

New Zealand Infrastructure and Communities Institute

by the Universities of Auckland and Canterbury

Executive summary

This submission focuses on an advanced training and research entity, the New Zealand Infrastructure and Communities Institute (working title), which is needed to enable the infrastructure objectives of the Infrastructure Commission and to improve infrastructure service outcomes. The proposed Institute will be established:

1. In collaboration with the Infrastructure Commission and other key industry and public sector organisations.
2. With a remit to lift sector capacity, capability and innovation.
3. With core functions (Figure 1) to deliver:
 - a) data, information and advice to improve infrastructure policymaking, planning, design, construction and management
 - b) collaborative research to identify, develop, assess and demonstrate advanced technical and non-technical infrastructure solutions
 - c) guidance, training and tools to upskill infrastructure practitioners and owners
 - d) authoritative voice on infrastructure solutions
4. With Government support of \$20M per annum for the Institute’s operations, subject to business case approval by the relevant Ministers and Cabinet.

The Institute will add scale, leadership and coordination to sector capability building and innovation, which are needed to implement new and better ways of delivering infrastructure.

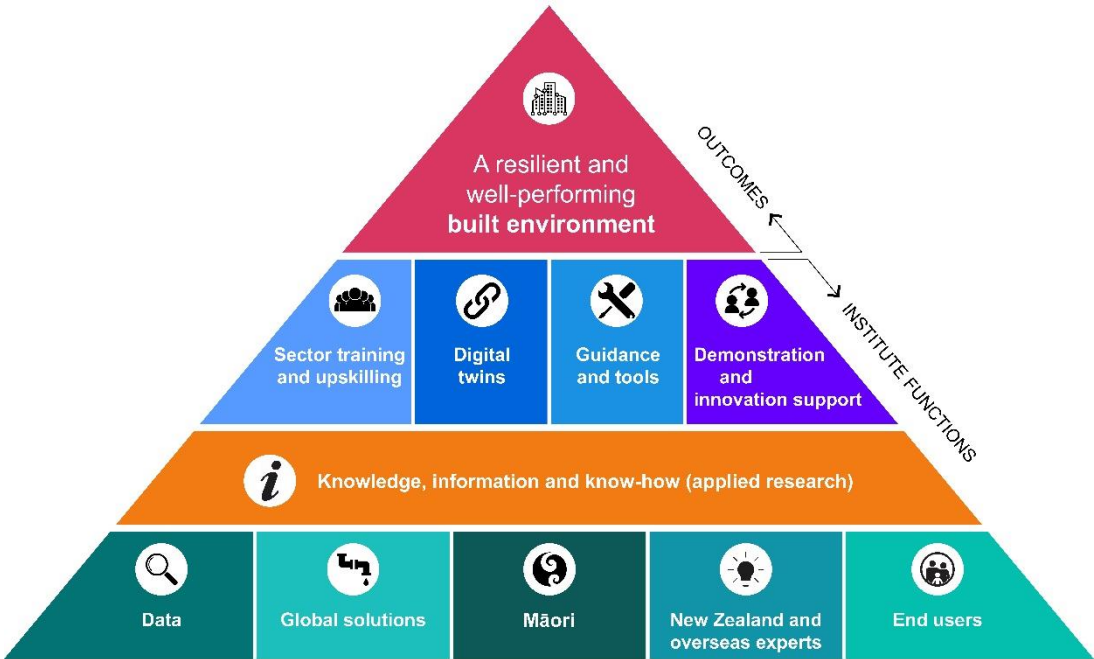


Figure 1. Functions of the proposed New Zealand Infrastructure and Communities Institute

Introduction

After careful consideration we identify that a missing element of the Strategy Consultation Document is the need for advanced training and research, to lift sector capacity, capability and innovation. This submission focuses on the proposed New Zealand Infrastructure and Communities Institute (working title) that addresses this need.

Why the Infrastructure and Communities Institute is needed

Given the size of the country's 'infrastructure deficit' and its limited financial resources, more funding for infrastructure is not the whole answer. New and better solutions for delivering infrastructure services are also needed to close the costs-funding gap.

The proposed Institute will support the development of new infrastructure solutions, in collaboration with Government, industry, Māori and the wider community. It will also help lift the infrastructure sector's capability, which is critical to implementing new solutions. It will do this by delivering:

1. Data, information and advice to improve infrastructure policymaking, planning, design, construction and management. It will 'host and promote' national databases (e.g. NZ Geotechnical Database) and support digital twins of national infrastructure.
2. Coordination of collaborative research to identify, develop, assess and demonstrate advanced technical and non-technical infrastructure solutions.
3. Guidance, training and tools to upskill infrastructure practitioners and owners.
4. Authoritative voice on infrastructure solutions.

The current provision of these functions is fragmented and inadequate to provide the step-change needed in sector innovation and productivity – the national spend on research is less than 0.2% of investments in horizontal and vertical infrastructure. The Institute will provide a platform for innovation and capability building, and will do this far more effectively than currently is the case.

