead>
<tr>
<th>Local Roads</th>
<th>Suburban</th>
<th>Resilience Expectation</th>
<th>Assessed Resilience</th>
<th>Desired Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main arterial with alternate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main arterial – no alternate</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Strategic freight routes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Roads</td>
<td>National with alternate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>National – no alternate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road/Rail Link Span</td>
<td>Cook Straight ferries &amp; terminals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td>Suburban (incl. rolling stock)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>National (incl. rolling stock)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>National Train Control Centre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ports</td>
<td>Individual Ports</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Ports with specialist facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ports Network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airports</td>
<td>Regional airports</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Airways NZ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>International airports</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Indicator Sources/Points of Assurance**
- Transport global: Transport Monitoring Indicator Framework (TMIF)
- Best Practice Asset Management Plans eg. PAS 55 or IIMM 2011
- Business Continuity Management eg. Standards NZ BCM
- Annual Financial Reports
- Resilient Organisations Practices

*Resilience Expectation*:
- High Resilience
- Medium Resilience
- Low Resilience

*Assessed Resilience*:
- Compliance International Ship and Port Security Code

*Desired Movement*:
- ↑

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Pinchpoints
(Nationally Significant)

- Northland
  - New Zealand Refining Company (NZRC)

- Auckland
  - Ports of Auckland
  - Auckland International Airport

- Wellington
  - Avalon Tower, Lower Hutt
  - Wilton Substation
  - Central Park Substation

- Canterbury
  - Wastewater Treatment Plant & ocean outfall
  - Cass Peak air traffic control radar installation

- Otago
  - Dunedin Fuel Terminal

- Taranaki
  - Port Taranaki
  - Gas; Kupe, Pohokura, Maui

Hotspots
(Nationally Significant)

- Auckland
  - Wiri Oil Terminal
  - Auckland Harbour Bridge
  - Greenlane Roundabout
  - Newmarket viaduct
  - Grafton Gully

- Wellington
  - Thorndon / Kaiwharawhara
  - Seaview
  - Haywards
  - Paekakariki / Pukerua Bay

- Canterbury
  - Lyttelton Road Tunnel and control centre
  - Ferrymead Bridge
  - Timaru Port & Tank Farm
Work Programme

Examples of recent activities

- Joint Resilience Operating Framework (KiwiRail, Transpower and NZTA)
- Measuring resilience of transport infrastructure (NZTA lead)
- Oil security (MBIE lead)
- Gas security (MBIE lead)
- Lyttelton Recovery Plan (CERA lead)
- Update of CDEM Directors Guide (MCDEM lead)
- International cables (MBIE lead)
- TA Emergency Management Offices and Lifelines (Auckland, Wellington, Canterbury, Bay of Plenty, Taranaki, Otago, Southland, ….)
- Joint NIU, Natural Hazards Research Platform, Lifelines and University of Canterbury Interdependencies workshops

Coordination
- Cross government agency
- Climate change adaptation
- Best practice guidelines

Economic/Financial
- Banks, financiers, insurers
- Seeking exemplars
- Economic modelling

Indicators
- Develop evidence base; MoT, MBIE et al
- Hotspots & Pinchpoints
- Sector priorities

Regional/Community
- Lifelines
- Regional vulnerability mapping
- Service restoration times

Research
- Encourage resilience related research
- Interdependencies, economics, water, ports
- Some parts of infrastructure more important

Outreach
- LGNZ, Lifelines, Resilience conferences
- Engage with private sector, consultants
- NIU newsletter
Advancing Interdependencies: CDEM & Lifelines

CDEM Act 2002

National CDEM Plan Order 2002

Guide to the National CDEM Plan

Director’s Guideline for Lifeline Utilities
Event resilience: Southland

Vulnerability | Scenario | Impact | Action plans | Recovery plan | Recovery
---|---|---|---|---|---

Re-route tankers
## Lifeline Utilities Restoration Times

<table>
<thead>
<tr>
<th>Area</th>
<th>Gas Restoration time (days)</th>
<th>Power Restoration time (days)</th>
<th>Water Restoration time (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hutt Central and Western Hills</td>
<td>80</td>
<td>60</td>
<td>25/40</td>
</tr>
<tr>
<td>Porirua, Mana, Plimmerton and Pukerua Bay</td>
<td>60</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>Northern /Western Wellington suburbs</td>
<td>60</td>
<td>60</td>
<td>45/55</td>
</tr>
<tr>
<td>Wellington CBD</td>
<td>80</td>
<td>95</td>
<td>55</td>
</tr>
<tr>
<td>Airport and Eastern Wellington suburbs</td>
<td>80</td>
<td>60</td>
<td>70</td>
</tr>
</tbody>
</table>
Damaged:
528 km of waste water network
Need to rebuild or replace 100+ sewer pumping stations

