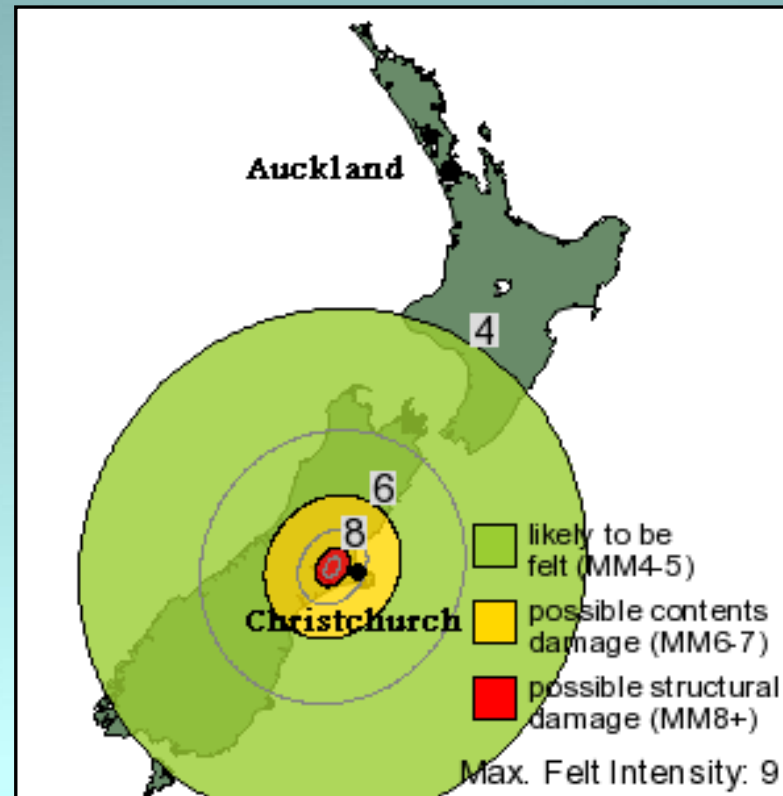


The Christchurch Earthquake

4.35am 4th September 2010

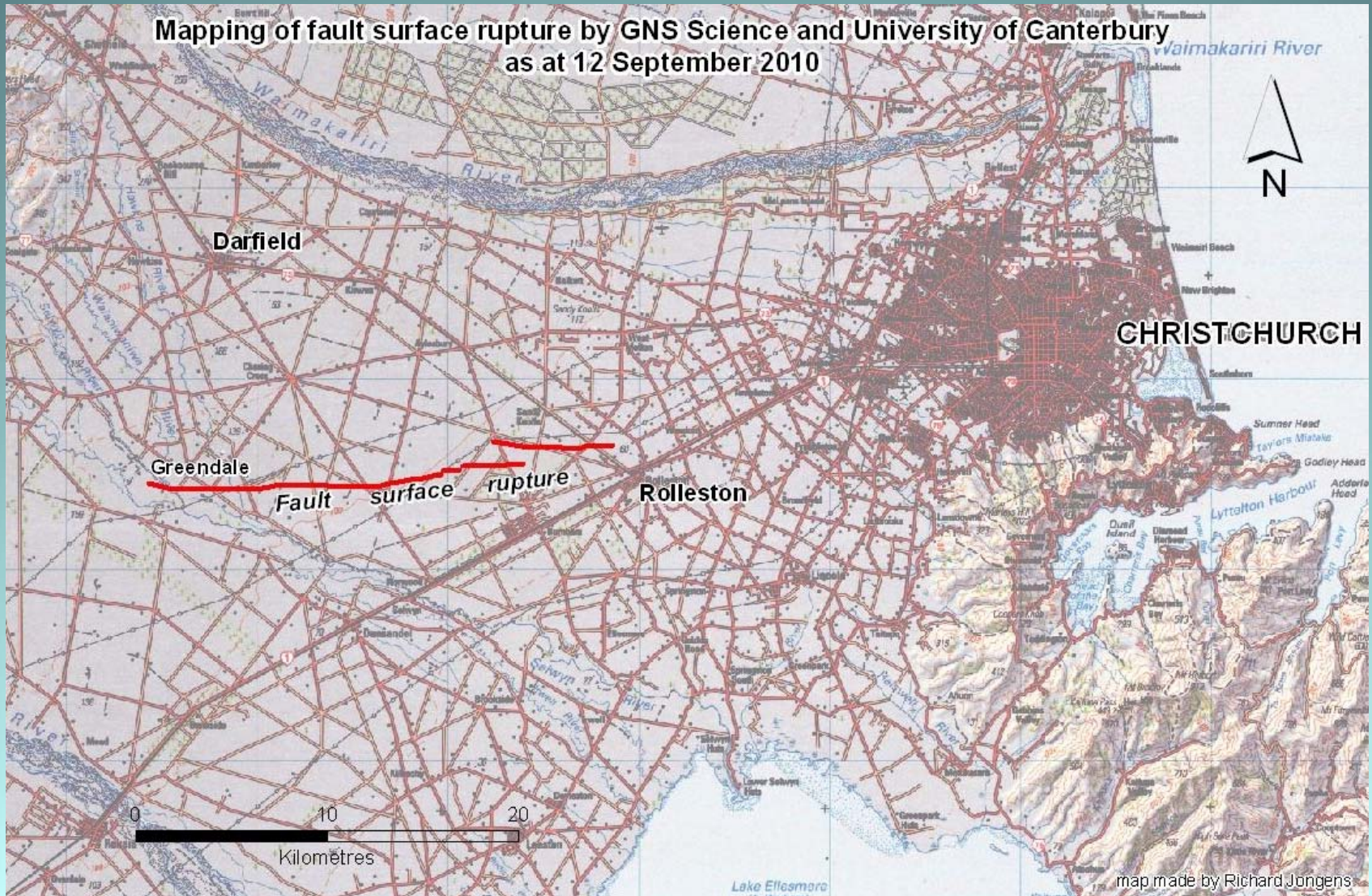


The Main Event

- The epicenter of the 7.1 magnitude quake was about 30km west of Christchurch near Darfield at a depth of 10km
- The fault that caused the quake has been named the Greendale fault
- It is likely that the Greendale fault had not moved for at least 16,000 years
- Up to 4.6 metres horizontal and 1.5 metres of vertical offset has been recorded
- Total surface rupture length of approximately 28 km



Mapping of fault surface rupture by GNS Science and University of Canterbury
as at 12 September 2010

