Submission on “Infrastructure for a Better Future” May 2021
Aotearoa New Zealand Infrastructure Strategy Consultation Document
NZ Infrastructure Commission
https://infracom.govt.nz/strategy/have-your-say/

From [redacted]

Comments that apply to the whole document

1. Critical Asset Lifetime Management

The **long life** of many assets is mentioned in several places (p, 23, 33, 44, 487 etc).
Critical infrastructure assets are mentioned in several places, mainly in section F6 (p.69).

I suggest Section F6 be extended. The benefit of F6.1 (Define) and F6.2 (Identify) goes beyond improving capacity to respond to “threats and shocks”. Another key benefit is to “proactively plan” to replace these assets ahead of their end-of-life, and possibly to expand their capacity ahead of that time. I would therefore add:

F6.3 For each identified Critical National Infrastructure Asset,

- **Identify “Asset End-of-Life”** (a range of years), and the range of forecasted funding required (in current year dollars)
- **Identify “Asset Capacity Expansion Needs”** (a range of years), if appropriate, and the range of forecasted funding required (in current year dollars)

F6.4 **The Timeframe** of the NZ Infrastructure Strategy needs to go beyond 2050 to include “End-of-Life and Asset Capacity Expansion Needs for every Critical National Infrastructure Asset.

In the UK, the infrastructure plan for the Thames Estuary goes out to 2100 – see https://www.gov.uk/government/publications/thames-estuary-2100-te2100/thames-estuary-2100-te2100

2. Equitable Funding across generations (mainly in section S2, p.99-105)

An economist once explained to me that public infrastructure assets, such as a water treatment plant, are typically funded by raising debt (for example bonds, in a US city). This has the advantage of “user pays” across generations and across geography. The generations who enjoy the benefits of the assets are the one who carry the burden of repaying the debt, and those who live in the jurisdiction (i.e. a city) that owns and funds the asset are the ones that pay – not those outside that jurisdiction.

I suggest consideration be given to the following hierarchy of funding mechanisms:

- Primary funding responsibility rests with the asset owner to meet the forecasted funding needs of each Critical National Infrastructure Asset. They should be required to create Infrastructure Renewal Reserves, similar to banks that are required to maintain liquidity reserves by the Reserve Bank, but these Reserves would be a

combination of savings and planned targeted debt capacity. The Renewal Reserve can be allowed to grow over time in line with the forecasted Asset End-of-Life

- Secondary funding responsibility lies with a new National Adaptation Fund as already mooted by the Climate Change Commission. This is a national savings program similar to Kiwisaver and pension funds. The funding equity rationale are
    - That all future generations, regardless of the geographic proximity to where these funds are spent, will enjoy the benefits of a NZ-wide robust infrastructure resilience as climate impacts cause changes to investment in Critical National Infrastructure Assets, and
    - That generations who contribute to the National Adaptation Fund for the benefit of future generations are doing so to partly offset the damage caused by the slow uptake of actions to mitigate and adapt to Climate Change impacts since it was first widely recognized by the formation of the UNFCCC in 1994.
- Tertiary funding responsibility lies with Treasury, to raise new debt in situations where both of the above sources have been shown to be insufficient, and the need is high for the specific Critical National Infrastructure Asset project. The National Infrastructure Bank idea recently mooted by the National Party could might contribute towards this.

NOTE: If owners of Critical National Infrastructure Assets carry out their work on time and properly using their adequately accumulated Infrastructure Renewal Reserves, those funds should satisfy the majority – perhaps over 90% - of the needs related to adequate climate change impact adaptation, because the likely timing of impacts such as sea-level rise is similar to the timing of most forecasted Asset End-of-Life costs.

