# Infrastructure in a coastal context: Interview with Geoff Cooper of Te Waihanga

Interview by Shelly Farr Biswell, Te Waihanga

*In May of this year, Te Waihanga released New Zealand's first long-term Infrastructure Strategy to set out the challenges we face and the changes needed over the next 30 years to build a stronger and more resilient Aotearoa. Shelly Farr Biswell, Te Waihanga Senior Communications, recently interviewed Geoff Cooper, Te Waihanga General Manager Strategy, to learn more about the Strategy and how it addresses infrastructure in the coastal environment.*

### Do you want to briefly describe what Te Waihanga (the New Zealand Infrastructure Commission) does?

Te Waihanga is relatively new on the scene. We were established as an autonomous Crown entity in 2019 to help the government and others to take a holistic and long-term view of our infrastructure. We work across government, sharing guidance on delivering critical projects, and identifying ways that New Zealanders can get value for money.

An important part of our initial work was developing Rautaki Hanganga o Aotearoa, the New Zealand Infrastructure Strategy. The Strategy identifies New Zealand's significant infrastructure challenges and provides a principles-based approach to address these challenges with the aim of achieving a thriving and resilient New Zealand. It represents the culmination of two years' independent investigation, and incorporates feedback from an extensive engagement process, along with guidance from a Te Ao Māori testing panel and a local government reference group.

### What are some of the overarching challenges for New Zealand when it comes to infrastructure?

Like many other OECD countries[1], New Zealand has under-invested in infrastructure in the past. In many cases this has meant lower service quality and resulted in existing infrastructure under pressure. At the same time, the expectations of our infrastructure are increasing. Achieving a net-zero carbon economy is in large part an infrastructure problem; changing weather patterns and rising sea levels asks more of our resilience (see Figure 1); and we need more infrastructure for housing so that our children are not priced out of our cities.

The challenges ahead are cause for introspection. Are our current ways of working fit for purpose in the face of rising building costs and greater project complexity? Are our regulatory and legislative settings fit for purpose against rapid technological change? And how can we attract the best minds to get the job done, at the very time global competition for talent is intensifying?

### What are some of the specific challenges facing coastal communities when it comes to infrastructure?

One of the biggest challenges is that even as the risks of coastal living are becoming more understood, the pressure to develop coastal land is strong. New Zealanders love living by the coast. One study estimates sea views raise the market price of a house by some 44%[2]. With new trends toward working from home and high prices in our cities, one might reasonably expect that the pressure to develop in more remote coastal living will only increase. At the same time, we have communities that have lived in remote coastal places for generations, with a strong connection to the land.

The Ministry for the Environment first cautioned of a collision between coastal development and climate change some 21 years ago[3]. Two decades on, we know more about where this collision will occur. The NZ SeaRise programme has mapped sea-level rise and vertical land movement under potential climate change scenarios (see Figure 2). We are still learning about the full impact on infrastructure, but we expect it will be significant. For instance, a 2019 study estimated that $8 billion worth of local government infrastructure is at risk from 1.5 metres of sea-level rise[4].

The Strategy doesn't have any easy answers when it comes to these issues, but it does provide recommendations on planning, decision making, financing and funding, and the types of information that we need to have available, such as robust risk assessments, good planning and regulatory policy and population modelling that can support some of the difficult choices we're going to need to make as a country.

### Can you talk a little more about the intersection of infrastructure, insurance and planning?

Adaptation will require a closer collaboration between these three disciplines. As sea levels rise, in coastal areas we might expect a sequential retreat of insurance, credit (from


*Figure 1: Satellite sea level observations, change in sea level from 1913 to 2021. For central and local government, using the best available hazard information and tools when developing regional spatial plans and planning documents and making other infrastructure investment decisions will help to reduce the risk of harm and the costs of poor investment. Source: Adapted from Physical Oceanography Distributed Active Archive Center (2021).*