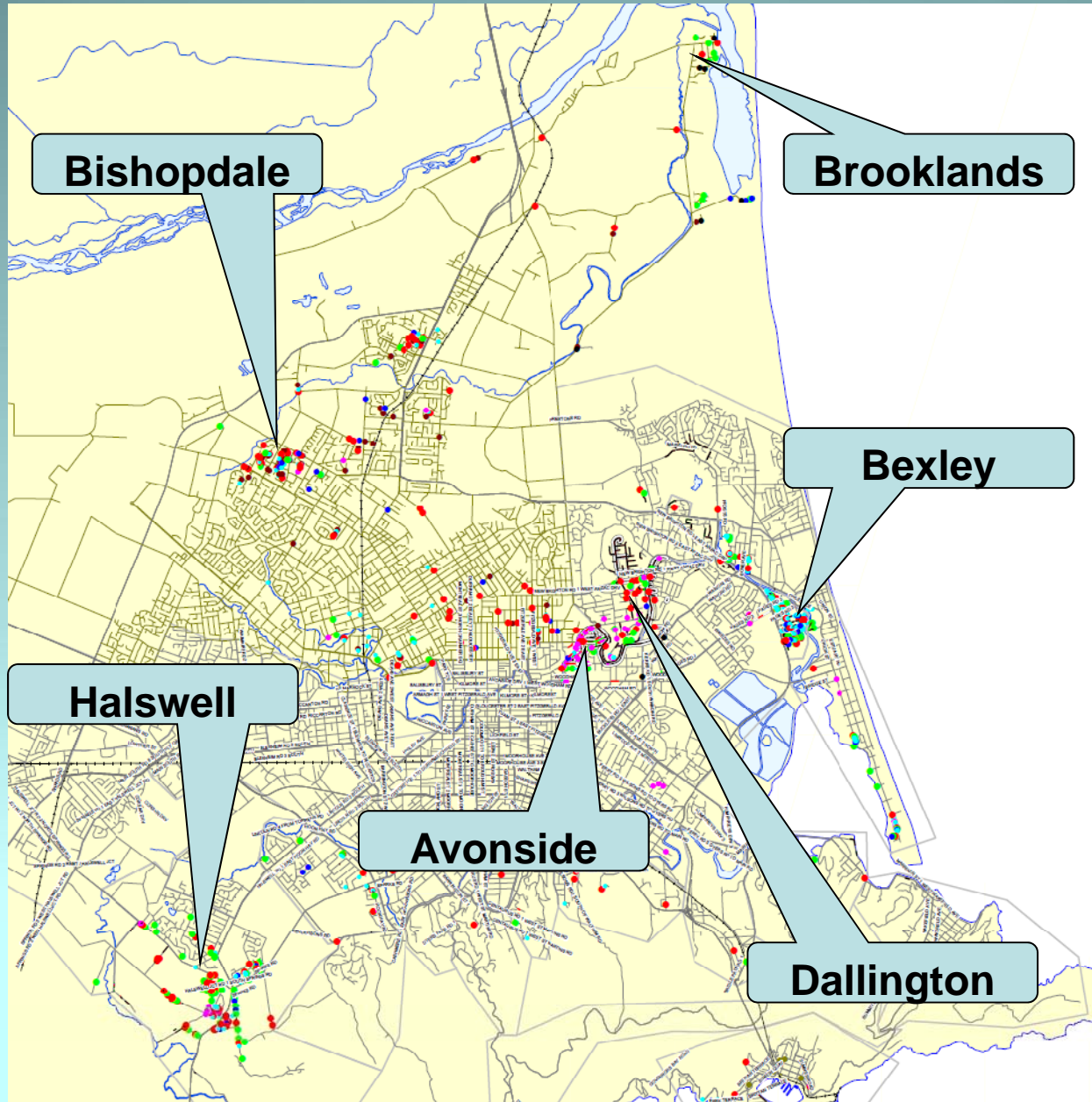


Damage

- Christchurch and environs has a population of 500,000 people – about 160,000 homes
- About 50,000 homes are damaged – almost 1 in 3
- About 10,000 homes are uninhabitable
- Over 100 commercial buildings are damaged and many are being demolished
- As of 29 Sep 2010, Earthquake Commission received more than 80,000 claims from homeowners in Canterbury
- The governments latest damage estimate is NZ\$4 billion – the costliest natural disaster in NZ history.



Some of The Most Affected Areas



Fulton Hogan - Assessed Repairs - Earthquake
As at 3pm 14Sept

- Rip & Remake
- Cracking
- Minor Repairs
- Drainage
- Potholes
- Retaining Walls
- Footpath Repairs

City Care - Assessed Repairs - Earthquake
As at 4pm 21 Sept

- Rip & Remake
- Cracking
- Minor Repairs
- Drainage
- Potholes
- Sand Clearance
- Footpath Repairs

CCC Identified Streets to Date
Major Reconstruction

Fulton Hogan

EQC Insurance

- [Making a Claim](#)
- [EQC's Insurance](#)
- [Conditional Building Consent Issues](#)
- [Latest natural disasters - claim numbers](#)
- [An Insurer's Guide to EQCover](#)
- [Natural Disaster Damage](#)
- [Items of interest](#)
- [householdersguide.aspx](#)

Latest natural disasters - claim numbers

Canterbury Earthquake

Local authority	No. of claims
Christchurch city	64,464
Selwyn	6,513
Waimakariri	4,811
Timaru	1,626
Ashburton	1,356
Other	1,313
Total	80,083

As at: 12 p.m. 29 September 2010


[Back to top](#)

What was I doing at the time?

