



M 7.1 Darfield Canterbury Earthquake of Sept 4, 2010

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ASCE TCLEE



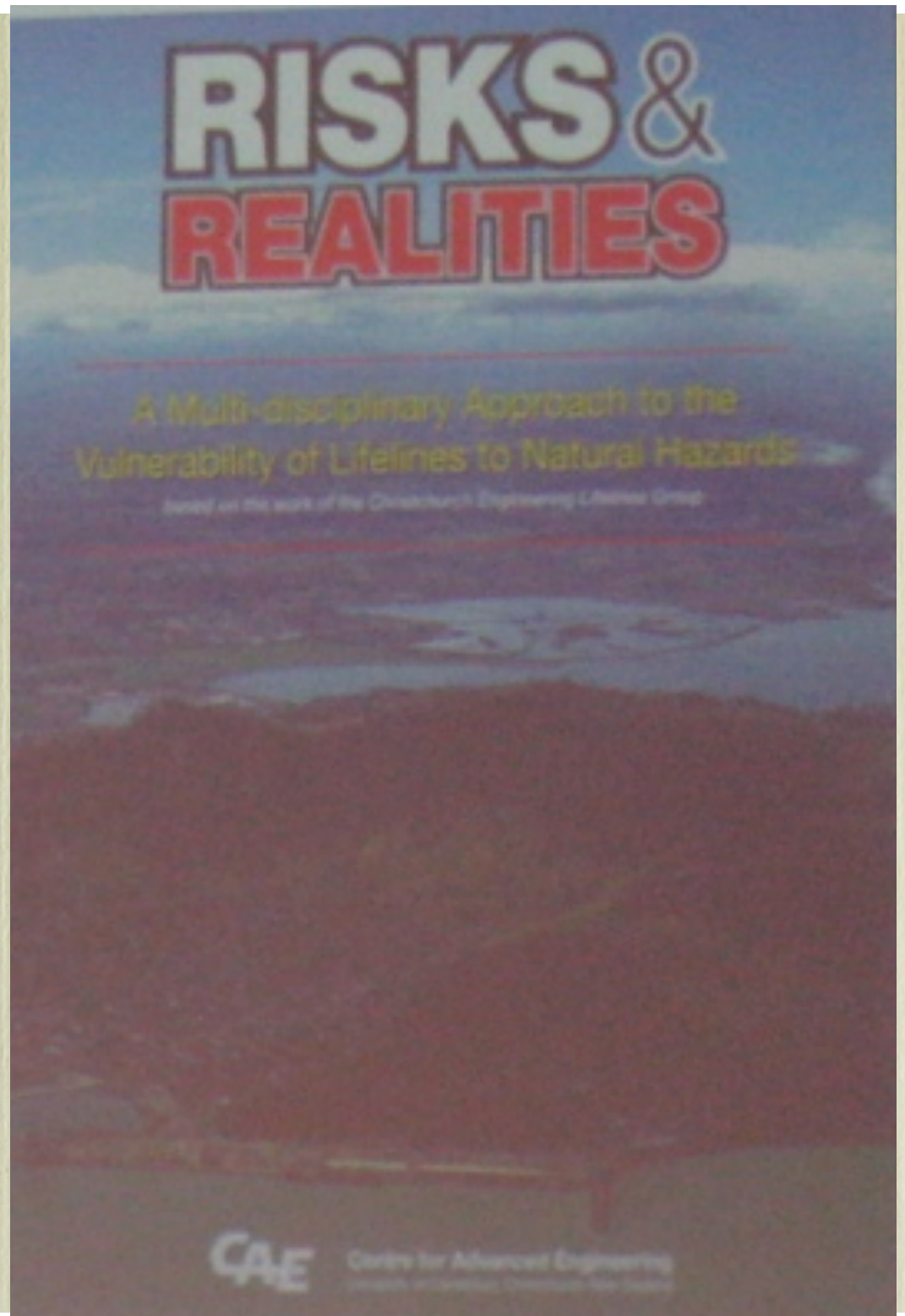
Risk and Realities:

