Submission by

AI Forum New Zealand
Te Kāhui Atamai Iahiko o Aotearoa

Architecture, Engineering and Construction (AEC) Working Group

to the

New Zealand Infrastructure Commission – Te Waihanga

on

Consultation on the Draft National Infrastructure Plan

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Background

The AI Forum of New Zealand is a not-for-profit organisation that brings together industry, academia, and government to advance the responsible and inclusive adoption of artificial intelligence (AI) across Aotearoa. The Architecture, Engineering and Construction (AEC) Working Group comprises professionals from across the infrastructure ecosystem, committed to leveraging digital innovation to improve the governance, planning, delivery, and performance of New Zealand's built environment.

We welcome the opportunity to provide feedback on the Draft National Infrastructure Plan developed by the New Zealand Infrastructure Commission – Te Waihanga. We commend the Commission's ambition to establish a long-term, coordinated, and sustainable approach to infrastructure investment. The Plan is a significant step forward in addressing the systemic challenges facing New Zealand's infrastructure sector.

Executive Summary of Recommendations

New Zealand's infrastructure sector is entering a pivotal period of transformation. The Draft National Infrastructure Plan, developed by the New Zealand Infrastructure Commission – Te Waihanga, sets out a 30-year vision to address the country's infrastructure challenges and opportunities. It rightly emphasises affordability, resilience, and coordination across sectors, and proposes a framework for sustainable investment and delivery.

As members of the AI Forum of New Zealand's Architecture, Engineering and Construction (AEC) Working Group, we support the Plan's ambition and direction. However, we believe its impact can be significantly strengthened by embedding digital transformation, improving governance and delivery assurance, and ensuring inclusive and future-ready infrastructure outcomes. The table below outlines our key recommendations, aligned with the Plan's chapter structure or identified as critical gaps.

Chapter / Gap	Theme	Recommendation
Gap	Digital Enablement	Introduce a dedicated digital infrastructure strategy, mandate ISO 19650, establish a national infrastructure data platform, and promote AI adoption in planning and asset management.
3.4	Digital Workforce Capability	Embed digital and AI literacy in infrastructure roles, fund targeted training in digital delivery and analytics, and expand leadership frameworks to include digital competencies.
4.4	Digital Tools for Spatial Planning	Integrate digital spatial planning tools, develop a shared geospatial infrastructure platform, and use digital engagement tools to support inclusive planning.
Gap	Te Ao Māori and Digital Co-Design	Use digital platforms and AI to support Māori participation, visualise infrastructure inequities, embed Te Ao Māori values in digital frameworks, and uphold Māori data sovereignty.
Gap	Public/private sector collaboration (Gap)	Clarify long-term investment priorities and formalise public sector needs to enable private sector innovation and capability investment.
Gap	Climate-Resilient and Climate-Adapted Infrastructure	Leverage AI for predictive risk modelling, real-time monitoring, climate-adaptive planning, and community-inclusive resilience to strengthen infrastructure resilience and support net-zero goals.
Gap	AI Capability Growth Across the Infrastructure Sector	Build AI capability across infrastructure agencies and businesses through tailored workshops, AI-enabled tools, use case portfolios, cross-sector pilots, and governance advisory support.

Detailed Feedback

1. Digital and AI Enablement (Gap)

The Plan underplays the transformative role of digital infrastructure and AI in enabling smarter, more resilient, and cost-effective infrastructure. The Plan does not sufficiently address the role of digital infrastructure and artificial intelligence (AI) in transforming infrastructure planning, delivery, and operations. Digital tools such as Building Information Modelling (BIM), digital twins, and AI-driven asset management are increasingly standard in global infrastructure practice. Countries like the UK and Singapore have national BIM mandates and digital twin strategies that underpin infrastructure efficiency and resilience.

Proposed Improvements:

- Introduce a dedicated section on digital infrastructure strategy that sets out a clear roadmap for digital transformation across the infrastructure lifecycle.
- Mandate ISO 19650 for all central government-funded projects to ensure consistent, interoperable information management practices across the sector.
- Introduce a Federated National Digital Twin (FNDT) Programme: Rather than a single National Infrastructure Data Platform, New Zealand should pursue a federated “system of systems” approach. This model, based on open standards and decentralised data sharing, respects data sovereignty and accommodates varied digital maturity across sectors. It enables organisations to collaborate and scale nationally without the constraints of a unified platform.
- Promote AI adoption in predictive maintenance, planning, and optimisation to improve asset performance and reduce lifecycle costs.
- Shift from tool mandates to outcome-based specifications: Government agencies should define the outcomes they expect, such as asset information requirements (types, attributes, formats), and hold suppliers accountable for delivering them, rather than prescribing specific tools or processes.
- Strengthen public–private collaboration by providing clarity on long-term investment priorities and formalising mechanisms for defining public sector needs. This will give private organisations confidence to invest in capability and innovation.