Tree stumps old Alpine Fault theories

By PAUL GORMAN - The Press

Last updated 05:00 03/09/2010

 Text Size

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A West Coast tree stump has revealed that the Alpine Fault is moving more quickly than thought.

Researchers working at Inchbonnie, a dairy-farming settlement about 60 kilometres from Greymouth that lies on the fault, dated wood from the dead podocarp, believed to be a matai, sitting in water at the southern end of Lake Poerua.

The dating was part of a series of investigations in the area in February 2008 to determine movement on the fault and how strain is transferred from it to the nearby Hope, Clarence and Kakapo faults at the western edge of the Marlborough Fault System.

Until now, the average annual horizontal slip rate of the Alpine Fault at Inchbonnie was believed to be about 10 millimetres a year.

The latest calculations, based on when the stump died as a result of an earthquake, show it is moving at an average 13.6mm a year, plus or minus 1.8mm. That equates to about an extra metre of movement each time the fault ruptures – about every 300 years.

The Alpine Fault is the boundary between the Australian and Pacific plates, which are moving past and pushing against each other, forcing the Southern Alps higher.

The fault is visible from space and runs for about 650km from the Wairau River valley through the central upper South Island, down the western side of the Southern Alps and out to sea near the Milford Sound entrance.

The last time the fault moved was about 1717, generating an earthquake of at least magnitude 8.0.

GNS Science earthquake scientists Rob Langridge and Pilar Villamor, Lincoln University soil scientist Peter Almond and two Spanish scientists have published a paper in Lithosphere outlining their Inchbonnie findings.

A slab of wood was cut from the stump and age analysis showed when the tree began growing and when it died as a result of a major Alpine Fault earthquake upsetting the water table.

"Podocarps are intolerant of saturated soil... When the local groundwater table rose, this tree effectively drowned and was preserved in place."

Dating indicated the tree was about 570 years old when it died between 947 and 1064 years ago.

Response

- Work and NZTA



Response

- Suppliers – Contractors and Consultants



Estimated Roading Infrastructure Cost (\$millions)

Selwyn DC	2.5 – 3.0
Waimakariri DC	15 – 25
Christchurch City	170 – 200
SH Network North Canterbury	6 - 8