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Probability</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seismic</td>
<td>See next page</td>
<td>Varies</td>
</tr>
<tr>
<td>Flood</td>
<td>1:50 yr (Building Act)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:200 yr (Local)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:500 yr (Regional)</td>
<td></td>
</tr>
<tr>
<td>Tsunami</td>
<td>1:100yr</td>
<td>~2 m</td>
</tr>
<tr>
<td></td>
<td>1:500yr</td>
<td>~4 m</td>
</tr>
<tr>
<td>Coastal Erosion &amp; Storm Surge</td>
<td>1:10-15 yrs</td>
<td>Significant</td>
</tr>
<tr>
<td>Landslide &amp; Rockall</td>
<td>Exposure to seismic activity, rainfall etc.</td>
<td>n/a</td>
</tr>
<tr>
<td>Wind</td>
<td>1:150 yr</td>
<td>130 km/h (gusts to 200 km/h)</td>
</tr>
<tr>
<td>Snow</td>
<td>Low</td>
<td>n/a</td>
</tr>
<tr>
<td>Changing Sea Level</td>
<td>~ next 80-90 yrs</td>
<td>0.5 m (0.8 m)</td>
</tr>
<tr>
<td>Volcanic</td>
<td>Very Low</td>
<td>n/a</td>
</tr>
<tr>
<td>Drought</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Other (Natural or Man-made, instant or gradual)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
This diagram is designed to illustrate that:

1) **resilience crosses a range of portfolios**: your team or organisation’s work might contribute to a particular aspect of resilience, but it is important to look at things holistically and to put what we do in the wider context of what makes communities – and the nation – resilient. This also illustrates the range and breadth of potential partners in your resilience work – there is no need to work in isolation, there will be synergies to working with others who have similar goals.

2) **resilience acts on a range of scales**, from individual to societal, and it follows that interventions and initiatives should be on a range of scales, and include "bottom up" and "top down" efforts.
National Resilience

Global Resilience (~ HYOGO Framework)

National Resilience (~ MCDEM/DPMC Framework)

Community Resilience (~ Rockefeller Framework)

Infrastructure Resilience

Civil Defence Emergency Management
Resilient is something you are not something you do

National Infrastructure Unit
www.infrastructure.govt.nz
roger.fairclough@treasury.govt.nz
Land use planning for natural hazards and infrastructure resilience – Legislative framework

Wendy Saunders, PhD, MNZPI
Natural Hazards Planner
Probe into Auckland power cuts: Key

Prime Minister John Key has announced a full inquiry will take place into a "freak fire" which cut power to 85,000 households in Auckland.

The fire at a Transpower substation in Ellerslie early on Sunday morning knocked out electricity to large swaths of the city.

Nearly 20,000 Auckland homes and businesses remained without electricity this morning as the city's massive power outage entered its second day.

Key said work was already underway to identify terms of reference for an inquiry into the outage.

"It's a huge inconvenience obviously for many people and there will be some cost. I know that the minister of energy has asked for the obvious thing which is what will shape an inquiry.

Key said an inquiry after an outage of this size was standard.

"And I guess people will have to look at the issue of compensation because people will have lost possessions through no fault of their own.

In fairness to Vector, there has been an enormous amount spent by both Transpower and Vector in recent years, upgrading the systems.

"The question is, is this a freak fire, but then what would happen if it was even larger and if the outages were for even longer?" he said.