3. Adoption of Dynamic Adaptive Policy Pathways (DAPP) for the National Infrastructure Strategy

The idea of DAPP was put forward in New Zealand in a 2019 research paper "From Guidance to practice: The adaptation transition at the coast" by Judy Lawrence, Rob Bell, Paula Blackett, Emma Ryan, and Laura Robichaux as part of the Resilience to Nature's Challenges National Science Challenge (p.4, 6, 9, and 15). It says:

> "The *Guidance* [the 2017 revision of the Ministry of the Environment national guidance on coastal hazards and climate change for local government] recommends the Dynamic Adaptive Policy Pathways (DAPP) approach because it enables uncertain futures to be considered by retaining flexibility, rather than prescribing a single sequence of actions (Haasnoot, Kwakkei, Walker, & ter Maat, 2013)."

The paper refers to following in its Reference List:

> Haasnoot, M., Kwakkel, J., Walker, W., & ter Maat, J. (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. *Global Environmental Change, 23*(2), 485-498. Available at: http://www.sciencedirect.com/science/article/pii/S095937801200146X.

Lawrence, J., Bell, R.G., & Stroombergen, A. (2019). A hybrid process to address uncertainty and changing climate risk in coastal areas using Dynamic Adaptive Pathways Planning, Multi- Criteria Decision Analysis and Real Options Analysis: A New Zealand application. *Sustainability, Special Issue: Policy Pathways for Sustainability*, 11:406, 18 p, doi:10.3390/su11020406, https://www.mdpi.com/2071-1050/11/2/406.

While DAPP is still relatively new, the Infrastructure Commission should invest effort into applying DAPP concepts to its strategy, and should keep abreast of ongoing work on this topic.

4. Integration of Regional Spatial Planning with Models that support National Strategies

Models are used in several government research and planning efforts:

- The suite of models used by the Climate Change Commission in preparing their "2021 Draft Advice for Consultation"
- Models of the electricity network that forecast building future projects in a "generation stack", including projects proposed in the MBEI NZ Battery Project
- Models developed by NIWA to forecast future risks of drought (areas of lower annual rainfall and higher temperature), fluvial flooding (areas of higher annual rainfall), and coastal inundation (areas exposed to risks of high sea-level events)
- GIS models used to support the Three Waters Review

Integration and coordination of regional spatial plans is mentioned in several places in the main consultation document (p.14, 60, 76, 79, 85, 89, 97, 98, 109 and 123). These strategy goals are broad, and a more specific action should be added:

> The Infrastructure Commission should, as part of its strategy, advocate for provisions in the soon-to-be-drafted Spatial Planning Act (SPA) that requires funding of ongoing efforts to integrate these climate-related models, infrastructure-related models, and the infrastructure project pipeline in ways that can, and eventually must, inform Regional Spatial Planning.

5. Expand the Infrastructure projects pipeline

The Infrastructure Commission maintains an infrastructure project pipeline that contains a mix of approved projects and proposed projects awaiting consideration. This needs to include a pipeline of candidate adaptation-targeted infrastructure projects, ideas yet to have their proof-of-concept projects funded. For example, the idea of Flexile Barges to capture Fiordland rainwater as it flows into the Tasman sea, to transport to urban water reservoirs (see https://en.wikipedia.org/wiki/Flexible_barge). DAPP can be applied to the consideration of investing in the early-stage development of selected ideas from this pipeline.

6. Public engagement for Active Citizenship.

Thank you for the engagement process you undertook in preparing this report, and for the consultation opportunity you are now publicly offering. Here is a recent article about a city in California I feel can help us all go further with our public engagement:

"The future of carbon removal is built on reimagined public engagement" by Vanessa Suarez, May-2021
https://carbon180.medium.com/the-future-of-carbon-removal-is-built-on-reimagined-public-engagement-7ef2b32b075b

The May 2021 Royal Society Submission "Aotearoa New Zealand's Histories: A Response to draft curriculum" (see https://www.royalsociety.org.nz/assets/Aotearoa-New-Zealand-histories-response-to-draft-curriculum-May-2021-digital.pdf) says in its conclusion (p.21) "The Aotearoa New Zealand Histories draft will make a significant contribution to providing children and young people with historical knowledge that has intrinsic value in and of itself, as well as providing an informed knowledge of the past that they, as active citizens, can apply in debates in the present." (my highlighting).

