2nd July 2021

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Aotearoa New Zealand Infrastructure Strategy Consultation Strategy Document, May 2021

Introductory comments

Thank you for the opportunity to comment on Aotearoa New Zealand Infrastructure Strategy Consultation Strategy Document May 2021. This submission is made by Water New Zealand.

Water New Zealand is a national not-for-profit sector organisation comprising approximately 2400 corporate and individual members in New Zealand and overseas. Water New Zealand is the country's largest water industry body, focusing on the sustainable management and promotion of the water environment and encompassing the three waters: drinking water, waste and storm waters.

The water sector is undergoing a period of radical change. The combined central goverment changes for 3 waters to improve service delivery and aging infrastructure opens a "window of opportunity" for reassessing past practices and design philosophies to re-orientate the sector towards an improved and efficent sector of critical infastructure. Each of these changes offer an opportunity for Te Waihanga to deliver on its strategy;

- The new drinking water regulator, Taumata Arowai is set to commence operation later this year.
- The Government Three Waters Reform Programme – a three-year programme to reform local government three waters service delivery arrangements.[1]
- Proposed amendments to the Civil Defence Emergency Management Act (CDEM) with an increased attention to resilience and reporting.
- The Tertiary Education Commission's Reform of Vocational Educational which will impact how the the majority of the three water operational and contracting staff are trained.[2]
- The review of the Resource Management Act (RMA), which may adress some of the iussues identified in stratgey document but will also bring with a new set of guidelines for looking after the environment.

The proposed three waters reform program has an estimated start date for new entities on 1st July 2024. Any existing three waters Long Term Plan (LTP) projects may be accelerated after this date or may be revised to be part of a more centralised approach to treatment of water that has a lower carbon footprint, greater resiliance and improved efficency. The time to consider a combined utility response to infastructure would be better suited to the early stages of the proposed three water

[1] Department of Internal Affairs, Central/Local Government Three Waters Reform Programme https://www.dia.govt.nz/Three-Waters-Reform-Programme
[2] Tertiary Education Commission Reform of Vocational Education (RoVE) https://www.tec.govt.nz/rove/reform-of-vocational-education
[3] Ministry for the Environment, Comprehensive review of the resource management system https://environment.govt.nz/what-government-is-doing/areas-of-work/rma/

entities looking at their infrastructure project workload. Combining with other utilities programs on day one will make a complicated task more challenging.

Overall Water New Zealand support the approach being taken by Te Waihanga.

Response to Strategy Document Questions:

Q1. What are your views on the proposed 2050 infrastructure vision for New Zealand?

We support the aims of the proposed infrastructure vision. In particular, the inclusion of both infrastructure that supports carbon-neutrality and improved resilience. While this is unlikely to be the cheapest option, these objectives will better serve Aotearoa.

We are pleased that a focus on education, training and skills has been identified as an area that needs change. We believe that a skilled workforce coupled with a more stable employment environment is critical to realising this vision and seizing the opportunities that technology provides.

Q2. What are your views on the decision-making outcomes and principles we have chosen? Are there others that should be included?

Water New Zealand supports the inclusion of Māori in decision making, particularly when considering infrastructure options. We note that the under-representation of Māori and Pasifika with the water sector are particularly stark, in technical and decision-making roles. This is a major constraint on the water infrastructure sectors ability to meaningfully partner with Māori and uphold principles of the Te Tiriti o Waitangi and an area where change and attention is needed.

Q3. Are there any other infrastructure issues, challenges, or opportunities that we should consider?

We are pleased to see that ensuring drinking water meets health standards has been identified as an issue and wish to underscore the importance of this. Many drinking water networks have not met the New Zealand drinking water standards and Health Act requirements for over 20 years[2]. For drinking water networks, this should be seen as a basic business as usual requirement.

Another challenge for the water sector is moving to a sustainable model, that unlocks resource recovery opportunities from wastewater which include water, energy and nutrients.

The resilience of water networks to a range of natural hazards (most notably earthquakes) is an issue, which is broader than the hazards posed by climate change.