Key's own Parnell mansion was unaffected by the power cuts, but he said neighbours a few houses down the road were not so lucky.
Introduction

- Legislative responsibilities for hazard management
- Focus on infrastructure
- Current research
Five key statutes

• Resource Management Act 1991 (RMA)
• Building Act 2004
• Civil Defence Emergency Management Act 2002 (CDEMA)
• Local Government Act 2002 (LGA)
• Local Government Official Information & Meetings Act 1987 – LIMS
<table>
<thead>
<tr>
<th>Statue</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Management Act 1991</td>
<td>Promote the <em>sustainable management</em> of natural and physical resources … managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their <em>social, economic, and cultural wellbeing</em> and for their <em>health and safety</em></td>
</tr>
<tr>
<td>Civil Defence Emergency Management Act 2002</td>
<td>Improve and promote the <em>sustainable management</em> of hazards in a way that contributes to the <em>social, economic, cultural, and environmental well-being</em> and <em>safety</em> of the public and also to the <em>protection</em> of property</td>
</tr>
<tr>
<td>Building Act 2004</td>
<td>Buildings are designed, constructed, and able to be used in ways that promote <em>sustainable development</em> … safeguard people from injury from critical fail</td>
</tr>
<tr>
<td>Local Government Act 2002</td>
<td>Provides for local authorities to play a broad role in meeting the current and future needs of their communities for good-quality local infrastructure …</td>
</tr>
</tbody>
</table>
Different definitions

<table>
<thead>
<tr>
<th>Statue</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Management Act 1991</td>
<td>Any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslide, subsidence, sedimentation, wind, drought, fire, or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.</td>
</tr>
<tr>
<td>Civil Defence Emergency Management Act 2002</td>
<td>Something that may cause, or contribute substantially to the cause of, an emergency.</td>
</tr>
<tr>
<td>Building Act 2004</td>
<td>Erosion (including coastal erosion, bank erosion, and sheet erosion); falling debris (including soil, rock, snow, and ice); subsidence; inundation (including flooding, overland flow, storm surge, tidal effects, and ponding); and slippage.</td>
</tr>
<tr>
<td>Local Government Act 2002</td>
<td>As per RMA</td>
</tr>
</tbody>
</table>
Integrating natural hazard management
Legislative requirements under the CDEM Act 2002 for managing hazards

- To encourage and enable communities to achieve acceptable levels of risk including
  - Identifying, assessing and managing risks
  - Consulting and communicating risk
  - Identifying and implementing cost-effective risk reduction
  - Monitor and review
What is reduction?

Reduction is:

“identifying and analysing the long-term risks to human life and property from natural or non-natural hazards; taking steps to eliminate these risks if practicable, and, if not, reducing the magnitude of their impact and the likelihood of their occurring”

(National CDEM Plan, 2005)
Risk reduction … the role of the planner?

Figure 1.1: Linkage between national, regional and local operational plans and arrangements and risk reduction policies and programmes.
Interesting context ….

• **In a recent study:**
  – 7.2% of DPs & 25% of RPS’s refer to CDEM Act.
  – 40% of council planning managers were unaware of CDEM plan risk reduction provisions

• **EQC:** *When the CDEM Act requirements were formulated it was expected that RMA land use planning would be one of the tools (possibly the main one) that would be used to deliver against the CDEM Group Plan priorities.*
Sustainability vs resilience

- RMA focus on sustainability
- CDEM focus on sustainability AND resilience
  - Vision “Resilient New Zealand – communities understanding and managing their hazards”
  - Ability to withstand, recover from and thrive after a disaster
- A resilient community is not necessarily a sustainable one
- A sustainable community should also be resilient
- Should the RMA include resilience?
Integrating natural hazard management
Infrastructure ....

- **S30 RMA Functions of regional councils**
  - (gb) the strategic integration of infrastructure with land use through objectives, policies, and methods:

- **CDEM Act**

- **S34 LGA 101B**
  - A local authority must prepare and adopt, as part of its long-term plan, an infrastructure strategy for a period of at least 30 consecutive financial years

- **Building Act**
  - Building importance categories (3 & 4)
RMA reforms: Six elements of reform package

Six elements of the proposed resource management system reform package (MFE, 2013, 33)
Natural Hazard & Infrastructure Provisions – Part II Changes

• Combined s.6 and s.7
• Includes “the management of significant risks from natural hazards”
  – Introducing risk to the RMA
  – Elevating the consideration of natural hazards
  – Natural hazard risk would have to be considered as part of any RMA process
  – Natural hazard risks would have to be considered in appeals.
  – ‘Significant risk’ not defined
Implications for infrastructure

- Includes “the efficient provision of infrastructure”
  - Means planning, design, construction, maintenance and functioning of infrastructure

- For some application types, the definition of an affected party is being refined. For subdivisions anticipated by underlying plan rules or zoning, the only parties who could be considered affected are the owners of affected infrastructure assets … (MfE, 2013, p18)
Natural Hazards Research Platform – Research Themes