"Active citizenship requires a sense of inclusion in an increasingly diverse society." ." (my highlighting).

Long-term public engagement – especially in face-to-face gatherings of local communities - on NZ's Infrastructure Strategy and Climate Change Adaptation Strategy has huge positive potential to develop NZer's active citizenship, thus improving connectedness and the overall social health of local communities.

Comments by document section & page

Most of the content in p.1-19 is repeated in p.20—125, so my comments are listed in page number order for p.20-125. However, one section appears only once on p.13-14:

Proposed Action Areas

- P.13-14 I agree that all 5 are priorities, but I would add a 6th:
  - **Balance Net migration with Infrastructure capacity**

1. (p.20) Introduction

- OK, no suggested changes

2. (p. 22) A 2050 vision for infrastructure

- P.24 Q1 response: Agree, wording is good – having "thrive for generations" as a focus works well.

- P.26 Q2 response: needs to add to the list of decision-making principles:
  - **"Public participation**: We regularly and meaningfully engage with the NZ public – exemplified by this Strategy consultation process – and with face-to-face programs in local communities."

3. (p. 27) The challenges for NZ infrastructure

- P.29 list of challenges
  - "access to safe drinking water" should read "access and secure supply in all seasons of safe drinking water"
  - Good to see "adapting to and mitigating the effects of climate change"
- P.30 Figure 3 is good, includes climate change adaptation
- P.31-32 list of trends, needs to add
  - **Increasing disruption of too-intense (lumpy) infrastructure work**: When infrastructure work is too intense over a period of time in one area (for example the City Rail Link in Auckland, compounded with Central Auckland urban design changes) the adverse impact on businesses and the public can be too costly. Better planning and coordination are needed to avoid the worst aspects of this.
- P.35 In the Transportation list add
  - Prices for fossil transport fuels may become volatile as global pressure on reserves creates scarcity before NZ can transition to EV fleets
  - Some trends are putting downward pressure on traffic congestion, complicating long-term plans for road capacity increases:
    - increasing uptake of car services and public transport with better smartphone apps.
    - Increasing and ongoing uptake of working and attending school from home, as introduced during the Covid-19 lockdowns

- P.36 **Congratulations – well said,** coordination across upcoming policy reforms is a key role for the Infrastructure commission
- P.37. This may be the place to make this statement (see my item 3 in the first section above):
    - "We need to build a capacity for Dynamic Adaptive Policy Pathways (DAPP) to allow the National Infrastructure Strategy and plans to be robust – capable to adjust to unexpected shocks such as the Covid-19 pandemic."

4. (p. 38) What you have told us

- P.41 Q3 response: On p.40 "..cities cannot keep up with [waste] growth" needs to be expanded. ALL infrastructure maintenance and expansion has failed to keep up with growth, so an obvious policy option is to **Balance Net migration with Infrastructure capacity**

5. (p. 42) Areas where action is needed

- P.45 Q4 response:
    - Agree: all but the Population item.
    - Disagree: For the Population item, we should delete "Infrastructure will need to keep up with this growth" and replace it with "The Net Migration part of Population growth must be kept to levels that can be supported by infrastructure capacity"
    - Gaps: "prepare infrastructure for climate change" is too broad. Only by identifying specific aspects can the magnitude of this "need" be properly appreciated. It not only involves managing complexities NZ's climate refugees who lose their homes and businesses to sea level rise, river flooding, drought and wildfires, but having the infrastructure capacity to accept climate refugees from our Pacific neighbours.

- P.50 Q5 response: This has been covered thoroughly in the Climate Change Commission's "2021 Draft Advice for Consultation" published in Feb-2021, section 3.8.1 Transport (p.57-59). It also highlights the growing importance of coordination between the Infrastructure Commission, the Climate Change Commission, the 11 Science Challenge programs, and the MBIE NZ Battery project.