Lifelines seismic
vulnerability report for
Christchurch

Published 1995

Prompted some mitigation
from 1996-2009

Helped limit damage to
some lifelines in 2010



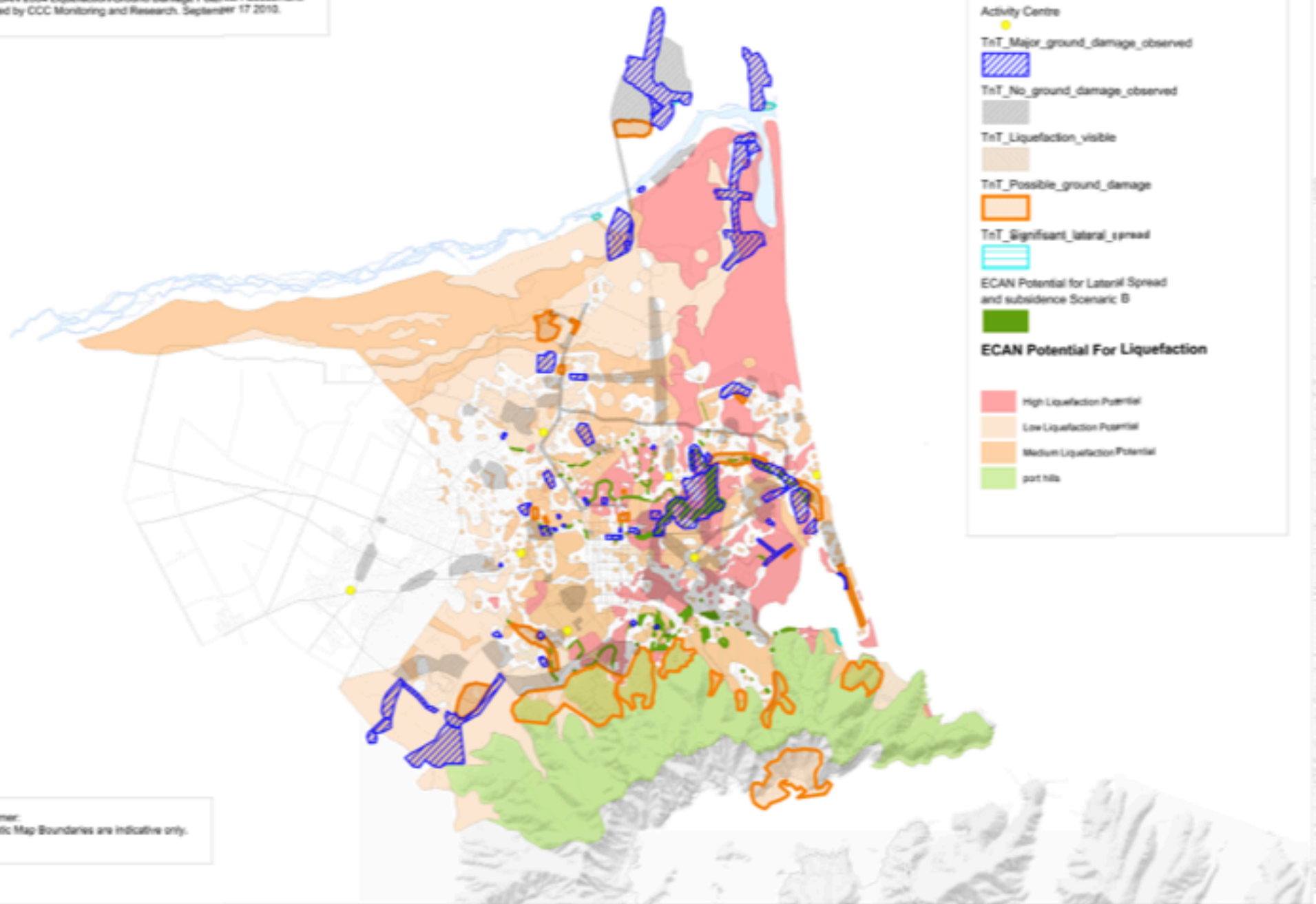
Lifelines

 "good"  "limited"  "marginal"  "poor"

Transpower	Orion	Christchurch water
Waimakariri water	Rockgas	Vodafone
Telecom Chorus	NZTA	Lyttleton Port
Kiwi Rail	Christchurch wastewater	Waimakariri wastewater

Total estimated long term repair and replacement cost: \$900,000,000
(\$NZ)

Torkin & Taylor preliminary damage assessment survey areas plus ECAN 2004 Liquefaction/Ground Damage Potential Assessment. Compiled by CCC Monitoring and Research. September 17 2010.



Disclaimer:
Thematic Map Boundaries are indicative only.

Christchurch City Council

- Water and Sewer Pipes - Zones with PGDs
- No seismic design then
- No seismic design now
- Will there be seismic design in the future?

Waimakariri District Council

- Water and Sewer Pipes - zones with PGDs
- No seismic design then
- No seismic design now
- Will there be seismic design in the future?

PREVENTION

- ENGINEERING DEVELOPMENT
- STANDARDS AND CODES
- RESEARCH

PREPAREDNESS

- PRACTICE STANDARDS & CODES
- ESTABLISH GOOD QUALITY CONTROL
- PERFORM VULNERABILITY EVALUATION
CONTINUOUSLY

RESPONSE PLANNING

- PRIORITY PROTOCOL
- DEGREE OF CONTROL
- RESOURCES CO-ORDINATION
- EXERCISE PLAN

RECOVERY PLANNING

- CAPACITY
- SOCIAL CONSIDERATIONS
- INTERVAL VS SEVERITY