Q4. For the 'Building a Better Future' Action Area and Needs: What do you agree with? What do you disagree with? Are there any gaps?

An additional area where action is needed is integrating research and development opportunities with infrastructure delivery. Research and development addressing water infrastructure issues is adhoc and disagregated. Academic institutions and CRI's operating models are not well aligned with industry needs. A new model is needed to address knowledge gaps and bring to market new technologies which individual industry actors can not address on their own. The BRANZ model, funded by the building industry levy is an example of a New Zealand model, that could be replicated for other infrastructure sectors. The government's three waters reform programme is an ideal time to develop such a model to serve the research needs of water infrastructure.

We agree with the need for action on transitioning infrastructure for a zero-carbon 2050. The contribution of the water sector to this transition is not insignificant. Direct greenhouse gas

[2] https://www.health.govt.nz/publication/annual-report-drinking-water-quality-2019-2020

emissions of methane and nitrous oxide from wastewater contribute an estimated 1.6% of total global emissions[3]. To this may be added the contribution from emissions associated with energy use. In New Zealand these are more than 700 TJ/year for water supply and 1,000 TJ/year for wastewater[4].

We particularly support the need to evaluate and include the costs of mitigating carbon over the life of infrastructure. Capital delivery of water infrastructure can also be a significant contributor to greenhouse gas emissions. For example, Watercare conducted an analysis of carbon emissions associated with projects planned to be undertaken prior to 2029. They found that carbon emissions associated with new projects were greater than operational emissions over the same period. Off the back of this analysis Watercare are targeting a 40% reduction in carbon emissions from construction by 2024[5]. A total carbon view should be taken when assessing potential project options, not just embodied carbon.

Q6. How else can we use infrastructure to reduce waste to landfill?

Approximately most half of the nation's wastewater treatment biosolids are disposed of in landfills. This disposal is typically consented at a four to one ratio mixed with general rubbish, hence there are issues across the country trying to find enough general rubbish to maintain this ratio. Alternative reuses exist including land rehabilitation (such as quarries) and as an agricultural amendment (where adequate trade waste and treatment can be provided). Central government assistance in writing guidelines on disposing of biosolids to land in a safe effective way could facilitate the reduction of biosolids to landfill.

There are also options that reduce the volume of biosolids (the solid fraction of sewage) that are produced from wastewater treatment plants, and simultaneously recover energy. Processes that achieve this include; anaerobic digestion, co-digestion of bio-solids with other organic wastes, bio-solids incineration, or conversion of bio-solids to other fuels through processes such as gasification and pyrolysis. Such technologies require a higher capital expenditure and level of expertise to operate but have a lower overall operational cost.

Wastewater treatment plants could also be used to reduce the volume of organic wastes going to landfill. Co-digestion of organic wastes at wastewater treatment plants is increasingly common internationally (for example the “Rewaste” facility in Melbourne) and is being actively trialled in a few locations in New Zealand (for example in Palmerston North). Co-digesting organic wastes with sewerage can increase energy production and provide solid and liquid streams which can be reused for their nutrient value. These opportunities are igniting a global movement to gradually recast “wastewater treatment plants” as the “resource recovery facilities” of the future.

Q7. What infrastructure issues could be included in the scope of a national energy strategy?

Water and energy nexus should be included in a national energy strategy. Water is an essential input for many energy sources, including thermal energy generation, hydro-power and geo-thermal. The national energy strategy will need to ensure that existing water supply shortages in areas such as Auckland are not exacerbated. Water shortages have the potential to result in increased energy use if desalinated or recycled water supplies are required to meet the water needs of towns and cities.

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[3] IPCC, Climate Change 2014 – Mitigation of Climate Change. Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. www.cambridge.org/9781107654815

[4] Water New Zealand, National Performance Review 2019-2020 www.waternz.org.nz/NationalPerformanceReview

[5] Managing Infrastructure Carbon in New Zealand, H. Edmond (Mott MacDonald), C. Thurston (Watercare Services Limited), A. Mogridge (Watercare Services Limited), N. Dempsey (Mott MacDonald)

Furthermore, energy is an input in the treatment and distribution of water. Further energy is consumed in the heating of water within homes and business and in water using appliances such as dishwashers and hot water heaters. At the other end of the pipe energy is used to convey and treat wastewater. Energy efficiency throughout this water cycle should also be considered as part of an energy strategy.