- P.51 Q6 response:

    - The biggest contributor to landfills in Auckland in the years to 2024 or so is construction and demolition waste from the Housing NZ rebuild of social housing. Options to divert more of that waste from landfills include:
        - Substantial increases in the cost of sending waste to landfills by construction firms
        - Development of infrastructure in new suburb sites in rural towns, with a financial "carrot" to move whole houses from Auckland social housing sites to these new suburb sites, and offer them as both affordable housing and emergency housing.

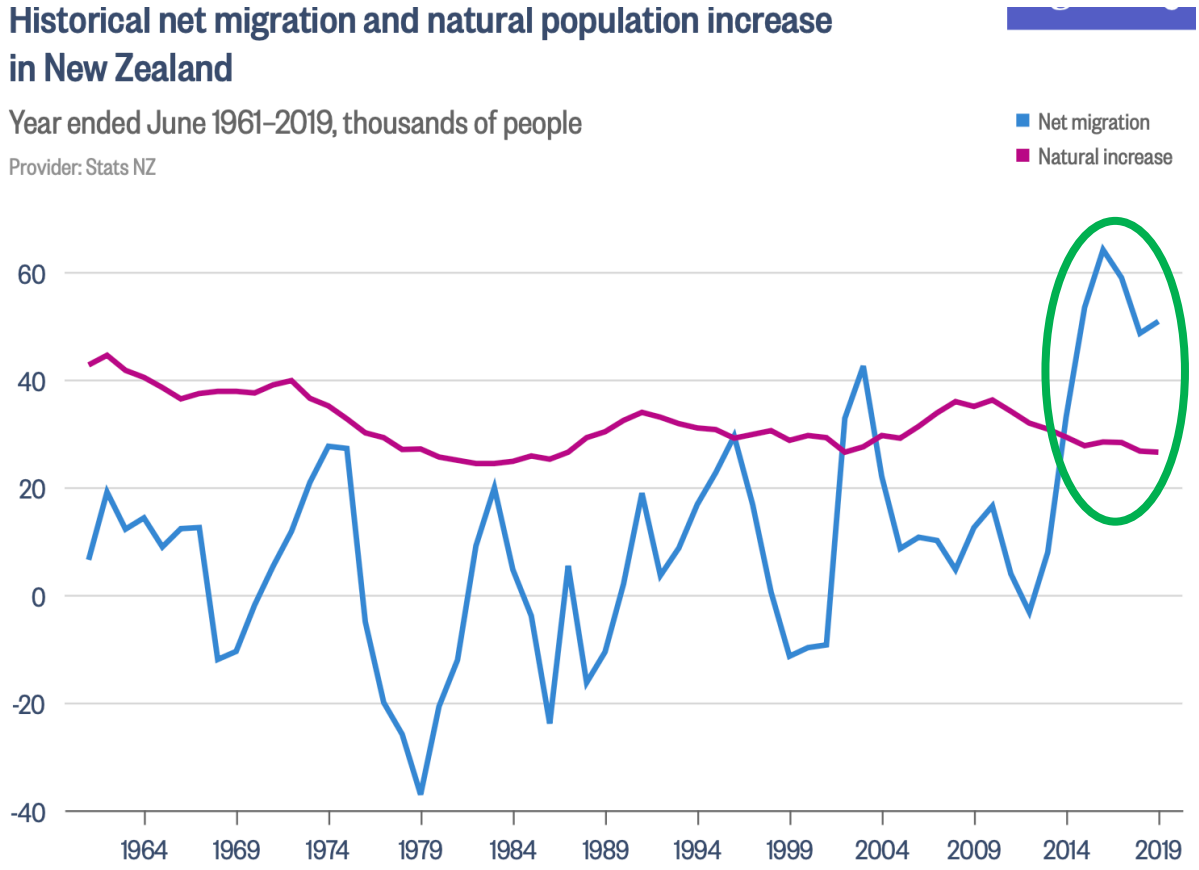
    - Legislation that requires Manufacturer Take-Back, via retailers, with required recycling, will dramatically reduce the volume of household goods that go to the landfill. The best examples are TV sets and computer printers.