- Theme 1: Geological Hazards Models
- Theme 2: Predicting Weather, Flood & Coastal Hazards
- Theme 3: Resilient Buildings & Infrastructure
- Theme 4: Developing Regional and National Risk Evaluation Models
- Theme 5: Societal Resilience: Social, Cultural, Economic & Planning Factors

- $1.5M per annum (to 2015)
Economics of Resilient Infrastructure

- Government’s higher living standards and business growth agendas
- Community-wide consequences of infrastructure outages not widely recognised
  - The benefits of risk mitigation accrue to the whole community
  - Wide community benefits need to be taken into account in infrastructure investment decisions
  - They also need to be fully recognised in city and Civil Defence Emergency Management planning
- Aims to improve infrastructure performance by increasing understanding of outage impacts
- Funded by MBIE $2.8M over four years from 2012
Specific Research Aims

Developing NZ’s understanding of the economic impacts of infrastructure failure

• Explore the economic implications of infrastructure failure

• Explore disaster recovery scenarios
  – Options = policy, infrastructure, business
Summary

- Integrated legislative requirements for infrastructure
- Consideration of infrastructure required in planning decisions
- Continuing research being undertaken
- Infrastructure failure can happen at any time …
Responding to Acts of God

Kim Arnold, NTEL Coordinator
Utilities Network Engineer
21 April 2013 Rain Event

• The Rain Event
• Response
  – Engineering
  – Planning
  – Building Control
  – Forward Planning
  – Communications
• Summary Thoughts
The Rain Event

• In excess of 100mm rainfall in one hour in urban areas and steep upstream hillsides
• Probability of occurring 0.2% (1-in-500 yr)
• Damage cost estimate ~$35 million
• 80+ homes flooded

Rainfall 21 April 2013
Engineering Response

• Although heavy rain was forecast, the high intensity rainfall and flooding that occurred was not. Preparation for the event was minimal. Normal level of pre-storm checks

• Council staff, consultants and contractors worked through the night assessing damage and arranging for clean up to commence the following day

• Historic flooding events, known system vulnerabilities and public feedback ensured targeted response

• Prioritised response for where lives and properties at risk
Response Issues

• Dangerous to be on the road, high velocity flows
• Staff’s own homes at risk
• Short duration/High intensity
• Flows far beyond Level of Service and capacity of networks
• Debris flow blocking primary systems
Gladstone Rd/Queen St, Richmond
PAK’nSAVE Carpark, Richmond
Queen Street, Richmond
Bill Wilkes Detention Dam
Bramley Estate – Hart Creek
Before and after repairs
Network Issues

Sediment filling detention basins

Gravel mobilisation in catchments
Erosion of streams undermining banks and structures

Forestry management
Focus points from Engineering

• Know the stormwater system vulnerabilities and have established relationships with contractors and consultants to facilitate efficient responses
• Facilitate receipt and capture of public input to improve targeting of Council’s short and long term response
• Estimate the needs for excavators and trucks as part of the response planning
• Consider both long duration ponding-focused and short duration flowpath-focused events
The Consenting Response

• Consent planning consideration of probable maximum impact, past levels may not apply
• Ongoing consideration of risk and internal protocols to generate a cross-Council (Building, Engineering, Environment and Planning) consistent approach to consenting
• Secondary flow path management has an elevated status; Integration as multi-use space
• Earlier and more robust consideration of natural hazards
• Pre-application education of developers
The Building Control Response

- Beneficial to be administratively prepared for post-event response inspections and advice
- Building/consenting staff review of old subdivision consent levels vs new hazard data
The Forward Planning Response

• Greater emphasis on secondary flow and ponding areas within catchment-wide planning
• Integrated whole-of-council planning
• Intention to ensure bylaws or planning rules support flood risk management
• Balancing stormwater level of service with community willingness to pay
The Communications Response

- Emergency preparedness needs to include streamlined data gathering systems.
- Time commitment from elected members and key staff to discuss the outcomes with ratepayers.
- The Level Of Service that the public is expecting to be provided needs to be discussed and the cost implications worked through.
- What the Council can and will do needs better communication.
Summary

- coordination of policy across Council
- Plan for event responses
- Improve education of residents and developers
- Construct and protect secondary flowpaths
- Discuss level of service, ability and willingness to pay within the community
Questions?

Thank you.