There are many opportunities to reduce energy by using water more efficiency. This can be achieved through financial mechanisms, such as charging for water, and non-financial mechanisms such as behaviour change campaigns and effective labelling. Technical options also exist to reduce emissions through optimisation of pumps and treatment plant processes.[6]

The energy generation opportunities from water and wastewater infrastructure are also numerous. Using micro hydro units (as an alternative to Pressure Reducing Valves) can provide generation off the hydraulic energy of water networks. Solar arrays can be co-located with water assets due the number of secure flat sites. Biogas recovery from wastewater can be used to produce gas, in turn fired to generate electricity, or burnt as a fuel to provide process heat. In addition, emerging technologies such as pyrolysis, hydrogen recovery and algae, all present opportunities to utilise wastewater as the feedstock for liquid fuels.

Q9. Of the recommendations and suggestions identified in the Ministry of Business, Innovation and Employment's "accelerating electrification" document, which do you favour for inclusion in the Infrastructure Strategy and why?

Water New Zealand agree with the challenges identified in getting resource consents. Similar challenges are faced by wastewater treatment plants. It is not uncommon for wastewater treatment plant discharge resource consent to take up to 6 years of planning and to cost several million dollars.

Q10. What steps could be taken to improve the collection and availability of data on existing infrastructure assets and improve data transparency in the infrastructure sector?

Adoption of a consistent approach for recording assets and their condition. Further development of the National Pipe Data portal, delivered by the Building Innovation Partnership, would be a significant step in this direction. The tool is underpinned by data standards which have now been adopted by several water entities. The three waters reforms being proposed by government offer a prime time to operationalise standard data collection and recording standards. Further development of a full suite of standards is required now to realise this opportunity. Consistent data collection and reporting is needed to create the foundation for innovative tools that could be used to better understand and predict asset performance. Having a national 3 waters SCADA standard would also assist in providing transparent data for the water sector.

Improving the transparency and availability of data to the public on water infrastructure could be improved throughout the reform process. Embedding appropriate performance metrics for new entities, with appropriate monitoring and reporting processes could provide the public with better understanding and oversight of water assets. The "Discover Water" website, coordinated by the British water regulator is a good example of how the public can be provided with information on infrastructure; https://www.discoverwater.co.uk/.

There is also an opportunity to make better use of the data and portals that exist now. For example, information on water, wastewater and stormwater consents and compliance is disaggregated and difficult to access. Development of a database to centralise this information could improve opportunities to assess performance and identify improvements. The Land and Water Aotearoa database could be further expanded to provide this information to the public. For example, to notify

of wastewater overflows, or wastewater treatment plant consent breaches that may impact on swim-ability.

Q11. What are the most important regulatory or legislative barriers to technology adoption for infrastructure providers that need to be addressed?

Three waters entities provide an essential public health service and as such need to have a cautious approach to innovative technology, given Cyber Security threats. This is not well understood by the sector and requires a more proactive assistance from central government.

Q12. How can we achieve greater adoption of building information modelling (BIM) by the building industry?

There is a group of people in the water sector and universities looking at how BIM can be adopted for horizontal infrastructure. This group is keeping across developments in both Australia and BIM for water in the UK. Central government assistance would add this group which is currently working in a volunteer basis.

Q22. Should a multi-modal corridor protection fund be established? If so, what should the fund cover?

Multi corridor protection should not be restricted to rapid transit networks, other networks also benefit from designated land and routes. As motorways expand other critical infrastructure gets buried making maintenance and impacts of failure challenging. For example, in the Wellington Region, the expansion of State Highway One over a bulk water main means replacing a $4,000 valve now costs more than $400,000.