- P.56 Q7 response: Components of a national energy strategy already exist in the March 2020 Transpower report "Whakamana I Te Mauri Hiko: Empowering Our Energy Future", their Feb-2021 report "A Roadmap for Electrification" and the in the Climate Change Commission's "2021 Draft Advice for Consultation" Chapters 5 and 6.
- P.56 Q8 response: The reform of the Resource Management Act could include a provision for renewable energy zones. For example, South Island high rainfall catchments could be zones for rapid consenting processes (a few months at most) for expanded hydro generation and water storage reservoirs for dry year hydro, irrigation and even urban drinking water supply.
- P.56 Q9 response: I favour "increased opportunities for investment in new distributed generation, and facilitating greater community involvement" (p.115). For example, reducing barriers to proposals like solarZero from SolarCity for wide-spread rooftop solar energy – see https://www.solarcity.co.nz/blog/solarzero/introducing-solarzero

- P.61 Q10 response: The use of cellular network data on smartphone GPS movement is currently used in mapping apps for near-real-time highlighting of traffic congestion. This could be used more widely (if it is not being used this way already): to identify route origins and destinations, and then to forecast changes with future higher density in housing to highlight potential future congestion points, and to model various congestion mitigation options (peak congestion charges, targeted carless days, etc).
- P.61 Q11 response: no comment
- P.61 Q12 response: no comment

- P.66 Q13 response: NZ could invest in "climate-refugee-ready housing" in regions with declining population, buying homes and mothballing them, ready for future use for both emergencies and for climate refugees from both NZ and the Pacific.

- P.66 Q14 response: Yes, New Zealand needs a public conversation about how we might define our Optimum Population for our changing "carrying capacity", measured in infrastructure quality, environmental quality, and economic production capacity. That process should take years, and require continuous re-revaluation, but it is not physically possible to continue the high rates of net migration of the years 2015-2019.



- P.68 Q15 response: no comment
- P.68 Q16 response: no comment
- P.68 Q17 response: no comment

- P.72 Q18 response: Agree/ Disagree/ Gaps
    - Infrastructure contributes, but is only part of a complex mix of factors that make up the quality of life in cities and regions. The rest of the mix needs to be acknowledged – avoid a one-eyed look at just infrastructure.
    - I agree with most of the specific discussion of Needs on p.73-90.
    - "Improved physical and social connection" are listed as C5.1 and C5.2 on p.90. A specific solution option for could be: "Replicate Success Examples" (even though it only tangentially involves infrastructure):
        - Identify examples of successful "model" businesses and supplier/market cooperation that are demonstrating prosperity.
        - Attract people who are committed to invest time and money into working towards replication of those examples

        - Support the replication process – providing a framework (including infrastructure) for connection between the Model operators and the would-be Replicators.

- P.81 Q19 response:
- P.81 Q20 response:

- P.85 Q21 response: no comment
- P.85 Q22 response: no comment

- P.90 Q23 response: Ubiquitous free WiFi is all public spaces: train stations, bus stops, community halls, sports and event venues, shopping malls and office buildings would transfer data traffic from the cellular network (where it costs the user) to the internet (where the WiFi is free in many places), thus widening the uptake of digital connection.

- P.93 Q24 response:
    - p. 13 shows "Institutional and governance reform" as the #1 priority – I agree, and that should be reflected in this section of the strategy
    - All 4 of my comments in the first section of this document apply to the "Creating a Better System" Action and Needs.

- P.97 Q25, Q26, Q27 response:
    - See all 4 of my comments in the first section of this document
    - An investigation into the sources of NZ's high costs compared to other countries should be undertaken – preferably with university students doing most of the leg work, reducing the investigation cost and boosting educational co-benefit.

