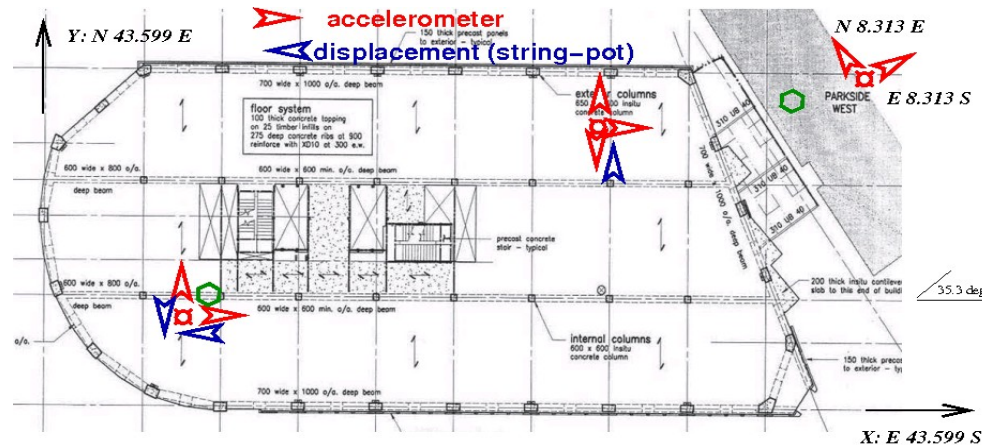


# Seismic Behavior of the Christchurch Women's Hospital

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The objective of this project is to collect perishable seismic response data from the base-isolated Christchurch Women's Hospital. The strong and continuing sequence of aftershocks presents a unique opportunity to capture high-fidelity data from a modern base-isolated facility. These measurements will provide quantitative information required to assess the mechanisms at play in this and in many other seismically-isolated structures.



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# Key Findings

The deformations within the isolation system were generally smaller than would have been anticipated for the M6 @10 km event of Dec 23 2011. Free-field records from these events had PGA ~ 0.2g and PGV ~ 15 cm/s (comparable to the Feb 22 2011 M6.3 motions at the site). Nonetheless, measured accelerations below the isolation system were half of the free-field levels this level (0.1 g) and isolator displacements were on the order of 2-5 cm. (Accelerations at the top level of the adjacent fixed-base structure were on the order of 0.4 g.)

Long period accelerations and liquefaction debris observed in the isolation galley suggest that soft soils may have contributed to this behavior.



# Opportunities for Future Research

- How do interactions with locally soft/weak soils and with adjacent/coupled structures affect the performance of seismically isolated structures, and how do these interactions scale with shaking intensity?
- This project has developed well over 200 triggered events (and counting) from M 3.5 to a M6 event (10 km from the building site).
- Up to 48 channels of processed data per event. Records are rotated, detrended and synchronized with nearby GeoNet (NZ) records.
- These records provide a unique opportunity to examine the effects coupled-building interactions with a seismically-isolated structure, SFSI interaction in an isolated structure, soil liquefaction and re-consolidation over time (months) and throughout an earthquake swarm.
- Many sites in the US share seismic risks that are qualitatively similar to those in Christchurch NZ: alluvial basins and liquefiable soil. Moreover, this data set will enable important insights into the performance of a structure with the kind of seismic-isolation used to protect many structures in the US.



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