Dallington



Horseshoe Lake



Sumner Rd – loose rock



Brooklands



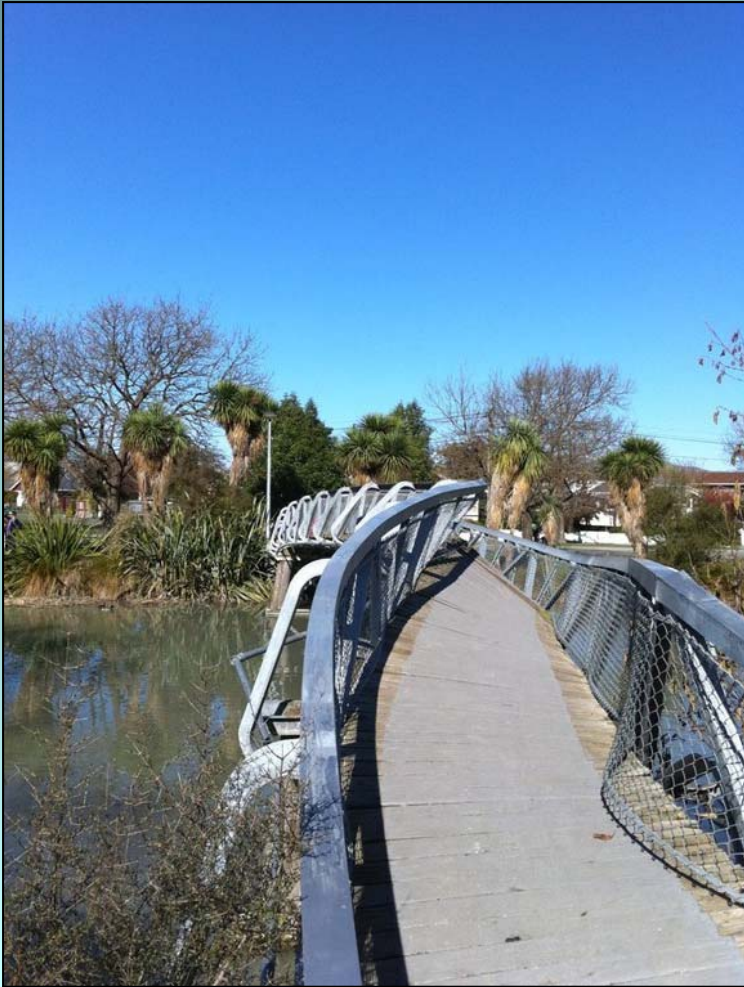
Avonside



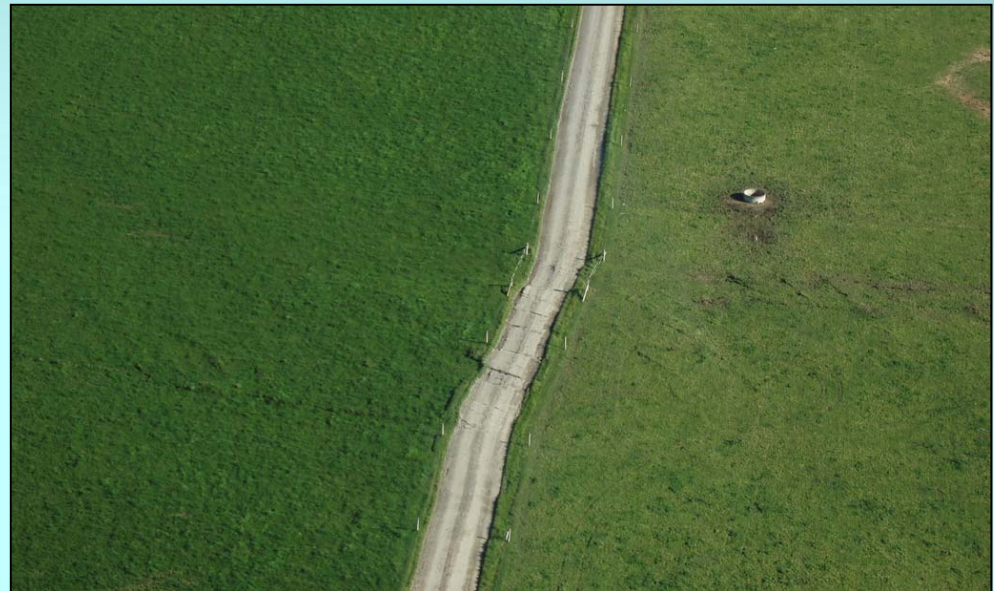
Bexley



Kaiapoi



Selwyn District

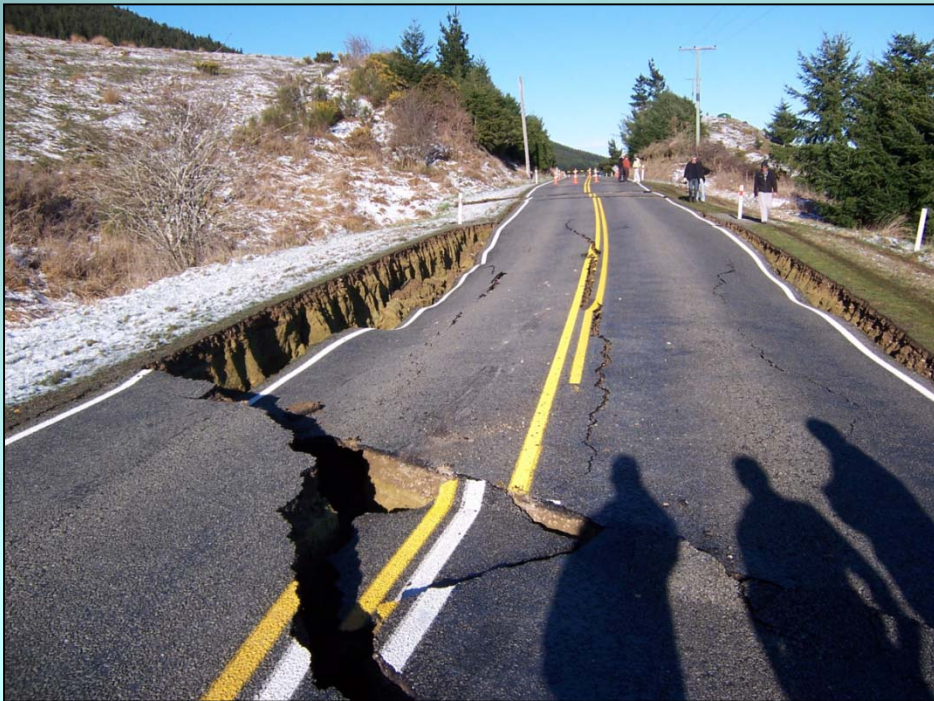


Christchurch CBD



State Highway





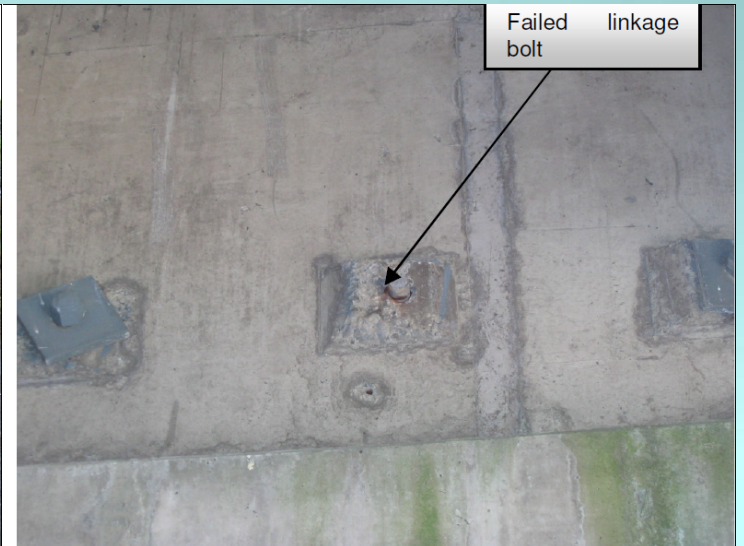
Bridges and Structures

- No bridges on the SH were closed
- Only 2 Christchurch CC bridges were closed
- Modest repairs will be required
- Reason for the good performance - quite a few bridges around Christchurch have been seismically retrofitted, also bridges not tested to full design capacity