- P.105 Q28, Q29 response:
    - The idea of an Infrastructure Bank has merit, gaining better terms for long-term debt see https://www.stuff.co.nz/national/politics/122710597/election-2020-national-promises-to-create-national-infrastructure-bank-to-fund-government-projects. However, I feel it would work best in an overall framework as outlined in my point #2 above on page 1 of this submission.
    - What should NOT be done is to privatise and sell or lease infrastructure (such as ports) to overseas investors, as has occurred in Australia – see https://www.abc.net.au/news/2019-03-19/can-darwin-port-99-year-lease-china-be-reversed-andrew-robb-role/10912478
- P.105 Q30 response: no comment

- P.111 Q31 response: no comment
- P.111 Q32 response: In electricity, the Electricity Authority might be the appropriate body to monitor the plans of electricity generators to renew/rebuild their generation assets against newly created standards for the quality and detail of such plans. Similar standards could be created for ports, airports, waste water treatment plants, electricity distribution networks and internet networks. An appropriate central body might be chosen to monitor renew/rebuild plans of asset-owners and enforce compliance to these standards.

- P.120 Q33 response: I agree with the points made in S6, and would add the following:
    - Infrastructure projects are large – they are most common type of large project in any country – and they have a terrible track record of cost and time overruns. Investing effort into researching and trialling new contract terms should result in a considerable improvement for cost control on future infrastructure project. For example, fixed price terms with no loopholes for contractors to escape via bankruptcy, and/or a solid backstop of construction insurance, the cost of which is potentially passed on to any contractors who incur penalty clauses. Also, owner-initiated design changes post-contract could equally incur penalties on the design team who may have overlooked something, or the party responsible for driving the design change.
- P.120 Q34 response: Yes, for any project where purchasing clout can make a difference, as long as the benefits gained are not offset by the extra costs of more internal management complexity.

- P.122 Q35 response: For a start, see my response to Q33 above, which applies to containing committed costs. To improve the quality and size of bids, expand the idea in S6.1 to include study of success stories & best practice in contractor bid preparation and cost minimisation.

- P.124 Q36 response: To answer this evidence would need to be collected from the 2020 experience – what were the specific productivity & economic losses in the infrastructure construction and design sector of the NZ economy? I would expect that work-from-home readiness could ensure no future losses occur in the design sector, and onsite-PPE-and-distancing protocol readiness could reduce future losses in the construction sector, although the supply chain issues are very complex.

6. (p. 125) What Happens Next

- You say “we will provide the draft Infrastructure Strategy to the Minister for Infrastructure in September 2021”. Will that version be published online for public viewing, or emailed to those who made submissions?

7. List of Discussion Questions

No comment, a repeat of the main text.

8. List of Options

- By using the term “options” I assume the final report will either limit the size of this list and/or sort it into priority order. On p.13-14 you list 5 “priority areas”. Are you requesting consultation on how people making submissions feel the Options should be weighted or prioritised?

9. Want to know more?

- I suggest you add (and use in your strategy) reference to these documents:

  ACP – Te Taruke-a-Tawhiri, Auckland's Climate Plan
  https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/environmental-plans-strategies/aucklands-climate-plan/Documents/auckland-climate-plan.pdf

  TE2100 – **Thames Estuary 2100**, UK Environment Agency
  https://www.gov.uk/government/publications/thames-estuary-2100-te2100/thames-estuary-2100-te2100

  SLR3 – Vulnerable: the Quantum of local government infrastructure exposed to sea level rise, LGNZ
  https://www.lgnz.co.nz/assets/Uploads/0bb3c3d32a/Planning-for-Sea-Level-Rise-v7-FINAL.pdf

  SLRLG – Sea-Level rise and local government: Policy gaps and opportunities, Victoria University for the Deep South National Science Challenge
  https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Sea-level-rise-and-local-government-Policy-gaps-and-opportunities.pdf

  The 3 papers on DAPP listed above on p.2-3 of this submission.

10. References

- As above in "Want to Learn More?"