Because there has not been a dedicated corridor for the fibre roll out, there have been several instances where directional drilling has damaged wastewater infrastructure. The effects for this will be ongoing for a decade or more to come with repair costs impacting rate payers and reducing funds available for improvements.

Q24. For the 'Creating a Better System' Action Area and the Needs: What do you agree with? What do you disagree with? Are there any gaps?

We agree that you have correctly identified the problems. Additional needs that we believe are gaps in the current list are.

1. *Workforce development*. Finding trained staff, contractors, and getting personal into New Zealand is a significant issue.
2. *Facilitating innovation*. The lack of co-ordination between universities and crown research institutes, or dedicated funding for infrastructure related research and development limits our ability for infrastructure to evolve.

Q25. Does New Zealand have the right institutional settings for the provision of infrastructure?

The Havelock North inquiry and the three waters reform programme have identified numerous, now widely recognised shortfalls with current institutional settings for water. These include constraints on the ability of network providers under current arrangements to fund infrastructure deficits, comply with safety standards and environmental expectations, build resilience to natural hazards and climate change into three waters networks, and support growth.

Q26. How can local and central government better coordinate themselves to manage, plan and implement infrastructure?

Consistent consenting practises for both resource consent and building consents, provided at a national level would assist co-ordination of infrastructure delivery. Central government funding to help create new development design guidelines would assist local councils as well as developers and contractors. A consistent approach rather than a developer lead design that is then gifted to a local government entity to operate and maintain creates a lot of systems that do not necessarily integrate well as well as requiring different spares, specialist tools as well as knowledge. This does not lead to an efficiently run system.

Q27. What principles could be used to guide how infrastructure providers are structured, governed and regulated?

The governance of three waters should be carried out by individuals that have a good understanding of infrastructure management and public health.

The term of the governance structure is such that it provides long term stability.

Q29. Are existing infrastructure funding and financing arrangements suitable for responding to infrastructure provision challenges? If not, what options could be considered?

Not for water infrastructure. The sheer size of the water infrastructure deficit indicated by Government - $120b-$185b over the next 30 years – is unlikely to be affordable and achievable under the current Local Government financing arrangements.

We support the gradual shifts that are underway to introduce volumetric charging of water. More than half of New Zealand's residential properties have metering in place (skewed by full water metering in Auckland). Twenty-one service providers have no residential metering.

Q31. What options are there to better manage and utilise existing infrastructure assets?

With the use of smart meters demand management applied to the electricity industry could equally be applied to mitigate peak water use, mitigating the need to increase the network capacity due to growth. There is benefit in combining water meters with power meters to this end.

With changing from a gravity sewer network to a pressure sewer network there is the ability to avoid larger gravity sewer pipes being installed and the associated carbon, traffic and health and safety challenges with installing new pipes to manage growth. Pressure sewers are a more resilient sewer network than gravity sewers but do come with a higher maintenance and operational challenges. There is the added benefit of homeowner education regarding the improper use of a sewer that comes with pressure sewers.

Q33. What could be done to improve the procurement and delivery of infrastructure projects?

Development of a cost benefits analysis template for the water sector.

Q35. What could be done to improve the productivity of the construction sector and reduce the cost of delivering infrastructure?

Further development of a skilled workforce. One example of how this could be facilitated is a contracting model used by New Plymouth District Council. The councils work contract includes workforce training as one of the key performance indicators. The spinoff from correctly installed assets that will last the full design life period far out way the additional cost imposed on the

construction contract. Having a skilled, knowledgeable workforce has additional societal benefits not just associated with infrastructure.

Q36. What components of the infrastructure system could have been improved to deliver effective stimulus spending during the Covid-19 pandemic?

Having a skilled water workforce. The demand for skilled workers already lagged a long way behind a trained professionals prior to the COVID-19 pandemic. This was exacerbated by an influx of Covid stimulus spending. For example, much needed stimulus spending was provided for asset condition monitoring, however the additional work that could be carried out is limited by the number of trained people able to carry out the asset condition assessments.

Ngā mihi nui

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