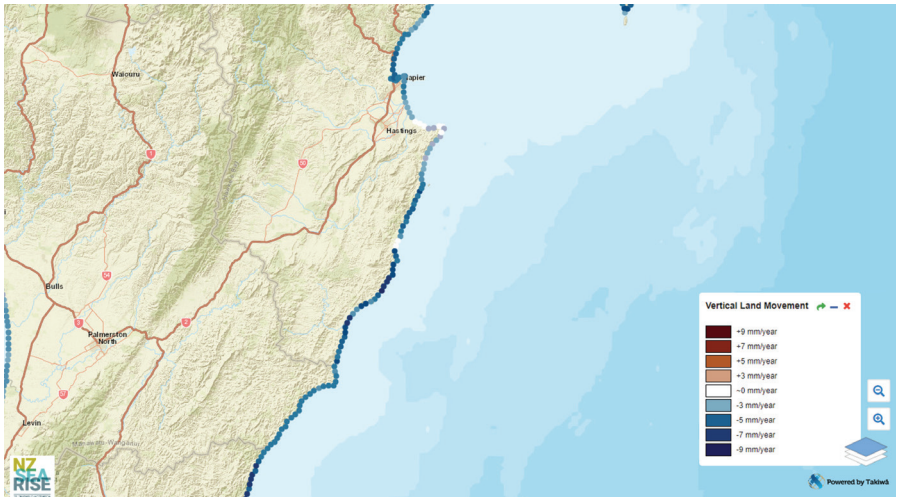


*Figure 2: NZ SeaRise's interactive map that illustrates vertical land movement. Source: NZ SeaRise (see: https://www.searise.nz/maps-2).*

banks and financial institutions) and existing infrastructure (including both economic and social). Insurance markets are a first mover because the sector is concerned with pricing risk by location – and we are learning more about the nature of that risk every day. For instance, many areas in New Zealand are expected to experience a 30 cm increase in sea levels over the next hundred years. According to Professor Tim Nash of Victoria University, this means a 1 in 50-year coastal storm flood will occur annually. For infrastructure owners, assets may become more difficult to insure at a reasonable cost, creating operating-cost pressures. Some assets may not be insurable at all. In light of such concerns, it is unsurprising to hear public comments from insurance providers asking for an end to building in flood-prone areas[5].

> *The point will come when homes become uninhabitable and homeowners will be forced to leave and live elsewhere... The inevitability of sea level rise means there is nothing unforeseen or sudden about it and insurers are likely to be unwilling to cover loss from this source.*
>
> *Tony Randerson, Chair of the Resource Management Panel*

One only needs to look at how much the insurance landscape has changed in California due to recent wildfires to understand the impending challenge[6]. Insurers have pulled back from underwriting homeowners insurance throughout the state, resulting in fewer homeowners insurance options, higher premiums, and more limited coverage terms. As insurers retreat, we should expect that mortgage applications in at-risk areas will be looked at differently as will the economic case for new infrastructure.

Those planning our future infrastructure will need to be aware of any such emerging trends and its cascading impact on spatial, infrastructure and asset management plans. The good news is that this is an area bustling with new tools and technology. Spatial geocoding and digital twin technology are just two technologies helping to rethink infrastructure planning to ease the transition; for instance, by guarding against lead infrastructure that might otherwise push new development to at-risk areas.

### How might the infrastructure response be similar or differ across coastal communities?

When we're talking about coastal communities in a New Zealand context, we need to remember that 65% of us live within 5 km of the coast. Traditionally much of our social organisation is determined by proximity, that could be local communities, cities or regions. But as sea levels rise, coastal areas will be important communities of interest. Residents on the coastlines of Opotiki, Owhiro Bay and Cooks Beach may find they have more in common than before.

While some approaches to infrastructure will be common, many of the solutions will be more bespoke. To take one example, areas with greater density of population are likely to have very different mitigation options, since these areas can spread large capital costs more effectively. Tokyo provides one extreme example, where the city has invested some 2 billion dollars in towering cathedral caverns beneath the city, which can now withstand up to 50 mm of rain per hour[7]. Adaptation in Auckland might look quite different to a small New Zealand coastal town.

Similarly, the solutions for growing areas may differ from those with flat or declining population. As we discuss in the Strategy, areas with flat or declining population already face challenges in funding existing infrastructure, even before we think about new infrastructure for adaptation. These issues may become more important in the future as 56 of New Zealand's territorial authorities are expected to experience population stagnation or decline into the 2030s. Infrastructure providers will need to consider new ways to reduce or even decommission infrastructure to manage the financial burden of maintaining under utilised or at-risk assets. In contrast, areas with population growth can adapt as they build, using asset management programmes to change course in a more incremental way.