Bridge Damage



SH1S Ashley River Bridge - Minor Spalling

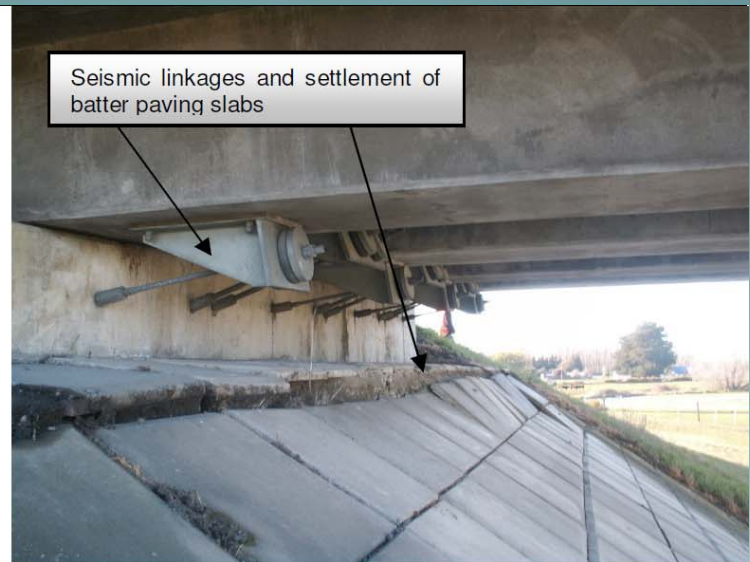


SH1S Kaiapoi River Bridge

Movement of structure during event

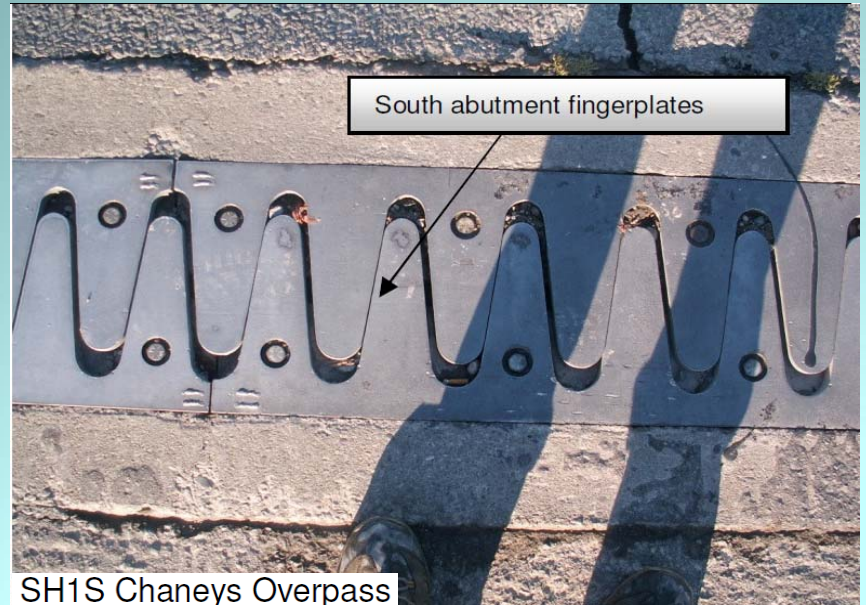


Seismic linkages and settlement of batter paving slabs



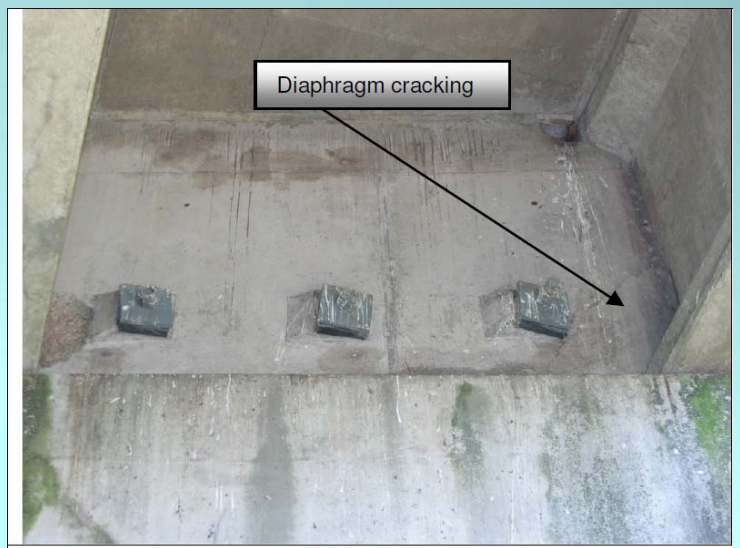
SH1S Chaney's Overpass

South abutment fingerplates



SH1S Chaney's Overpass

Diaphragm cracking



SH1S Kaiapoi River Bridge

Bridges and Structures – Lessons Learned

- Keep the seismic retrofit programme going (funds permitting)
- Ensure the roading network Bridge Consultant has a robust emergency response plan and good communications
- Ensure robustness of Emergency Control Centres