2. Chapter 3.4 – Infrastructure Workforce Must Grow

The Plan identifies workforce shortages but does not fully address digital capability gaps or the need for AI literacy across the infrastructure sector. The infrastructure workforce is underrepresented in digital skills, and there is no national framework for digital or AI capability development in infrastructure roles.

Additionally, the Plan assumes that workforce capacity must grow through increased full-time equivalents (FTEs), without fully recognising the role of technology in driving productivity gains. Aligning digital competency expectations across both public and private sectors is essential to ensure consistent capability development. It is also important to clarify that government-funded training should focus on public sector employees, while enabling private organisations to invest in their own capability uplift.

Proposed Improvements:

- Embed digital and AI literacy as core competencies in infrastructure roles.
- Fund targeted training programmes in digital delivery, data analytics, and AI for infrastructure professionals, with a focus on public sector employees.
- Expand use of the Project Director Capability Framework to include digital leadership competencies.
- Align digital competency expectations across public and private sector infrastructure roles.

- Recognise the role of technology in improving productivity and efficiency, reducing reliance on FTE growth to meet infrastructure demands.

3. Chapter 4.4 – Provide Cost-Effective Coordination Tools

While spatial planning is acknowledged in the Draft National Infrastructure Plan, the document does not fully explore how digital tools can enhance coordination between infrastructure and land-use planning. Digital twins and geospatial platforms can support scenario modelling, risk analysis, and integrated planning across agencies and sectors, ultimately driving more efficient, resilient, and collaborative infrastructure outcomes.

Digital twins, in particular, represent a transformative opportunity. These virtual replicas of physical infrastructure assets, powered by AI analytics and predictive modelling techniques, enable advanced capabilities such as:

- Predictive maintenance – anticipating and preventing asset failures
- Optimisation – streamlining resource allocation and operations
- Forecasting – projecting future demands and impacts
- Scenario planning – testing “what-if” strategies under varying conditions like climate change or population growth
- Data-driven insights – supporting informed decision-making to minimise costs and maximise long-term value

To amplify these benefits, New Zealand should pursue a Federated National Digital Twin (FNDT) Ecosystem. This interconnected framework would allow individual digital twin systems—across sectors like transport, water, energy, and urban development—to leverage their value in a synergistic way. For example, linking a city's transport digital twin with its water infrastructure model could reveal holistic insights into urban resilience, enabling cross-sector optimisations that isolated systems couldn't achieve alone. Such an ecosystem would foster collaboration, reduce silos, and scale innovations nationwide.

The public sector plays a crucial role in enabling this transformation by:

- Fostering an environment of data and model trust
- Prioritising secure and transparent data sharing protocols
- Championing interoperability through open-source standards to ensure seamless integration without proprietary barriers
- Supporting rapid prototyping of digital twin applications to accelerate adoption and learn from real-world pilots

Proposed Improvements:

- Integrate digital spatial planning tools into the national planning framework, with a strong emphasis on digital twins to enable real-time simulation and AI-driven analysis for infrastructure coordination
- Support the development of a shared geospatial infrastructure platform, expanded to form the backbone of a Federated National Digital Twin Ecosystem that promotes synergy across sectors and regions
- Encourage use of digital engagement tools to support community and iwi participation in spatial planning, incorporating AI-powered digital twins for interactive scenario visualisation aligned with data sovereignty to enhance inclusive decision-making.

4. Te Ao Māori and Digital Co-Design (Gap)

While the Draft Plan acknowledges Māori-Crown relationships and the importance of partnership, it lacks detail on how these relationships will be operationalised in infrastructure planning and delivery. In particular, there is limited discussion on how digital technologies and AI can support Māori aspirations, enable co-design, and improve equity in infrastructure outcomes.

Māori communities face unique infrastructure needs, such as marae located in hazard-prone areas, and often experience barriers to participating in infrastructure decision-making. Digital tools can help overcome these barriers by enabling more inclusive, transparent, and culturally responsive engagement.