Innovation in the infrastructure sector

The infrastructure sector is ripe for innovation. McKinsey (private communication) estimates a 25%+ improvement in infrastructure investment efficacy is possible if sector innovation is lifted.

Game-changers that will significantly improve infrastructure performance and help close the costs-funding gap include:

1. Apply best global practices and technologies (adapted for the NZ context) that improve infrastructure efficacy and resilience, and social licence
2. Data analytics, simulation and AI-enabled digital twins of infrastructure, to assess/optimize infrastructure system performance and improve infrastructure decision-making
3. Next generation transport solutions using demand management, autonomous vehicles and mobility services (substitute vehicle ownership)
4. Geospatial approach to planning the services needed by communities and individuals
5. Detailed medium-long term planning to support the transition to low carbon energy supply

Looking at its track record, it is clear that the infrastructure sector cannot, by itself, lift innovation to the level needed to address New Zealand's infrastructure challenges. It will need the support of all the Institute's functions to successfully implement these, and other, game-changing innovations.

Challenges the Institute will address

The work programmes and scope of the Institute will respond to Government, community and industry needs, and Te Tiriti ō Waitangi principles and obligations. We believe the Institute needs to address the following challenges to improve infrastructure service outcomes:

1. Co-create solutions, with Government, industry, Māori and end users, for headline issues in our cities – burst pipes, traffic congestion, polluted beaches, business disruption ...
2. Maximise benefits from maintenance/renewal investments for existing infrastructure
3. Provide information on current and future (projected) performance of infrastructure
4. Embed wellbeing economics into infrastructure decisions
5. Engage effectively with communities and especially iwi regarding infrastructure decision-making, reducing infrastructure approval times and strengthening social licence
6. Develop effective infrastructure strategies to address the impacts of climate change and the transition to a net-zero carbon economy
7. Improve the resilience of vulnerable infrastructure systems
8. Lift workforce capacity and capability
9. Utilise data and digital technology to improve sector efficiency and productivity, and infrastructure performance

These challenges are strongly aligned with the strategic priorities emerging from the Infrastructure Commission’s work.

By utilising local and international expertise, the Institute will have the following core capabilities to address these challenges:

1. Data analytics and digital technology
2. Global connections, technology transfer and innovation support
3. Training and upskilling
4. Authoritative voice and communications
5. Collaborative socio-economic, technical and systems research

These capabilities are needed to address the infrastructure challenges identified above, as shown in the following table.

Table 1. Core capabilities of the Institute needed to address infrastructure challenges

Infrastructure challenge	Capabilities needed to address challenge				
	Data and digital	Innovation support	Training and upskilling	Authoritative voice	Collaborative research
1. City solutions	✓	✓	✓	✓	✓
2. Maintenance and renewals	✓	✓	✓	✓	✓
3. Performance information	✓			✓	✓
4. Wellbeing economics	✓		✓	✓	✓
5. Effective engagement	✓	✓	✓	✓	✓
6. Climate change	✓	✓	✓	✓	✓
7. Resilient infrastructure	✓	✓	✓	✓	✓
8. Workforce capability	✓		✓	✓	✓
9. Data and digital technology	✓	✓	✓	✓	✓

Institute structure and how it will make a difference

The proposed Institute is a crown entity, with locations near clusters of expertise at the Universities of Auckland and Canterbury, and in Wellington. It will be structured for strong collaboration with the Infrastructure Commission, other Government entities, industry, Māori, external subject matter experts and end-users – a critical success factor for the Institute.

The Institute will deliver projects using a ‘best teams’ approach by bringing together experts from Government, industry and other organisations. As indicated in Figure 2, it will be a lean organisation with a small team of subject-matter experts supported by engagement, administration and management capability. How the Institute will make a difference is summarised in Figure 3.

To create a step-change in infrastructure performance, the annual turnover of the Institute is expected to be \$30M+. Government funding of \$20M p.a. is proposed, reflecting the fact that Government is the largest owner of New Zealand’s infrastructure assets.

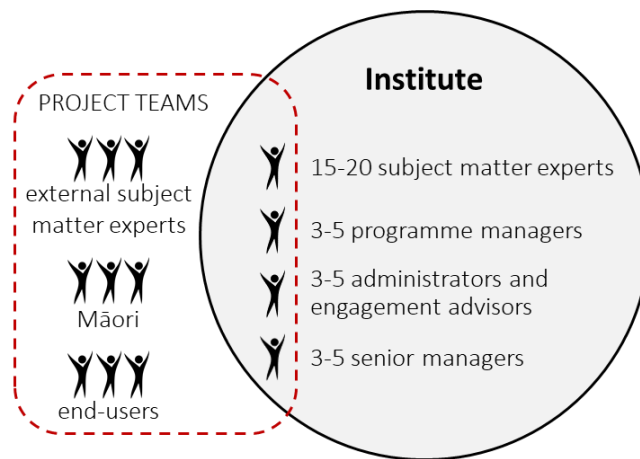


Figure 2. Structure of the proposed New Zealand Infrastructure and Communities Institute



Figure 3. How the New Zealand Infrastructure and Communities Institute will make a difference

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