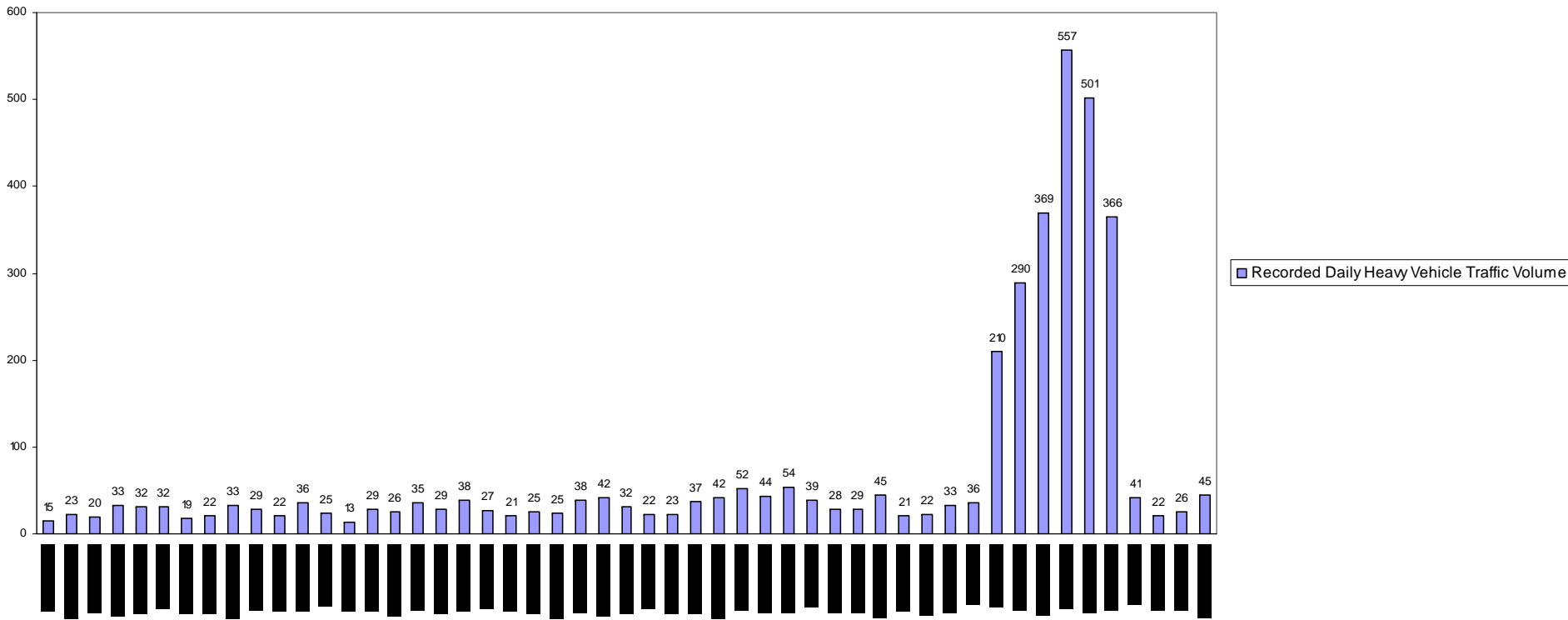


Kaikoura Slip

- Occurred at approximately 10 pm on 10 September 2010 and blocked off SH1 for 6 days
- Estimated volume - 30,000 m³
- The importance of SH1 - Average daily heavy vehicle traffic volume on SH 63 is 31 vehicle per day, during the SH1 closure daily heavy vehicle traffic volume of 557 had been recorded
- SH1 reopen at 4pm on 16 September 2010



Daily Heavy Vehicle Traffic Volume on SH63 St Arnaud -
 Pre & Post SH1 Kaikoura Slip on Friday, 10 Sep 2010
 (note SH1 reopen at approx. 4pm Thursday 16 Sep 2010)





Thank You

Any Questions?