Proposed Improvements:

- Support the co-development of digital engagement platforms that enable iwi and hapū to participate meaningfully in infrastructure planning, including spatial planning and project prioritisation.
- Use AI and data analytics to identify and visualise infrastructure inequities affecting Māori communities, such as service gaps, climate vulnerability, or access to public transport.
- Incorporate Te Ao Māori values into digital infrastructure frameworks, including data sovereignty, kaitiakitanga (guardianship), and whakapapa (interconnectedness).
- Fund capacity-building initiatives that enable Māori entities to develop and lead digital infrastructure projects, including digital twins of whenua, marae, and rohe.
- Ensure that Māori data is governed in accordance with Māori Data Sovereignty principles (e.g., through partnerships with Te Mana Raraunga).

5. Public/Private Sector Collaboration (Gap)

The Draft National Infrastructure Plan provides limited commentary on how the public and private sectors should collaborate to achieve shared infrastructure outcomes. This gap risks undermining the ability of private organisations to invest confidently in capability and innovation. Strengthening Public–Private Sector collaboration remains a fundamental aspect to enable investment in digital tools and technology.

Proposed Improvements:

- Provide more clarity around long-term investment priorities and commit to delivering a consistent volume of work. This will give private sector organisations confidence to invest in digital tools and technology.
- Formalise an approach to defining public sector needs and requirements. This will help private sector organisations respond effectively and create value through improved quality, cost, and speed of delivery.

7. Climate-Resilient and Climate-Adapted Infrastructure (Gap)

New Zealand is increasingly impacted by severe climate events, with “once-in-a-century” disasters now occurring every few years. Given infrastructure lifespans of 40+ years, the Draft Plan must more explicitly address how AI and digital technologies can support climate resilience and adaptation.

Proposed Improvements:

- Predictive risk modelling: Use AI to simulate climate impacts such as flooding, sea-level rise, storm frequency, and coastal erosion, enabling prioritisation of infrastructure investments based on risk exposure and cost-benefit trade-offs.
- Real-time monitoring and early-warning systems: Partner with Earth Science institutes (e.g., GNS, NIWA, MetService) to deploy sensor networks and AI-powered hazard detection systems (e.g., flood and landslide alerts).
- AI-driven asset management: Integrate sensors and AI to optimise maintenance schedules, extend asset life, and identify resilience upgrades at lower cost.
- Climate-adaptive planning: Use AI to stress-test infrastructure under multiple climate scenarios, supporting flexible, long-term investment strategies.
- Decarbonisation support: Apply AI to improve energy efficiency, optimise renewable integration, and support infrastructure upgrades aligned with net-zero goals.

- Community-inclusive resilience: Develop AI-assisted platforms for Māori and local communities to track, plan, and protect taonga, aligning with Te Ao Māori kaitiakitanga principles in infrastructure design.

8. AI Capability Growth Across the Infrastructure Sector (Gap)

The Draft Plan does not explicitly address the need to build AI capability across infrastructure agencies, businesses, and sector organisations. As AI converges with other transformative technologies, targeted capability development is essential to unlock its full potential.

Proposed Improvements:

- Deliver tailored AI capability development workshops for infrastructure agency staff to support learning, adoption, and innovation.
- Support the development and deployment of AI-enabled asset management and resilience tools, including predictive maintenance and hazard modelling.
- Create an AI Use Case Portfolio for the infrastructure sector to map high-impact applications and share best practices.
- Launch cross-sector collaboration and innovation pilots, including partnerships with iwi/Māori organisations and adjacent sectors (e.g., forestry, engineered timber).
- Provide advisory support for policy and governance, including integration of ethical AI frameworks and resilience-focused AI strategies into the Plan's implementation pathways.

Conclusion

The Draft National Infrastructure Plan is a strong foundation. To realise its full potential, it must embrace digital transformation, strengthen delivery capability, and embed inclusive governance. The AEC Working Group urges Te Waihanga to incorporate these recommendations into the final Plan and looks forward to continued collaboration.

Thank you for the opportunity to provide feedback on the consultation document. We are happy to engage further to discuss our submission and provide any further assistance.
If you have any further queries, please do not hesitate to contact us.

Yours sincerely,

Madeline Newman
Executive Director
AI Forum New Zealand
E| madeline.newman@aiforum.org.nz **P|** +64 21 274 9778

Maria Mingallon
Chair of the Architecture, Engineering and Construction Working Group
AI Forum New Zealand
E| maria.mingallon@mottmac.com **P|** +64 27 770 5679