But one thing is true for all our coastal communities whether a dense urban metropolis or a sparsely populated coastal town; long-term infrastructure planning is essential. Sea-level rise and more extreme weather patterns are coming whether we plan for it or not. And as the OECD has stated, in terms of climate change measures, 'doing nothing will cost more than acting'[8]. Similarly, and perhaps decisively, as local communities around the country rethink the infrastructure of where we live, work and play, our communities will need to grapple with the impacts on our most vulnerable. For some, this is a moral imperative, but it is also essential to an enduring consensus on the path forward.

### Can you talk about solutions to our current infrastructure challenges?

While all of us at Te Waihanga are aware of New Zealand's infrastructure challenges, we're also excited about the innovative work being done in both New Zealand and the rest of the world to address these issues. As many of your members know, for example, nature-based solutions, such as the restoration of coastal dunes, can support both climate change adaptation and mitigation objectives. Forward maintenance programmes give us the opportunity to rethink investment programmes, digital twins can allow new approaches to land-use planning, and

## NAP unpacked webinars

The National Adaptation Plan (NAP) sets out the government's response to the risks our communities, built-environment, economy and natural environment will face from a changing climate. Led by the Ministry for the Environment, the NAP is the result of collaboration across government, and incorporates feedback from a wide range of stakeholders including, iwi/Māori, local government, industry, and community groups.


Te Waihanga has hosted two webinars to unpack what the NAP means for the infrastructure sector.

- Webinar 1 (www.tewaihanga.govt.nz/news/commission-news/nap-unpacked) features Monique Cornish, Principal Advisor, Policy, Te Waihanga; Joseph Hägg, Lead Advisor – Climate Change Adaptation, Waka Kotahi; and Antonia Reid, Policy Director, Building for Climate Change, Ministry of Business, Innovation & Employment.
- Webinar 2 (www.tewaihanga.govt.nz/news/commission-news/watch-nap-unpacked-webinar) features Monique Cornish, Principal Advisor, Policy, Te Waihanga; Ajay Makhija, Team Leader, Infrastructure Resilience, National Emergency Management Agency, Te Rākau Whakamarumaru; Richard Mowil, Project Manager, Lifelines Group; and Maiki Andersen, Senior Analyst, Climate Adaptation, Ministry for the Environment.

dynamic adaptive policy pathways are helping policymakers test different scenarios and consequences before committing to a particular direction.

In the Infrastructure Strategy, we recommend prioritising non-built options when choosing how to address infrastructure challenges, including using pricing to manage demand, making better use of existing infrastructure by adapting or repurposing it, using regulation and education to manage infrastructure demands, and considering lower-cost options before progressing to higher-cost options. When it comes to new infrastructure, we need adaptation issues to be front of mind.

There's currently extensive reform going on in the planning space, but the Strategy provides recommendations on creating a planning system that meets the pace of the challenges ahead. For example, meeting the net-zero carbon emissions target and building cities that are affordable for future generations means infrastructure will need to be built in certain locations at certain times.

### What if people would like to learn more?

One of our key roles is to support government agencies, local authorities and others to procure and deliver major infrastructure projects. Our aim is to supplement, rather than replace, existing capability. As part of this we provide best practice guidance, along with procurement and delivery support. If NZCS members have questions, please feel free to get in touch.

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### References

1 https://doi.org/10.1787/354aa2aa-en (p 16).

2 Samarasinghe, OE, and Sharp, BMH (2008). The value of a view: A spatial hedonic analysis. *New Zealand Economic Papers* 42:1, 59-78.

3 MfE (2001). *Planning for climate change effects on coastal margins*.

4 Simonson, T, and Hall, G (2019). *Vulnerable: The quantum of local government infrastructure exposed to sea level rise*. Local Government New Zealand. www.lgnz.co.nz/assets/Uploads/d566cc5291/47716-LGNZ-Sea-Level-Rise-Report-3-Proof-FINAL-compressed.pdf

5 www.interest.co.nz/insurance/117220/iag-proposes-three-step-plan-combat-flood-risk-calls-end-building-flood-prone

6 https://apnews.com/article/wildfires-fires-california-eb657eafeec9b25455af06bb6dc134d5

7 www.bbc.com/future/article/20181129-the-underground-cathedral-protecting-tokyo-from-floods

8 www.oecd.org/environment/climate-change-consequences-of-inaction.htm

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