

5 November 2015

Arnold review of Tonkin and Taylor report for the Christchurch City Council: Coastal Hazard Assessment Stage Two

Background

Tonkin and Taylor (T&T) prepared a report, Coastal Hazard Assessment Stage 2 (T&T 2015), for the Christchurch City Council (CCC) for the purpose of CCC using it to identify coastal hazards on a 50 and 100 year time frame under the Resource Management Act (RMA). Mr Arnold is a mathematician who has had extensive involvement in policy analysis and was involved in the Kapiti process where poor work by coastal consultants led to the Kapiti Coast District Council withdrawing the hazard lines in both its proposed district plan and from the LIMs.

The expert evidence given by Mr Ivamy a T&T employee on behalf of the CCC in the Replacement District Plan Independent Hearings came to Mr Arnold's notice. Mr Ivamy's evidence was on sea level rise and was one of the inputs into T&T 2015. His evidence contained a number of significant legal and methodological errors (including a simple error in arithmetic that inflated the assumed sea level rise).

This led to Mr Arnold undertaken a more extensive review of T&T 2015. This too suffered from legal and methodological errors.

The basic conclusion from the review is that T&T 2015 isn't fit for purpose, and any actions taken by the CCC based on it should be withdrawn.

The bottom line

Mr Arnold *reviews* T&T 2015 and doesn't try to repeat it with the errors corrected. One of the criticisms of T&T 2015 is that one can't tell how the assumptions and errors impact on the reported results making the assessment useless in any subsequent planning and resource management decisions by the CCC or the residents.

However virtually all the errors do serve to exaggerate the risks of coastal erosion. A back of the envelope calculation suggests that accretion and sea level rise over the next century are likely to cancel out, leaving little change in the hazard risks over this period.

This however is not robust conclusion; it simply gives an order of magnitude indication of the extent to which T&T 2015 exaggerates. It suggests that the encroachment onto properties T&T 2015 shows is primarily a product of T&T's assumptions and mistakes.

The problems the review found

1. Under the RMA coastal hazard assessment needs to be in accordance with the NZ Coastal Policy Statement. The first NZCPS was issued in 1994 but this was superseded by a new version in 2010 that extensively reworded the provisions around hazard assessment from sea level rise. Most surprisingly T&T 2015 bases crucial assumptions, particularly on sea level rise, on the NZCPS 1994 (and guidance issued in respect of that), not the NZCPS 2010. This significantly exaggerates the risks because NZCPS 1994 refers to *possible* sea level rises; NZCPS 2010 requires the *likely effects* of climate change to be used.
2. T&T 2016 incorrectly applied precaution adding bits for “safety” throughout. Thus it further exaggerates the risk it reports. This too is contrary to the NZCPS 2010 (and DOC’s guidance on this) namely that precaution is not to be used in the assessment phase, this being the prerogative of the Council when it comes to managing those risks.
3. They double counted uncertainty in the models they used to do their projection of the shore line and this exaggerates the risks. They used grossly exaggerated limits when estimating the uncertainty compared with what they claimed they were doing.
4. They failed to test their model against history to see if it stacked up in the real world. For example they made no attempt to look at what the coast line did when major storms hit in the past to see if their model was consistent with that.

The legal failings alone make it unfit for use under the RMA.

Soundness of the legal assumptions made by Mr Arnold

The errors made in T&T 2015 fall into two areas: legal interpretation of the RMA and the NZCPS, and the projection of complex systems under uncertainty. In respect of the legal issues Mr Arnold drew on a report “The Kapiti Fiasco” written by retired Principal Environment Court Judge Joan Allin.

The views of CCC and T&T on the Arnold report

Both have had copies of the report with a request for them to identify any errors. Both have responded *without identifying any errors*. T&T have said the arithmetic error in their sea level rise estimates wasn’t material, but based this view on a NZCPS 1994 interpretation of what they were required to do rather than the NZCPS 2010 (see problem 1. above). Discussions are continuing with them on this point. CCC has asserted T&T 2015 is fit for purpose based on the standing of T&T and others. Discussions are ongoing on what should now be shown on the LIMs.

Scope of the report

The Arnold review is limited to the sea level rise assumption in T&T 2015 and its assessment of the coastal erosion hazard zones. T&T 2015 also addresses inundation zones. This aspect hasn’t been reviewed.