Notes to accompany Kelvin Berryman presentation to Kaikoura EQ Transport Links Rebuild 13 March 2018

Slide 3:

- Lots of new data types
- Suggests we can 'see' more in this earthquake in terms of deformation and complexity than any prior earthquake
- Yes this event was very complex, but perhaps some of this complexity has always be there in large earthquakes and only now do we have the technologies to begin to reveal it

Slide 4

- Lidar provides topographic resolution not previously available
- Lidar can now go into the shallow ocean to 'see' the seafloor
- Marine surveys with high resolution equipment are increasingly sophisticated

Slide 5

- With increasing recording station density, we are beginning to record the real variability in ground shaking – Kaikoura recordings richer because of new stations installed after the Cook Strait events of 2013
- GeoNet, since 2002 has enhanced the opportunity for all NZers to be earthquake scientists through rapid felt reporting

Slide 6

- Kaikoura earthquake 'jumped across' the Hope fault event though it is relatively advanced in its seismic cycle
- This is an example of new knowledge gained since the last NSHM model in 2010 and much better than knowledge underpinning the 2002 model that informs the current Building Code and related documents

Slide 7

- Globally increasingly dense recording networks is beginning to reveal the close to source levels of ground motion
- >1 g accelerations not surprising to us now, but the 2002 version of the NSHM was very limited in understanding what constitutes maximum ground motions with implications for current code

Slide 8

- New data on the Kekerengu-Needles fault shows that this fault alone exceeds the 2002 (and 2010) levels of ground motion for 1000 year return period associated with the designated critical transport corridor

Slide 9

- Because the code and guidance has not kept up with improved research knowledge a major step change in codes is on the horizon
- This has major implications for existing designated critical infrastructure, critical facilities, current infrastructure build and reasonably new building that may slip into 'earthquake prone' territory as soon as the new NSHM is incorporated into code requirements
- With this forewarning there is urgent need for broad discussion and consultation that will be of major concern to building owners, insurers (and NZ's insurability), designers of buildings and infrastructure, and the public